

Summary of “RE-Powering” State Programs for the Reuse of Virginia Landfills & Brownfields for Solar

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1. Summary of Request for Technical Assistance

The U.S. Environmental Protection Agency's (EPA's) RE-Powering America's Land Initiative¹ produced this paper as part of a technical assistance request for the Virginia Department of Environmental Quality (DEQ). EPA's ongoing research on "RE-Powering" state programs will inform Virginia DEQ about best practices in other states.

This paper highlights specific "RE-Powering" programs from other states that are relevant to Virginia², and summarizes best practices for program development and implementation. This topic -- reuse of previously contaminated lands for solar -- is particularly timely in Virginia as the solar footprint in the state continues to expand and state policymakers, municipalities, and other stakeholders are increasingly active in efforts to preserve open agricultural and forested space, leverage existing electricity infrastructure, revitalize communities with landfills, mines, brownfields, and other formerly contaminated lands and otherwise inform where new solar projects are located. Recent state legislation³ and results from the recently published *Virginia Solar Survey*⁴ point to the importance of this topic to the solar industry in Virginia.

The paper concentrates on small to mid-sized landfills and brownfields (those with up to approximately 30 acres of solar-suitable space) as requested by DEQ. Small to mid-sized landfills and brownfields are: (1) prevalent in Virginia, (2) the most-common size for solar projects on reused sites nationally⁵, and (3) unlikely to be large enough to be reused under the Virginia Clean Economy Act's provision for at least 200 megawatts (MW) of new solar or wind capacity on "previously developed project sites."⁶

Many of these candidate sites for reuse in Virginia are former mines or mine-scarred lands, with hundreds of such sites in the state of approximately 5 acres or more. In general, a large number of state programs for renewable energy reuse apply to former mines. Virginia Energy is also focused on opportunities for mine reuse through the Abandoned Mine Land Economic Revitalization Program (AMLER) and other efforts.⁷

¹ EPA's RE-Powering America's Land Initiative (hereafter "RE-Powering") has a mission to encourage renewable energy development on landfills, mine sites, and current and formerly contaminated lands and analyzes state programs supporting as part of that mission.

² In this paper, "programs" collectively refers to organized policies, programs, and other activities performed by states to advance renewable energy development on landfills, mines, and current and formerly contaminated lands like brownfields.

³ In addition to the Virginia Clean Economy Act (2020 Session) referenced below, creation of the Brownfield and Coal Mine Renewable Energy Grant Fund and Program in Virginia House Bill 1925 (2021 Session) and the House Bill 206 (2022 Session) requirements for additional environmental analysis of future solar projects on certain agricultural and forested sites demonstrate this land use interest.

⁴ See Virginia Department of Energy and the Virginia Solar Initiative at the Weldon Cooper Center for Public Service at the University of Virginia, *Virginia Solar Survey: Results and Initial Findings*, April 2022, https://energy.virginia.gov/renewable-energy/documents/VASolarSurvey_ReportofResults_FINAL.pdf [accessed June 2022].

⁵ Of all RE-Powering projects built in the U.S., 83% are five megawatts or less in capacity, which for solar projects is roughly equivalent 30 acres or less in land space. Only 3% of projects on these types of sites are larger than 20 megawatts. See EPA, *RE-Powering America's Land Initiative: Project Tracking Matrix*, 2021, p. 6, https://www.epa.gov/system/files/documents/2021-11/re_on_cl_tracking_matrix_110321_508.pdf [accessed June 2022].

⁶ See Virginia House Bill 1526, 2020 Regular Session, <https://legiscan.com/VA/text/HB1526/id/2183469> [accessed June 2022].

⁷ For more information on Virginia's participation in AMLER, see <https://www.energy.virginia.gov/coal/mined-land-repurposing/abandoned-mine-land.shtml> [accessed June 2022].



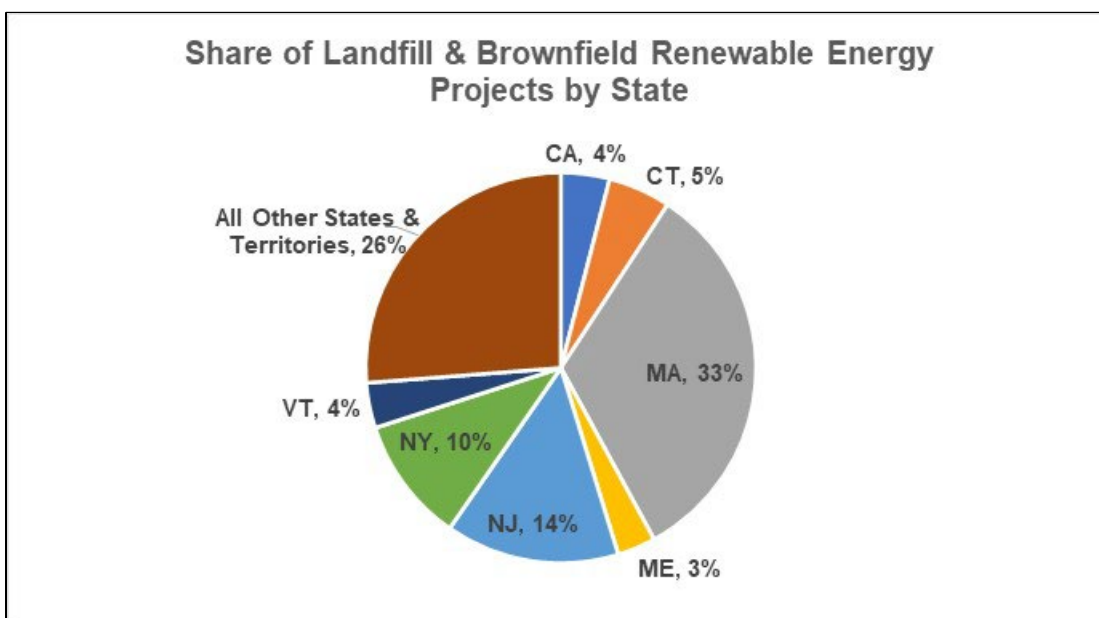
2. Role of State “RE-Powering” Programs

RE-Powering America’s Land Initiative tracks the number of solar projects developed on contaminated lands and has consistently found that state programs make a significant contribution to successful project development. That is because state programs focused on the intersection of renewable energy development and reuse of previously contaminated lands can increase the speed and lower the cost, risk, and complexity of project development.

The most successful state programs do not tend to be standalone efforts, but instead build on existing, broader renewable energy and land reuse policies in the state. Several states, such as Massachusetts, New Jersey, and New York, have market shares of solar projects on previously contaminated lands that are several times higher than the national average, due in large part to longstanding RE-Powering programs that complement broader state policies. For that reason, EPA emphasizes the linkage between RE-Powering programs in other states and specific renewable energy activity in Virginia in this paper.

A. Where Landfill & Brownfield Renewable Energy Projects are Most Prevalent

Of the 347 completed landfill and brownfield renewable energy projects identified nationally by EPA RE-Powering, 74% are in seven states identified in the chart below, all but one of which have state financial incentive programs specifically directed at these types of sites.⁸



⁸ See EPA, *RE-Powering Tracking Matrix*, 2021, <https://www.epa.gov/re-powering/re-powering-tracking-matrix> [accessed June 2022]. For this chart, projects with the following “Type of Site” were selected: landfill, landfill buffer, brownfields, and state brownfields.



B. State Program Types

Based on its research, EPA has grouped state programs into eight categories per the table below.

Program Category	Types of Programs in Category
Direct Financial Incentives	Production-based or capacity-based increased incentives; offtake agreements; grants
Procurement Preferences or Requirements	Brownfield, landfill, or mine siting as important rating factor in state or utility electricity procurements; mandated minimum procurement percentages from potentially contaminated sites
Streamlined Permitting & Environmental Reviews	Expedited processes; central coordination; favorable ordinances
Liability Relief	Laws, regulations, or enforcement discretion to reduce renewable energy landowner, developer, and/or operator liability
Site Identification & Development Support	Databases; mapping tools; direct technical assistance from state staff or state contractors; hands-on project development by state
Education & Outreach	Guides; templates; toolkits; training presentations; dedicated webpages
General Brownfield Reuse	Loans; grants; technical assistance (not specific to, but also applicable to, renewable energy reuse)
Inter-agency Coordination	Inter-agency, renewable-specific meetings and processes to remove development barriers; working groups

States select categories and individual types of programs to pursue based on state goals as well as existing policies, resources, and market factors in their jurisdictions. Tips for program development are included at the end of this paper.

C. Importance of Community Engagement to State Program Success

For any state program addressing site reuse for renewable energy, EPA's research has found that it is important to coordinate early and consistently among internal and external stakeholders. These stakeholders may include renewable energy developers, environmental justice communities, utilities, land use and environmental groups, and others. The *Virginia Solar Survey* indicates local interest in this topic: "currently, seven localities responded that their comprehensive plan has land use strategies that recommend solar on previously disturbed lands. These responses indicate there are significant opportunities to provide resources to localities to assist them in prioritizing solar on previously disturbed lands."⁹

⁹ See *Virginia Solar Survey: Results and Initial Findings*, April 2022, p. 24.



3. Profiles of Specific Programs Potentially Relevant to Virginia

Below, six programs from other states across four program categories are profiled. These programs were selected because they may be particularly relevant for Virginia. EPA RE-Powering will be publishing brief profiles of several dozen additional state programs on its website later this Spring.

A. Upfront Financial Incentives

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

In New York, the **NY-Sun Program offers the MW Block incentive** to approved solar contractors and developers for projects up to 7.5 MW_{Direct Current (DC)} in capacity. In addition to the base incentives in that program, brownfield and landfill projects in much of the state are eligible for an additional incentive -- the **brownfield/landfill adder**. That adder is \$0.15/watt_{DC} (equal to \$150/kilowatt [kW]_{DC}).^{10,11}

Rhode Island offers the Brownfields Solar PV Program. It provides grants for solar projects on brownfields that use net metering or virtual net metering arrangements, and remediation costs are not eligible fund uses.¹² The incentive levels are higher than the New York program on a per-unit basis at \$1.00/watt_{DC} (equal to \$1,000/kW_{DC}) to a maximum of \$250,000 per project for direct-owned projects, and \$0.80/watt_{DC} (equal to \$800/kW_{DC}) to a maximum of \$175,000 per project if third-party owned.^{13,14}

B. Procurement Preferences

Nationally, community solar projects tend to be well-matched for landfill and brownfield sites due to their typical sizes and the proximity of residential and business consumers, who can be program

¹⁰ For more information on the program, click on "Available Incentives" at: <https://www.nyserda.ny.gov/All-Programs/NY-Sun/Contractors/Doing-Solar-Business> [accessed June 2022].

¹¹ This New York incentive level is generally similar to the Virginia law creating the Brownfield and Coal Mine Renewable Energy Grant Fund and Program, for which "grants shall be awarded in an amount of ... \$100 per kilowatt of nameplate capacity from renewable energy sources that are located on brownfields." See Code of Virginia, § 45.2-1725, <https://law.lis.virginia.gov/vacode/title45.2/chapter17/section45.2-1725/> [accessed June 2022].

¹² See Rhode Island Commerce Corporation, *Brownfields Solar PV Program: Request for Projects*, p. 2, <https://commerceri.com/wp-content/uploads/2021/05/Brownfield-RFP-FINAL-4.28.20.pdf> [accessed June 2022].

¹³ Ibid, p. 3.

¹⁴ In 2021, Rhode Island's "Brownfields Solar PV program approved three solar projects (with combined capacity of) 3,545 kW, (with) awards (totaling) \$733,280." See Rhode Island Commerce Corporation, *RI Renewable Energy Development Fund: Annual Financial and Performance Report For the calendar year ending 12/31/2021, 2022*, p. 10, https://commerceri.com/wp-content/uploads/2022/04/REF_Financial-and-Performance-Report-CY21-FINAL.pdf [accessed June 2022].

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subscribers, to these sites.^{15,16} There is growing interest in Virginia in community solar¹⁷, which could make New Jersey's program that offers procurement preferences for brownfields, landfills, and other sites that preserve greenspace potentially relevant. As the recent *Virginia Solar Survey* states, "many potential projects on brownfields and landfills would be in this (community-scale solar) size range."¹⁸

New Jersey's Community Solar Energy Pilot Program allows residential and business electricity customers to subscribe to output from specific solar projects. Its **evaluation criteria include strong preferences for brownfields, landfills, areas of historic fill, rooftops, and parking canopies**. Among Year 1 awards in the New Jersey program, nine projects (with 33 MW_{DC} of combined capacity) were on landfills, and one project with 2 MW_{DC} was on a brownfield. Among Year 2 awards, nine projects (with 36 MW_{DC} of combined capacity) were on landfills, and one project with 5 MW_{DC} was on a brownfield.¹⁹

C. Streamlined Permitting

The speed of environmental review and permitting processes is a major factor affecting the desirability of solar development in a state. Virginia already has one DEQ program, Renewable Energy Permits by Rule (PBR), that can accelerate permitting of projects in general as it "enables the construction and operation of renewable energy projects of 150 megawatts and less. DEQ's regulations take the form of ... PBR establish(ing) pollution limits for industrial processes or categories. Facilities can obtain authorization from DEQ by agreeing to comply with all the construction and operating requirements of the specific PBR."²⁰ New York State has two programs that specifically streamline permitting of renewable energy projects on sites it classifies as "repurposed" including landfills and brownfields.

Landfill and brownfield solar projects of 25 acres or fewer can qualify as Type II actions, not requiring further evaluation under **New York's State Environmental Quality Review Act**

¹⁵ For example, "the Oxon Run community solar installation is the largest clean energy project in the District (of Columbia) focused on serving neighborhood residents. (It is a) 2.65 MW solar installation (that) covers approximately 3.6 acres of an underutilized brownfields site." There is also local subcontractor participation in the project, and about 750 low- and moderate-income households in the area get electricity bill savings from the project. See EPA, *RE-Powering America's Land Initiative: Benefits Matrix*, 2022, p. 6, https://www.epa.gov/system/files/documents/2022-04/benefits_matrix_508_040122.pdf [accessed June 2022]. Benefits from several other community solar projects on landfills and brownfields are summarized in that publication.

¹⁶ For more details on the linkages between site reuse and community solar, see EPA, *Community Solar: An Opportunity to Enhance Sustainable Development on Landfills and Other Contaminated Sites*, 2016, https://www.epa.gov/sites/default/files/2016-12/documents/epa_repowering_community_solar_discussion_paper_final_120716_508.pdf [accessed June 2022].

¹⁷ For example, Harrisonburg Electric Commission (HEC) is offering a community solar subscription option starting this year. See HEC, *Friendly City Solar Program*, <https://www.harrisonburgelectric.com/friendly-city-solar-program/> [accessed June 2022].

¹⁸ See *Virginia Solar Survey: Results and Initial Findings*, April 2022, p. 10.

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

²⁰ "Through the PBR, DEQ coordinates reviews from the Department of Historic Resources, the Department of Wildlife Resources and the Department of Conservation and Recreation to ensure potential significant impacts to cultural or threatened and endangered species are avoided or mitigated. Some of the requirements for the PBR include conducting surveys for cultural and biological resources, developing mitigation plans if necessary, receiving local government approval and conducting interconnection studies and obtaining interconnection agreements." See DEQ, *Renewable Energy*, <https://www.deq.virginia.gov/permits-regulations/permits/renewable-energy> [accessed June 2022].



(SEQRA). SEQRA is also known as “mini-NEPA” due to its similarities to the National Environmental Policy Act (NEPA).²¹

Landfills, brownfields, and other repurposed commercial or industrial sites receive expedited review from the **New York Office of Renewable Energy Siting** that was established to provide faster, more predictable permit reviews. **Complete permit applications for landfills, brownfields, and other repurposed sites are acted on within six months**, while permit applications for other (not repurposed) sites receive final decisions within 12 months.²²

New Jersey also has several agency coordination mechanisms to carefully track and advance renewable projects on landfills and brownfields. It has a central permit coordination process inside its New Jersey Department of Environmental Protection (NJDEP) as well as interagency processes to review program applications between NJDEP and NJBPU as well as between NJDEP and the New Jersey Economic Development Authority.²³

D. Liability Relief

One barrier to reuse of contaminated sites is concern about solar developer, owner, and operator liability for prior contamination. Virginia provides liability defense for bona fide prospective purchasers and other entities if they meet the requirements of the pertinent statute.²⁴ A bona fide purchaser in Virginia “shall not be held liable for a containment or cleanup that may be required at a brownfield site” if the person did not cause, contribute, or consent to the release or threatened release; is not liable through familial or contractual relationship; completes reasonable steps to stop and prevent further release/exposure; and does not impede response action.²⁵ Massachusetts has liability relief provisions that are similar to those in Virginia, but that are more specific in several ways. Massachusetts also provides a guidance document entitled *Addressing Renewable Energy Development at Contaminated Properties in Massachusetts – Managing Chapter 21E Liability* from which the Massachusetts-specific material in the paragraph below was obtained.²⁶

Under the Massachusetts Oil and Hazardous Material Release Prevention and Response Act, multiple statutory liability protections are available for qualifying persons with contamination at a property. Most often, protections for “eligible tenants” and “eligible persons” are utilized. If these two protections do not apply, there may be an opportunity to qualify for liability relief under a “Brownfields Covenant Not to Sue Agreement.” In addition, “liability relief (can be) offered to applicants as an incentive towards, and in return for, cleanup and redevelopment at the site.”

²¹ For more information, see New York State Energy Research and Development Authority (NYSERDA), *New York State Solar Guidebook*, 2022, p. 122, <https://www.nyserda.ny.gov/All-Programs/Clean-Energy-Siting/Solar-Guidebook> [accessed June 2022].

²² All new renewable energy projects above 25 MW in capacity must go through the Office of Renewable Energy Siting permitting process, and new projects between 20 MW and 25 MW and certain existing projects can opt into this office's permitting process. See NYSERDA, *Office of Renewable Energy Siting*, <https://www.nyserda.ny.gov/All-Programs/Clean-Energy-Siting/Siting-for-Large-Scale-Renewables/Office-of-Renewable-Energy-Siting> [accessed June 2022].

²³ For examples of this intra-agency and interagency coordination in New Jersey, see NJDEP, *Office of Permitting and Project Navigation*, <https://www.nj.gov/dep/pcer/> [accessed June 2022] and NJDEP, *Hazardous Discharge Site Remediation Fund*, <https://www.nj.gov/dep/srp/finance/hdsrf/> [accessed June 2022].

²⁴ Code of Virginia, § 10.1-1234. Limitations on liability, <https://law.lis.virginia.gov/vacode/title10.1/chapter12.1/section10.1-1234/> [accessed June 2022].

²⁵ Ibid.

²⁶ The document is available at: <https://www.mass.gov/doc/addressing-renewable-energy-development-at-contaminated-properties-in-massachusetts-managing/download> [accessed June 2022].



Massachusetts names additional liability relief opportunities for specific contamination scenarios. Unlike the Massachusetts statute, in Virginia there is no mention of incentives and there is one liability relief provision to encompass all bona fide purchasers with four conditions.²⁷

4. Tips for Program Development and Implementation

For all types of state programs, there are best practices that can streamline development, improve implementation outcomes, and help establish realistic timeline expectations.²⁸

Expanding on existing programs, rather than creating wholly new programs, has been a successful strategy to **streamline program development** in several states. Many high-impact programs focused on landfills and brownfields link to existing renewable incentive programs in states such as Illinois, Massachusetts, New Jersey, and New York.

Implementation outcomes are enhanced by leveraging common types of sites in states, thus providing more potential locations for reuse. For example, Massachusetts has numerous municipally-owned landfills with 5 to 30 acres of solar-suitable space which were ideal sizes for the combination of virtual net metering and solar renewable energy certificate policies in that state.

In addition to technical factors like those described above, state agency officials tell EPA that organizational factors are equally important to program outcomes. Consistent champions or sponsors, who understand renewable energy development and previously contaminated lands, are very important to program launch. It is also critical to match program designs and goals to agency staffing levels and expertise. The scale and background of energy, environmental, and economic development staff vary widely from state-to-state, and some otherwise promising program ideas are not transferable due to staffing differences between jurisdictions.

In **setting timeline expectations**, it is important to recognize that states with significant amounts of solar on landfills and brownfields have combined several program types and have implemented them over long periods. It can take three or more years from a program's initiation to see results in installed projects, due to the length of the renewable energy project development cycle. The timeline can be even longer when large-scale (~20 MW+ in capacity) projects are emphasized. Programs that require enabling legislation may take multiple years to even get to the program initiation stage. To accelerate and inform the development process, states can design new programs with early pilot-type phases²⁹, with subsequent full programs drawing from pilot lessons learned.

²⁷ Code of Virginia, § 10.1-1234. Limitations on liability.

²⁸ For an overview of best practices and highlights from selected states on program design, see EPA, *Unlocking Brightfields Potential: State Programs to Encourage Renewable Energy Siting on Contaminated Lands*, 2022, https://clu-in.org/conf/tio/renewableenergyland/slides/1Slide_Presentation_for_Lora_Strine,_U.S._EPA;_Gina_Bellato,_MDOER;_Emily_Chessin,_NYSERDA;_Steve_Myers,_NJDEP.pdf [accessed June 2022].

²⁹ An example of a program like this is Minnesota's Closed Landfill Solar Redevelopment and Reuse Account. See State of Minnesota, H.F. No. 6 (2021 Special Session), http://wdoc.house.leg.state.mn.us/leg/LS92/1_2021/HF0006.1.pdf [accessed June 2022].