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Profiles of State Programs

FOR RENEWABLE ENERGY DEVELOPMENT ON
LANDFILLS, MINES, AND FORMERLY CONTAMINATED SITES



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Profiles of State Programs for Renewable Energy Development on Landfills, Mines, and Contaminated Sites for the U.S. Environmental Protection Agency (EPA) RE-Powering America’s Land Initiative (RE-Powering)

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Overview of Report

Background and Purpose

Renewable energy projects on landfills, mines, and current and formerly contaminated sites (hereinafter “RE-Powering sites”) have been successfully developed in 47 states and territories. These projects are engineered, constructed, and operated so that the renewable technologies do not interfere with existing or future corrective actions and therefore do not increase threats to human health or the environment from the sites. Most of the states with the highest levels of project development on RE-Powering sites have designed and implemented longstanding, state-specific programs targeted toward such sites (hereinafter “RE-Powering programs”). Additional states, such as Illinois, are implementing newer programs for renewables on these types of sites and seeing project development and deployment growth. Many other states, as well as local communities and utilities, are considering similar programs to expand landfill, mine, and contaminated site reuse and steer renewable development away from greenfield sites, forests, and agricultural lands, where feasible.

The state program summaries in this document are geared toward multiple audiences: state and local government energy, environmental, and economic development agency staff; legislators; renewable energy developers; land use, environmental, business, and labor officials; electric utility staff in states considering adopting or expanding RE-Powering programs; and EPA headquarters and regional staff. The summaries are meant to educate readers about key aspects of relevant programs, allowing audiences to more fully and quickly address initial questions from state, local, regional, and other officials on program features and whether, how, and why those features are associated with program success. Providing quick access to key program features through these summaries will help with replication and adaptation of best practices nationally, as well as ensure efficiency in research and communication.

RE-Powering piloted these program summaries in 2022 with information from the three states with the most RE-Powering sites hosting renewable energy projects—Massachusetts, New Jersey, and New York—and a fourth state, Illinois, which requires that a portion of its new utility-scale solar projects be on RE-Powering sites. This edition updates information from those four states and adds profiles for Colorado and Rhode Island, which each contain innovative state programs. The program summaries are informed by secondary source research and interviews with state agency staff, renewable energy developers, and other stakeholders in each state; however, they are not meant to be comprehensive. Similar summaries for other states may be added to the document in the future.

Overall Observations on State Program Design

One key observation from comparing the program designs implemented in Massachusetts, New Jersey, New York, Rhode Island, Colorado, and Illinois is how different they are as a result of being tailored to specific state market characteristics.

Another observation is that state programs can be grouped into eight categories:

1. Direct Financial Incentives
2. Procurement Preferences or Requirements
3. Streamlined Permitting & Environmental Reviews
4. Liability Relief
5. Site Identification & Development Support
6. Education & Outreach
7. General Brownfield¹ Reuse (not specific to, but also applicable to, renewable energy reuse)
8. Interagency Coordination

States with high levels of RE-Powering project deployment have all consistently implemented programs in several categories for many years. While their specific program designs vary widely, the following success factors appear to be universally applicable: (1) analyzing in-state markets to identify high-potential program components; (2) building on existing, broader renewable energy efforts in the state; (3) engaging with stakeholders to design the components; and (4) ensuring that they complement broader trends and energy policies in the state.

¹ EPA defines a “brownfield” as “a property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant.” See EPA, *Overview of EPA’s Brownfields Program*, 2023, <https://www.epa.gov/brownfields/overview-epas-brownfields-program>.

Highlighting Individual State Program Best Practices

Massachusetts, New Jersey, New York, and Rhode Island have achieved high levels of deployment for RE-Powering projects by implementing best practice programs tailored to their market characteristics. Illinois and Colorado have implemented innovative programs, for solar procurement and site mapping respectively, that are also among national best practices.

In **Massachusetts**, the overall solar photovoltaic (PV) market has grown rapidly since 2010, spurred by solar-specific financial incentives and a virtual net metering (VNM) program that offers flexibility in allocating solar output credits produced in locations with little onsite electricity consumption (e.g., a landfill) to locations where there is substantial onsite consumption (e.g., municipal buildings in the town owning the landfill). That market backdrop, together with rules that incentivize solar projects, has been conducive to the development of landfill-based solar projects. The potential for such projects was very large due to the number of municipally owned landfills in Massachusetts with between 5 and 30 acres suitable for ground-mounted solar projects. Dozens of such sites have been converted to renewable reuse over the past decade.

To help capture this potential, Massachusetts implemented (starting in 2011) a long-term collaboration called the Clean Energy Results Program between state departments managing environmental protection and energy resources. This and related programs offered a wide range of site identification and assessment, education, technical assistance, stakeholder engagement, streamlined permitting, and liability relief services focused particularly on solar and wind redevelopment of RE-Powering sites. Because Massachusetts has a strong tradition of home rule, programs tended to be implemented on a “bottom-up” basis that encouraged, rather than actively managed or required, local participation. As a critical accompaniment to these programs and a main driver of the state’s significant solar market growth, Massachusetts implemented the Solar Renewable Energy Certificate and Solar Massachusetts Renewable Target incentive programs. These incentive programs have included enhanced financial benefits for solar projects on landfills and brownfields for the past 11 years.

Regulatory and financial incentive programs implemented more than a decade ago have helped Massachusetts RE-Powering projects overcome early phase barriers to development and ride the wave of rapid overall solar development in the state. The outcome is that Massachusetts is the most frequent implementer of RE-Powering projects in the United States, with 131 total projects deployed, equal to 26% of all RE-Powering projects nationally.

New Jersey has the highest population density of any state and has been encouraging reuse of landfills, brownfields, and other types of underutilized sites for solar for more than a decade to preserve its limited greenspace. Its overall solar market has long been one of the 10 largest in the United States; RE-Powering sites have hosted 6% or more of all new solar capacity in the state every year since 2010; and New Jersey has the second highest installed capacity of RE-Powering projects of any state.

New Jersey has achieved this high share of RE-Powering sites through a combination of carefully managed procurement preferences for brownfields and landfills, direct incentive factors, and numerous other programs designed to reduce development costs, risks, and timelines for renewable reuse. In each iteration of the state's overall solar policy, it has included specific mechanisms for encouraging landfill and brownfield site reuse, including utility-scale and community solar procurement preferences in the Successor Solar Incentive Program established in 2021. The Office of Permitting and Project Navigation provides a one-stop shop to accelerate environmental permit coordination and review. The state has also been a leader in making data on RE-Powering sites available to potential developers, with a suite of free mapping tools that includes a community solar PV siting tool that integrates utility data on how much new solar can be accommodated at points on the grid with renewable energy potential and land use data layers.

In **New York**, a long tradition of providing streamlined permitting and environmental reviews for site redevelopment, clear capacity-based incentives for solar projects, and educational materials has contributed to steady growth, consistently placing the state near the top of the list nationally in RE-Powering sites. These efforts helped two RE-Powering wind projects become operational near Buffalo, totaling 35 megawatts (MW) of capacity, and three to six new RE-Powering solar projects to typically become operational throughout the state each year.

In 2020, significant new legislation (the Accelerated Renewable Energy Growth and Community Benefit Act [Benefit Act]) was enacted in New York. This legislation aims to greatly accelerate the deployment of 20+ MW renewable energy projects, with an emphasis on using underutilized lands (such as landfills and brownfields) where possible to meet the state's 70% by 2030 renewable energy goal. This legislation launched the Build-Ready Program, under which the state's energy agency will directly advance underutilized sites until the development projects on those sites can be auctioned to the private market. The Build-Ready Program seeks to identify, develop, and de-risk landfills, brownfields, mines, and other underutilized sites in collaboration with their host communities to overcome market barriers. This program began screening more than 500 sites in its first year. Through New York's Climate Leadership and Community Protection Act of 2019 (Climate Act), the Climate Action Council released a scoping plan in 2022 that acts as a framework for how New York will meet its climate goals and attain climate justice for disadvantaged communities, including through the reuse of landfills and brownfields.

Rhode Island has deployed the seventh most RE-Powering projects of any state, which is a reflection both of its (1) attention to minimizing forest loss as the state grows its renewable market to meet the earliest 100% renewable electricity requirement of any state, and (2) multi-year management of financial incentive and education programs tailored to solar siting. Rhode Island developed the Brownfields Solar PV Program within its Renewable Energy Fund to provide up to \$250,000 per project, and the program has awarded grants to more than 40 MW of projects over the past 4 fiscal years. The state recently enacted legislation to update its Renewable Energy Growth and Net Metering programs to provide preferences for various site types, including landfills, brownfields, and Superfund sites, and it also publishes an extensive list of municipal solar ordinances to inform local siting rules. In administering these programs, Rhode Island consistently collaborates across state agencies with specialized roles and expertise.

Colorado experienced a relatively active market for RE-Powering projects between 2010 and 2017, with nine projects installed during that time. While no new RE-Powering projects have been recorded by EPA as having been completed since then, the COLORADO BRIGHTFIELDS mapping application was created in 2021 to further reuse of brownfields, landfills, mine-scarred lands, and other marginalized sites as the overall renewable market grows toward significant statewide targets.

Illinois implemented a procurement requirement in the Future Energy Jobs Act of 2017 that at least 2% of new utility-scale solar PV output must come from brownfield or landfill sites.² This requirement and other parts of the legislation have led to significant new RE-Powering project capacity in development. In the Climate and Equitable Jobs Act passed in September 2021, the state increased that requirement to 3% and expanded the definition of “qualifying sites” to include closed coal mines. The Climate and Equitable Jobs Act calls for significant acceleration of clean energy statewide, and the legislation ensures that RE-Powering sites will be part of that growth. The legislation complements a formal interagency Climate Working Group organized by the Illinois Environmental Protection Agency and a brownfield loan program managed by that agency, which can be useful for renewable energy reuse.

² Although the requirement is written for brownfield solar, its definition also includes solid waste sites such as landfills. See State of Illinois, *Future Energy Jobs Act*, <https://www.ilga.gov/legislation/publicacts/99/PDF/099-0906.pdf>.

Individual State Program Profiles

Organization of the Profiles

The state program profiles are presented as short facts and observations in table format to make the information user-friendly and allow for efficient updating in the future. Each state summary comprises the following sections:

- Overview
- Program profiles
 - Grouped by the eight program categories identified above
- Program best practices/success factors
- Achievements to date (including deployment trends)
- General electricity market factors
- Points of contact for more information

The state summaries were prepared by ICF Incorporated, LLC (ICF), under contract to EPA, with assistance from EPA contractor General Dynamics Information Technology in the production of certain charts. Links to data sources are provided on the right side of the tables, where appropriate, and were current at the time of publication. Summary data attributed to the *RE-Powering Tracking Matrix* are from the October 2022 edition, unless otherwise noted. A list of acronyms and abbreviations can be found at the end of the document. The state profiles are presented in order of the number of RE-Powering projects installed, with Massachusetts listed first, followed by New Jersey, New York, Rhode Island, Colorado, and Illinois.

Topic	Massachusetts	
	Data	Sources
	Overview	
	<p>Massachusetts has more renewable energy projects on RE-Powering sites than any other state (per the <i>RE-Powering Tracking Matrix</i>). This fact is particularly remarkable given that Massachusetts’ aggregate retail electricity sales are only the 29th largest of the states (per the U.S. Energy Information Administration).³ About 97% of Massachusetts’ renewable project capacity on RE-Powering sites is for solar projects, with the remainder being on-shore wind projects. Massachusetts began several efforts encouraging solar projects on RE-Powering sites in 2011, and significant deployment of such projects began the following year. Massachusetts’ achievement is due to the following:</p> <ol style="list-style-type: none"> 1. More than a decade of landfill- and brownfield-specific programs (e.g., added financial incentives for landfills and brownfields, streamlined permitting, liability relief, education) with dedicated staff, strong collaboration between the state’s energy and environmental agencies, and consistent support from elected officials. 2. General features of Massachusetts’ solar market. <p>In the latter category, there are strong solar incentive programs, a VNM policy conducive to municipalities building solar projects at landfills and other sites, and relatively high retail electricity prices by national standards.</p> <p>Massachusetts’ success is largely attributable to this combination of factors, together with program rules and the prevalence of municipally owned landfills with 5 to 30 acres of land suitable for solar-led RE-Powering development that leads to projects concentrated between 1 MW and 6 MW of capacity (104 of Massachusetts’ 128 RE-Powering solar projects are in that size range). This has been the “sweet spot” size for RE-Powering projects in Massachusetts; in other states, the “sweet spot” size can differ.</p>	

³ Data on total retail electricity sales are from the U.S. Energy Information Administration, U.S. Department of Energy, *State Electricity Profiles*, release date: November 10, 2022, <https://www.eia.gov/electricity/state/>.

Topic	Massachusetts Data	Sources
Program Profiles		
Direct Financial Incentives	<p>There is a 4 cents/kilowatt-hour (kWh) adder for landfill solar projects and a 3 cents/kWh adder for brownfield solar projects in the current Solar Massachusetts Renewable Target (SMART) tariff program. There is also a subtractor for greenfield projects:</p> <ul style="list-style-type: none"> • The adders were established following a cost study of the incentives necessary to put landfill and brownfield sites on equal footing with other sites. • Due to the design of this program, participants know at the outset of the development process what the incentive will be for the project over the tariff term of 10 or 20 years. <p>Under its previous Solar Renewable Energy Certificate (SREC) program, landfill and brownfield solar projects had a SREC factor (i.e., multiplier) higher than other ground-mounted sites in the state’s SREC-II program (0.8 vs. 0.7) and were not subject to the same capacity cap as large greenfield sites.</p> <ul style="list-style-type: none"> • The SREC-II program, like SMART, was performance-based (i.e., incentives were based on the kWh output of solar projects). • Net SREC-II prices, before original multipliers ranging from 1.0 to 0.7, were 28.5 cents/kWh through an auction process and were often higher in bilateral market transactions. • While there was an auction floor price in the SREC-II program that provided certainty to participants on minimum SREC prices each year, there was considerable uncertainty around realized SREC prices among participants forgoing the auction process and selling their SRECs through other mechanisms. 	<p>https://www.mass.gov/solar-massachusetts-renewable-target-smart</p> <p>https://www.mass.gov/doc/capacity-block-base-compensation-rate-and-compensation-rate-adder-guideline-2</p> <p>https://www.mass.gov/guides/solar-carve-out-and-solar-carve-out-ii-program-information</p>

Massachusetts		
Topic	Data	Sources
Streamlined Permitting & Environmental Reviews	Massachusetts has various programs to accelerate environmental review steps and timelines for qualifying renewable energy projects.	https://www.mass.gov/siting-clean-energy-at-closed-landfills https://www.mass.gov/clean-energy-results-program
Liability Relief	<p>“For renewable energy project developers interested in contaminated properties, Chapter 21E provides a number of statutory liability protections associated with contamination at the property for qualifying persons.”</p> <p>“The liability protections most likely to be used by renewable energy developers are” for (1) eligible tenants and (2) eligible persons.</p> <ul style="list-style-type: none"> • Eligible tenant protections include the following: Section 2 of Chapter 21E “is intended to exclude certain tenants from the statutory liability they may otherwise have merely as current operators at a contaminated site.” • Eligible person protections include the following: “Owners and operators who did not cause or contribute to contamination at the site and who meet other statutory requirements receive liability protection upon the completion of a cleanup.” 	https://www.mass.gov/doc/addressing-renewable-energy-development-at-contaminated-properties-in-massachusetts-managing/download

Topic	Massachusetts Data		Sources
Site Identification & Development Support	<p>To aid in identifying promising sites for reuse and ascertaining the characteristics of existing sites that are hosting renewables, Massachusetts publishes the following:</p> <ul style="list-style-type: none"> • A database of RE-Powering sites with general and renewable-related characteristics: <ul style="list-style-type: none"> ○ The database has more than 1,000 site records and includes renewable energy-related information such as wind speed, local utility provider, and distance to transmission line for each record. • A detailed map showing operating solar and wind projects, as well as in-development solar projects on landfills. • Copies of permits from approved landfill renewable energy projects: <ul style="list-style-type: none"> ○ The approved project permit documents include site descriptions, summaries of environmental evaluations, and permit conditions. <p>Massachusetts Department of Environmental Protection (MassDEP) staff also provide post-closure landfill technical assistance (e.g., with regard to solar development and other topics) on a regional basis.</p>		<p>https://www.mass.gov/lists/developing-solar-photovoltaics-on-contaminated-land</p> <p>https://www.mass.gov/service-details/clean-energy-results-contact-services</p>

Massachusetts		
Topic	Data	Sources
Education & Outreach	<p>The state has produced and maintains an extensive set of educational materials and conducts in-person and online outreach, including the following:</p> <ul style="list-style-type: none"> • Training presentations on renewables and complementary topics such as greener cleanups. • An extensive Q&A document on ground-mounted solar. • A detailed <i>Guide to Developing Solar Photovoltaics at Massachusetts Landfills:</i> <ul style="list-style-type: none"> ○ This guide includes insights on ownership structures, system design, permitting and utility interconnection, managing procurement, and operations and maintenance of constructed solar PV systems. 	<p>https://www.mass.gov/lists/developing-solar-photovoltaics-on-contaminated-land#technical-resources-</p> <p>https://www.mass.gov/doc/photovoltaics-on-massachusetts-landfills-0/download</p>
General Brownfield Reuse	<p>Among brownfield reuse programs, Massachusetts has a Brownfields Redevelopment Fund that “finances the environmental assessment and remediation of brownfield sites.” The fund is administered by MassDevelopment. There are two programs within this fund that can support site reuse:</p> <ul style="list-style-type: none"> • “Interest-free financing of up to \$250,000 per site is available for environmental testing” in the Brownfields Site Assessment Program. • “Loans of up to \$750,000 per site are available for environmental clean-up required for redevelopment” in the Brownfields Remediation Loan Program. 	<p>https://www.massdevelopment.com/what-we-offer/financing/loans-and-guarantees/</p> <p>https://www.mass.gov/brownfields-cleanup</p>

Massachusetts		
Topic	Data	Sources
Interagency Coordination	<p>This collaboration between the Massachusetts Department of Energy Resources (DOER) and MassDEP was established in 2011 and continues to operate to remove regulatory and other barriers to clean energy development in the state.</p> <ul style="list-style-type: none"> • Clean Energy Results Program (CERP) activities pertain to renewable energy on landfills and brownfields, as well as energy efficiency, anaerobic digestion, and other waste diversion. There is also an emphasis on wastewater treatment facilities. • Technical assistance, regulatory guidance, and outreach are provided on a regional basis. There are four regions of the state, each with its own coordinator for different aspects of CERP (such as closed landfill renewable development support) who devotes a portion of their job to CERP. • The agencies also coordinate regarding incentives; DOER approves landfill and brownfield incentives after MassDEP completes an initial environmental review and evaluation of eligibility. <p>Note: Some of the program components mentioned earlier in this summary also fall under the CERP umbrella.</p>	<p>https://www.mass.gov/service-details/clean-energy-results-contact-services</p> <p>https://www.mass.gov/lists/clean-energy-results-progress-reports</p> <p>https://www.mass.gov/doc/clean-energy-results-2020-2021-annual-report/download</p>

Massachusetts		
Topic	Data	Sources
Program Best Practices/Success Factors		
Strong, Consistent Government Sponsorship	<p>Consistent policies, programmatic support, and knowledge of renewable energy development in general and reuse of RE-Powering sites in particular, from the legislature, governor, and DOER and MassDEP agency leadership.</p> <p>For example, see the Global Warming Solutions Act (https://www.mass.gov/service-details/global-warming-solutions-act-background) and Climate Change Strategy Executive Order 569 (https://www.mass.gov/doc/executive-order-climate-change-strategy/download).</p>	
Interagency Coordination	Strong links between DOER and MassDEP efforts through CERP and otherwise, as well as important contributions from the Massachusetts Clean Energy Center and MassDevelopment.	
Dedicated & Decentralized Staffing	<p>According to EPA RE-Powering data, CERP originally had 29 staff members partially or fully supporting it. As the program has matured, the staff allocation now efficiently operates with approximately 15 staff actively involved as of 2022.</p> <p>Post-closure landfill technical assistance (e.g., with regard to solar development) is performed on a regional basis. Many MassDEP staff have renewable support for landfills as a component of their jobs.</p>	
Significant Financial Incentives	Favorable multipliers in the prior SREC-II program and adders of 3 cents/kWh (brownfield) to 4 cents/kWh (landfill) in the current SMART program for solar projects.	
Numerous Complementary Programs	<p>To complement financial incentives, Massachusetts offers streamlined environmental review processes, liability relief provisions, sophisticated mapping tools and site databases, general brownfield loans, and extensive education and outreach materials.</p> <p>Agency staff are active in stakeholder settings and via conferences and webinars and have produced guides specifically tailored to RE-Powering sites.</p>	

Massachusetts		
Topic	Data	Sources
Learning Curve (Internal and External)	<p>MassDEP is experienced in landfill and brownfield project reviews, which expedites the development of viable projects.</p> <ul style="list-style-type: none"> For brownfield determinations, sites must have evidence of past contamination AND technical or community difficulties in site reuse for other purposes. This is to avoid solar on sites that could be redeveloped for other purposes. <p>The widespread development of solar projects on RE-Powering sites helps with community acceptance and reduces “not in my backyard” (NIMBY) pushback. Solar landfill and brownfield projects are now widely accepted by the public and elected leaders. Nonetheless, communities still have an abiding interest in being assured of the safety of placing solar on landfills and brownfields.</p>	
Barrier: Strong Home Rule	<p>Because Massachusetts has strong home rule provisions and 351 cities and towns, it can be difficult to impose state-level development requirements or hands-on development programs. This has affected Massachusetts’ renewable program design (e.g., a program like New York’s Build-Ready might face major local opposition if adopted in Massachusetts).</p>	
Achievements to Date		
RE-Powering Data on All Renewable Technologies (as of Oct. 2022, unless otherwise noted)	<ul style="list-style-type: none"> 131 operational projects (72% more than any other state and 26% of all projects nationally). 359 MW of installed capacity (third highest total in the country). Three projects (aggregate capacity of 12 MW) are wind; the rest are solar. Cumulatively, 10% of all state solar capacity is on RE-Powering sites, as of the end of 2021. Projects are most commonly 1 to 6 MW solar installations at municipal landfills. This size reflects incentive and VNM policies in this state, as well as the large number of cities and towns in Massachusetts with landfill acreage suitable for solar projects of that size. 	<p>https://www.epa.gov/re-powering/re-powering-tracking-matrix</p> <p>https://www.eia.gov/electricity/state/massachusetts/</p>

Massachusetts		
Topic	Data	Sources
Massachusetts-Reported Data for Operational Solar Projects (only from SREC-II and SMART programs)	<p><u>SREC-II Operational Projects (2014–2018)</u></p> <p>Landfill and brownfield combined: 70 projects with a combined capacity of 183.2 MW_{Direct Current (DC)}; average capacity/project of 2.6 MW_{DC}</p> <ul style="list-style-type: none"> • Landfill: 52 projects with a combined capacity of 133.6 MW_{DC}; average capacity/project of 2.6 MW_{DC} • Brownfield: 18 projects with a combined capacity of 49.7 MW_{DC}; average capacity/project of 2.8 MW_{DC} 	<p>https://www.mass.gov/doc/solar-carve-out-ii-qualified-renewable-generation-units</p>
	<p><u>SMART Approved Projects (2018–September 5, 2023)⁴</u></p> <p>Landfill and brownfield combined: 28 projects with a combined capacity of 60.0 MW_{Alternating Current (AC)}; average capacity/project of 2.1 MW_{AC}</p> <ul style="list-style-type: none"> • Landfill: 20 projects with a combined capacity of 43.1 MW_{AC}; average capacity/project of 2.2 MW_{AC} • Brownfield: 8 projects with a combined capacity of 16.9 MW_{AC}; average capacity/project of 2.1 MW_{AC} <p>Of these 28 RE-Powering site projects in the SMART program, 7 also received the low-income community shared solar adder:</p> <ul style="list-style-type: none"> • To receive the adder, a project must have “at least 50% of its energy output allocated to low-income customers in the form of electricity or bill credits.” • This adder varies from 6 cents/kWh to approximately 3.3 cents/kWh under the declining block incentive program, with later projects being eligible for lower incentives. 	<p>https://www.mass.gov/doc/smart-solar-tariff-generation-units</p> <p>https://www.mass.gov/doc/low-income-generation-units-guideline-october-2020/download</p> <p>https://www.mass.gov/doc/capacity-block-base-compensation-rate-and-compensation-rate-adder-guideline-2</p>

⁴ From the source spreadsheet (available at <https://www.mass.gov/doc/smart-solar-tariff-generation-units>), the data presented here were obtained by selecting “Approved” in the “Status” column and “Brownfield” and “Landfill” in the “Location Adder” column.

Massachusetts		
Topic	Data	Sources
Comparison with Total Renewable Energy Capacity in the State	<p>As of 2021, Massachusetts had the following:</p> <ul style="list-style-type: none"> • 3,541 MW of solar PV capacity. • 168 MW of wind-generating capacity. <p>As of 2021, RE-Powering projects (with 339 MW of solar capacity and 12 MW of wind capacity) represent the following:</p> <ul style="list-style-type: none"> • 10% of cumulative solar PV capacity statewide. • 7% of cumulative wind capacity statewide. 	<p>https://www.eia.gov/electricity/state/massachusetts/</p> <p>https://www.epa.gov/re-powering/re-powering-tracking-matrix</p>
Solar Deployment Trends in the State	<p>Although solar projects on RE-Powering sites continue to be built, the pace has slowed. Likely reasons include the following:</p> <ul style="list-style-type: none"> • Land use saturation: Many of the best and largest landfill and brownfield sites already have been developed with solar projects in Massachusetts. • Net metering saturation: Many municipalities already have all the VNM credits they can use: <ul style="list-style-type: none"> ○ This VNM policy, along with the 10 MW net metering project cap for public agency projects (much higher than the 2 MW cap for private entities), was particularly helpful to landfill solar development because many cities and towns own landfills that could host multi-MW solar projects and apply the VNM credits to municipal building electricity consumption elsewhere. • Utility interconnection challenges: It often takes more time and costs more to interconnect mid-size to large solar projects in Massachusetts with utility grids than in past years. This has slowed overall solar market development. 	

Massachusetts		
Topic	Data	Sources
	<p>With the Commonwealth of Massachusetts focused on meeting its 2050 and earlier greenhouse gas emissions reduction goals, MassDEP anticipates a revitalized program that will support expected increases in renewable energy permitting and construction applications. Current emphases of this agency include efficiently processing site reviews (e.g., brownfield site determination letters) and supporting resilience efforts.</p> <p>Overall, Massachusetts has the 11th most total solar capacity of any state. As Massachusetts transitioned from the SREC-II program to the SMART program, the volume of new solar development declined from its peak. Many of the 1 MW to 6 MW solar projects built in the 2010s are classified as “commercial” in Chart 1 on the next page.</p> <p>The remainder of this section contains five charts on deployment trends in Massachusetts. All but the first chart were developed by EPA and its contractors based on <i>RE-Powering Tracking Matrix</i> data and U.S. Energy Information Administration (EIA) overall statewide data.</p>	<p>https://seia.org/states-map</p>

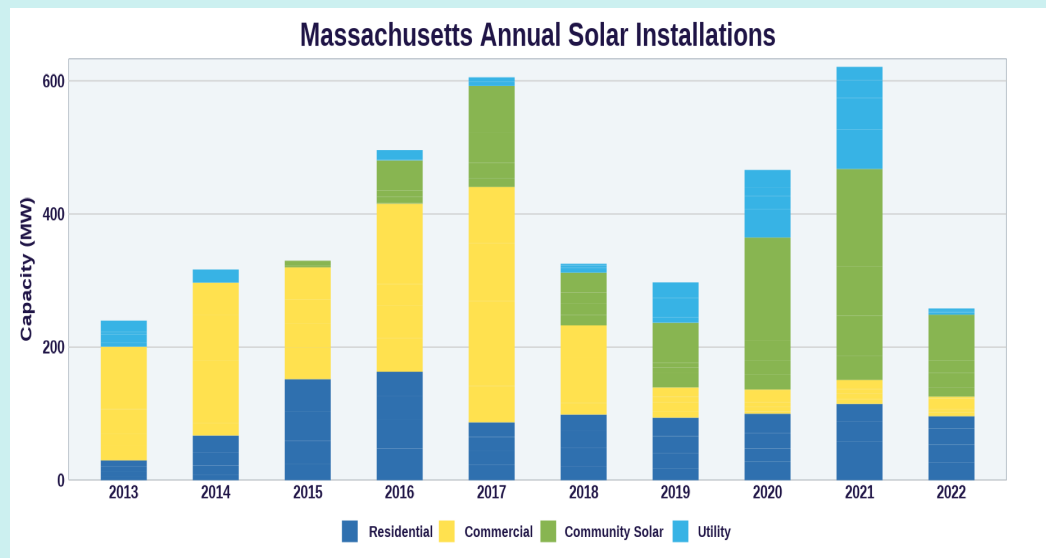
Massachusetts

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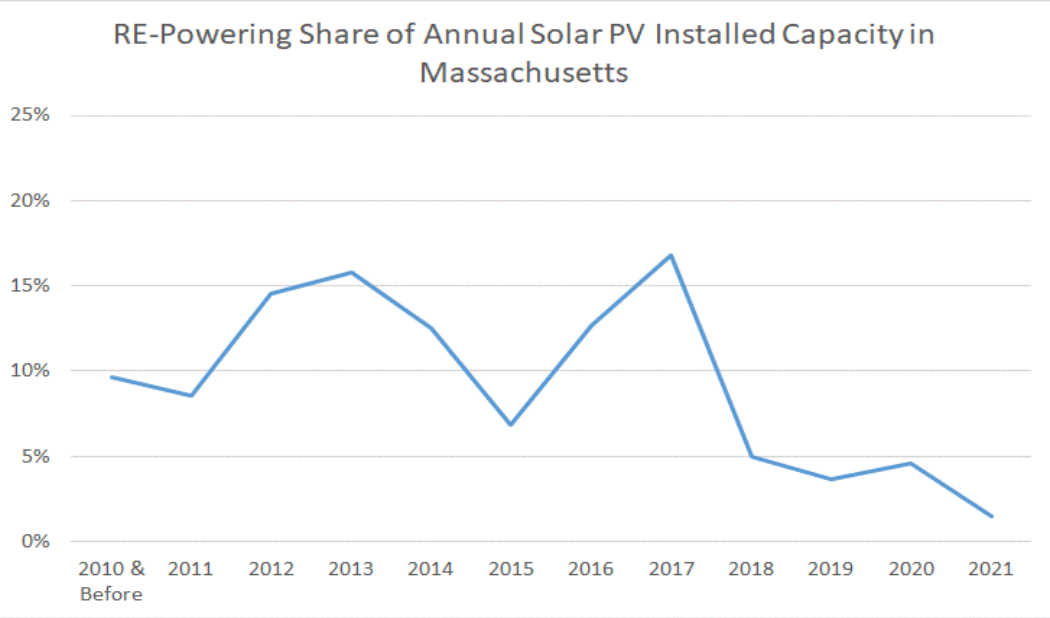
Data

Sources

Chart 1: The annual pace of solar deployment in Massachusetts has varied widely, from about 200 MW to 600 MW over the past decade. Utility-scale and community solar projects have become more significant parts of the market, while the commercial segment (as defined by the Solar Energy Industries Association in this chart) has decreased. It is important to note, however, that community solar projects serve commercial as well as residential customers as subscribers.



Solar Energy Industries Association and Wood Mackenzie Power & Renewables, *U.S. Solar Market Insight 2022 Year in Review*, <https://www.seia.org/state-solar-policy/massachusetts-solar>

Topic	Massachusetts Data	Sources																										
	<p>Chart 2: RE-Powering projects represented about 7% to 16% of the overall Massachusetts solar market each year between 2010 and 2017, before declining to about 2% to 5% of new solar projects between 2018 and 2021, likely due to land use and VNM saturation and other causes as described earlier in this section.</p>  <table border="1"> <caption>RE-Powering Share of Annual Solar PV Installed Capacity in Massachusetts</caption> <thead> <tr> <th>Year</th> <th>Share (%)</th> </tr> </thead> <tbody> <tr> <td>2010 & Before</td> <td>9</td> </tr> <tr> <td>2011</td> <td>8</td> </tr> <tr> <td>2012</td> <td>14</td> </tr> <tr> <td>2013</td> <td>15</td> </tr> <tr> <td>2014</td> <td>12</td> </tr> <tr> <td>2015</td> <td>7</td> </tr> <tr> <td>2016</td> <td>12</td> </tr> <tr> <td>2017</td> <td>16</td> </tr> <tr> <td>2018</td> <td>5</td> </tr> <tr> <td>2019</td> <td>4</td> </tr> <tr> <td>2020</td> <td>4</td> </tr> <tr> <td>2021</td> <td>2</td> </tr> </tbody> </table>	Year	Share (%)	2010 & Before	9	2011	8	2012	14	2013	15	2014	12	2015	7	2016	12	2017	16	2018	5	2019	4	2020	4	2021	2	<p>https://www.epa.gov/re-powering/re-powering-tracking-matrix</p> <p>https://www.eia.gov/electricity/state/massachusetts/</p>
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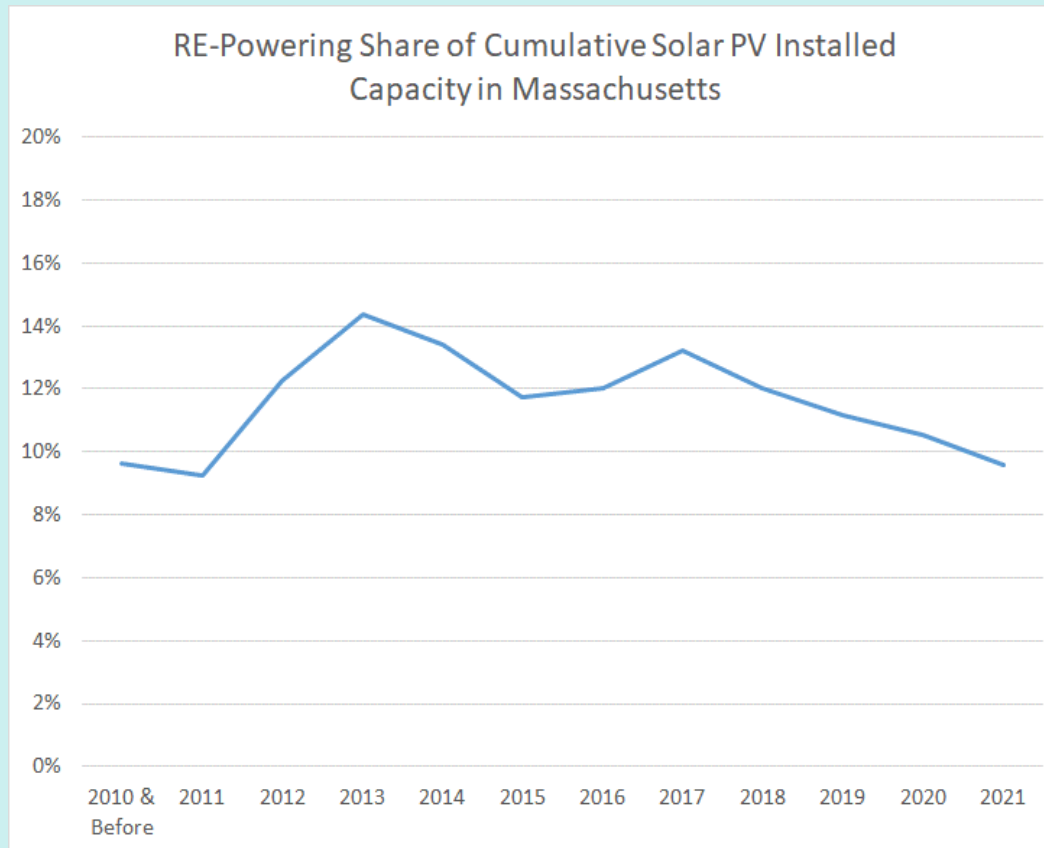
Massachusetts

Topic

Data

Sources

Chart 3: This graph converts annual data into a cumulative trend. At the end of 2021, RE-Powering projects represented just under 10% of cumulative statewide solar capacity, after being just above 13% 4 years earlier.



<https://www.epa.gov/re-powering/re-powering-tracking-matrix>

<https://www.eia.gov/electricity/state/massachusetts/>

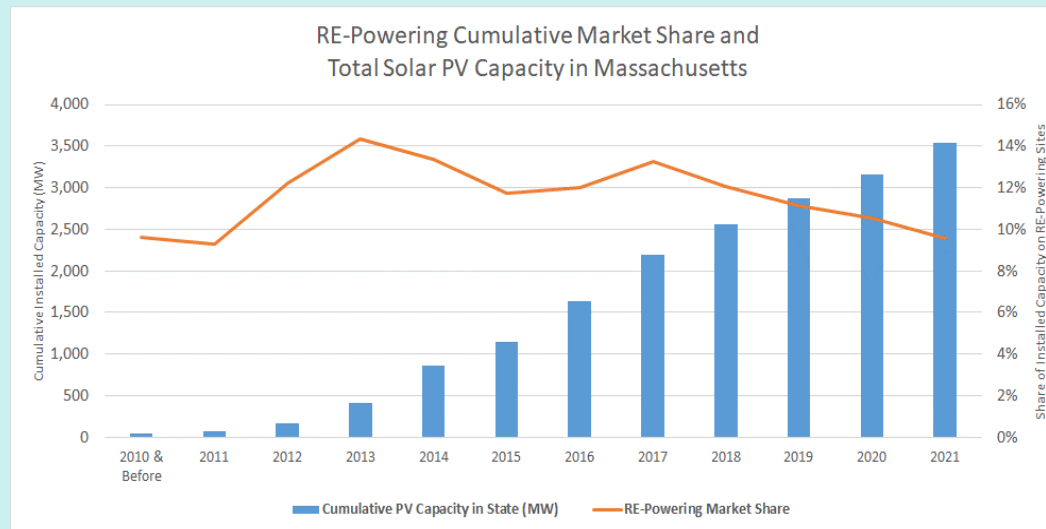
Massachusetts

Topic

Data

Sources

Chart 4: This graph overlays the trend line of RE-Powering site market share (the same line seen in Chart 3) with bars showing cumulative solar PV capacity in the state on all types of sites.



<https://www.epa.gov/re-powering/re-powering-tracking-matrix>

<https://www.eia.gov/electricity/state/massachusetts/>

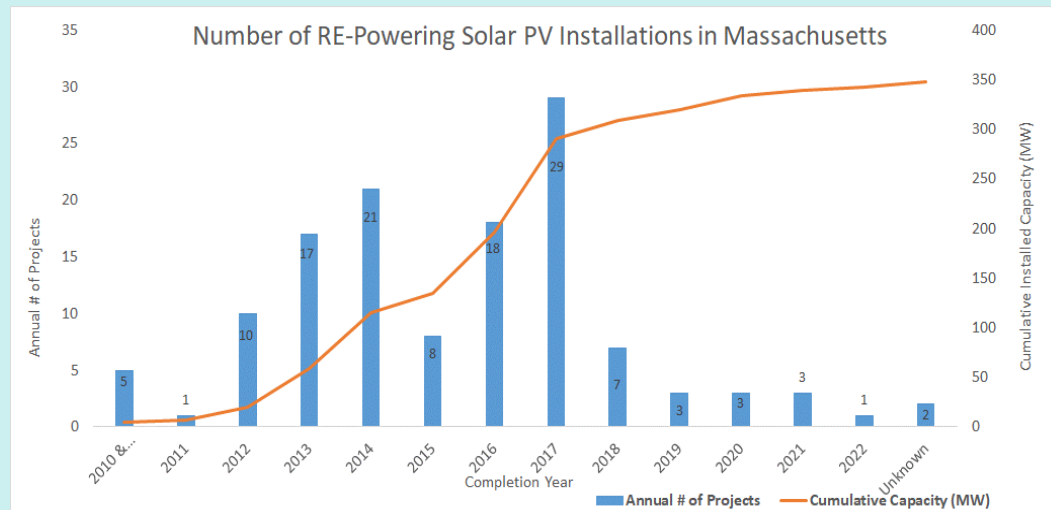
Massachusetts

Topic

Data

Sources

Chart 5: The annual path taken in Massachusetts to reach its total of 347 MW of RE-Powering solar capacity through October 2022 is displayed. Between 2012 and 2018, Massachusetts installed 7 to 29 new RE-Powering projects each year. Growth slowed beginning in 2018 due to market saturation, increased distances between landfills and available distribution and transmission points of interconnection, utility interconnection queue challenges, and declining state incentives.



<https://www.epa.gov/re-powering/re-powering-tracking-matrix>

Massachusetts		
Topic	Data	Sources
General Electricity Market Factors		
Power Prices	<p>Massachusetts has higher-than-average electricity prices that, other factors being equal, support renewable energy development. The national average retail electricity price paid by end-use consumers is 11.1 cents/kWh, while Massachusetts' average price is 72% higher at 19.06 cents/kWh. Massachusetts has the fourth highest retail electricity prices of the 50 states.</p> <p>Wholesale electricity prices in the New England region containing Massachusetts average 10.1 cents/kWh, which is 35% above the national average of 7.5 cents/kWh.</p>	<p>Retail electricity prices (in 2021): https://www.eia.gov/electricity/state/</p> <p>Wholesale electricity prices in 2022 (generation-only electricity prices: EIA, Annual Energy Outlook 2023, Reference Case Electric Power Projections by Electricity Market Module Region): https://www.eia.gov/outlooks/aeo/tables_ref.php</p>
Clean Energy Standard	<p>Massachusetts has a Clean Energy Standard that “sets a minimum percentage of electricity sales that utilities and competitive retail suppliers must procure from clean energy sources. The minimum percentage begins at 16% in 2018 and increases 2% annually to 80% in 2050.”</p>	<p>https://www.mass.gov/service-details/program-summaries#:~:text=Clean%20Energy%20Standard%20(CES)&text=The%20minimum%20percentage%20begins%20at,of%20the%20RPS%20ACP%20thereafter</p>
For More Information		
State Energy Agency POC	<p>Samantha Meserve, Director, Renewable and Alternative Energy Division, Massachusetts Department of Energy Resources: samantha.meserve@mass.gov</p>	
State Environmental Agency POCs	<p>Danah Tench, Director of Clean Energy and Climate Resilient Programs, Bureau of Planning and Evaluation, Massachusetts Department of Environmental Protection: danah.tench@mass.gov</p> <p>David Foss, Statewide Brownfields Coordinator, Bureau of Waste Site Cleanup, Massachusetts Department of Environmental Protection: david.foss@mass.gov</p>	

Topic	New Jersey Data	Sources
Overview		
	<p>New Jersey combines the highest population density of any state with significant renewable energy goals, including specific carve-outs for solar generation. This has led New Jersey to focus on RE-Powering site reuse from the outset of its solar incentive and procurement programs and to offer numerous other programs that reduce the costs, timelines, and risks of developing solar projects on landfills and brownfields. As a result, New Jersey has 76 operating RE-Powering projects, the second highest total of any state. It also has the second highest installed capacity of RE-Powering projects in the country.</p> <p>The state has implemented and adapted its programs in ways that allow for steady growth of RE-Powering projects. RE-Powering sites have continued to represent about 7% to 9% of the overall New Jersey solar market as the market grew almost sixfold over the past decade. New Jersey has accomplished this consistent growth by establishing a state-managed process in 2012 for landfill and brownfield projects to access SREC incentives; supporting an innovative procurement program by the state’s largest electric utility; providing attractive incentives for RE-Powering sites in the transition program following SRECs, along with a community solar pilot program that awarded approximately 45% of its Year 1 capacity and 25% of its Year 2 capacity to landfill and brownfield projects; and by continuing site reuse preferences in its Successor Solar Incentive Program taking effect in 2021 and 2022.</p> <p>Three state agencies—the New Jersey Board of Public Utilities (NJBPU), New Jersey Department of Environmental Protection (NJDEP), and New Jersey Economic Development Authority (NJEDA)—are actively involved in administering RE-Powering programs and have several formal coordination mechanisms to accelerate and simplify the renewable site assessment and development process, as well as sophisticated database and mapping tools to aid site identification.</p>	

Topic	New Jersey Data	Sources
Program Basics		
Direct Financial Incentives	<p>Subsection (t) of New Jersey’s Solar Act of 2012 established a certification process whereby grid supply (i.e., front-of-the-meter) solar projects on brownfields, closed landfills, and areas of historic fill can be eligible for the state’s SREC incentives:</p> <ul style="list-style-type: none"> • NJBPU subsequently extended the Subsection (t) certification process to the Transition Renewable Energy Certificate (TREC) program and established that Subsection (t) projects would receive the full TREC factor (see below for more information about TRECs). • Subsection (t) is a mechanism to direct solar development projects away from greenfields and toward preferred sites. • Between April 2013 and July 2023, 91 solar projects applied for Subsection (t) certification, and 30 of these projects representing 264 MW_{DC} of capacity have been fully certified and completed: <ul style="list-style-type: none"> ○ Of these fully certified projects, all but two (a 20 MW_{DC} project on historic fill and 15 MW_{DC} of a combined historic fill/landfill project) were entirely on landfill or brownfield sites. ○ Some of these certified projects are part of the Solar 4 All[®] program run by the state’s largest electric utility. See the Procurement Preferences or Requirements section below for more information about Solar 4 All[®]. • Subsection (t) also contains a process for conditional certification when NJDEP makes a determination that further remedial action, or additional protective measures for a closed landfill, is needed before a final certification decision can be made: <ul style="list-style-type: none"> ○ As of July 2023, 18 projects representing 333 MW_{DC} in total capacity are conditionally certified. Projects with this status are typically under construction. Another 11 projects representing 141 MW_{DC} in total capacity are pending review. 	<p>https://www.njcleanenergy.com/renewable-energy/program-updates/solar-act/solar-act-proceedings-archive</p> <p>https://www.njcleanenergy.com/files/file/BPU/FY24/Subsection%20t%20Project%20Status%20July%205%202023.pdf</p> <p>https://www.njcleanenergy.com/files/file/BPU/FY24/Subsection%20t%20Project%20Status%20July%205%202023.pdf</p>

Topic	New Jersey Data	Sources
	<p>After the original production-based solar incentive program (i.e., SREC) met its goal of providing 5.1% of all electricity in the state in 2020, the TREC program came into effect:</p> <ul style="list-style-type: none"> • The TREC program, as its name denotes, is a transition program until New Jersey implements a successor program. • TRECs have a 15-year term and “factors” that differentiate for the type of solar installation. Installations with a full (1.0) factor receive a TREC price of \$152/megawatt-hour (MWh) for their term: <ul style="list-style-type: none"> ○ Landfill and brownfield projects (outside of the community solar pilot program) were among those receiving full 1.0 factors; other site types have factors that are as much as 40% lower. ○ All community solar projects received TREC factors of 0.85, which is equivalent to a TREC value of \$129.20/MWh. ○ A key characteristic of TRECs is that their value is fixed over their 15-year term, offering revenue predictability to aid in financing and project development. <p>The TREC program ends after implementation of the Successor Solar Incentive Program (SuSI Program).⁵ The SuSI Program has two subprograms, both of which provide incentives via NJ SREC-IIs:⁶</p> <ul style="list-style-type: none"> • Administratively Determined Incentive Program: <ul style="list-style-type: none"> ○ Provides preset (through an administrative analysis process) incentive levels for several types of solar projects up to 5 MW of capacity; all community solar projects; and on an interim basis (until the other subprogram is implemented), Subsection (t) projects: 	<p>https://njcleanenergy.com/renewable-energy/programs/transition-incentive-program</p> <p>https://njcleanenergy.com/renewable-energy/program-updates-and-background-information/solar-transition-frequently-asked-questions</p> <p>https://www.njcleanenergy.com/renewable-energy/programs/community-solar/FAQs#Incentives</p> <p>https://njcleanenergy.com/renewable-energy/programs/susi-program</p> <p>https://www.njcleanenergy.com/files/file/Solar%20Transition/FY22/NEW%20JERSEY%20REGISTRATION%20SUCCESSOR%20SOLAR%20INCENTIVE%20PROGRAM%20RULE%20PROPOSAL%20AUGUST%202016.pdf</p>

⁵ The TREC program closed to new registrations on August 27, 2021, with two exceptions: (1) Subsection (t) applications under review as of that date will be allowed to register for the TREC program if they are conditionally certified by the NJBPU, and (2) projects conditionally approved under the second year of the Community Solar Energy Pilot Program will be allowed to register for the TREC program.

⁶ NJ SREC-II refers to the incentive mechanism in the successor version of New Jersey’s SREC program. New Jersey’s production-based solar incentives began with SRECs, then utilized TRECs for a transition period until the SuSI Program with SREC-II incentives was developed. It is labeled “NJ SREC-II” in this document to distinguish the New Jersey program from “SREC-II,” which is the name of Massachusetts’ second SREC program.

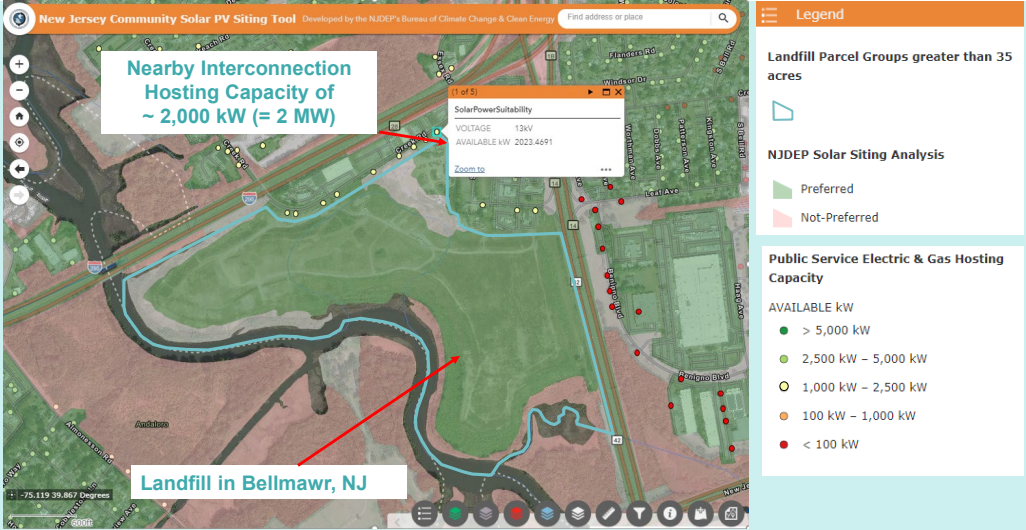
Topic	New Jersey Data	Sources
	<ul style="list-style-type: none"> ▪ The incentive is \$90/MWh for community solar projects with at least 51% of their capacity dedicated to low- and moderate-income (LMI) subscribers (and \$70/MWh for projects with less than 51% of capacity dedicated to LMI subscribers), with 15-year NJ SREC-II regulatory agreements providing that compensation. Community solar projects in New Jersey are commonly on RE-Powering sites (see the Procurement Preferences or Requirements section below). ▪ The incentive is \$100/MWh for a 15-year term for Subsection (t) projects approved during the interim period. <ul style="list-style-type: none"> • Competitive Solar Incentive Program: <ul style="list-style-type: none"> ○ Provides competitively determined incentives for grid supply projects (including Subsection (t) after the interim period) and large net metered, nonresidential projects (with a capacity above 5 MW). ○ The subprogram’s first competitive solicitation has closed, and bids were due on March 31, 2023. <p>The Hazardous Discharge Site Remediation Fund, administered jointly by NJDEP and NJEDA, is a grant and loan program that supports brownfield redevelopment by funding preliminary environmental assessments, remedial investigations, and portions of remedial actions:</p> <ul style="list-style-type: none"> • One of the program’s funding options is specific to renewable energy: <ul style="list-style-type: none"> ○ This option offers grants covering up to 75% of the costs of remedial actions for projects involving the redevelopment of a property for renewable energy. • The program provides up to \$10 million annually across renewable energy, affordable housing, and recreation and conservation purposes. 	<p>https://njcleanenergy.com/renewable-energy/programs/susi-program/csi-program</p> <p>https://www.nj.gov/dep/srp/finance/hdsrf/</p> <p>https://www.njeda.com/public-information/adopted/</p> <p>https://www.njeda.com/hdsrf/</p> <p>https://www.nj.gov/dep/srp/finance/hdsrf/hdsrf_chart.htm</p>

Topic	New Jersey Data	Sources
Procurement Preferences or Requirements	<p>New Jersey’s Clean Energy Act of 2018 established a Community Solar Energy Pilot Program that allows residential and business electricity customers to subscribe to output from specific solar projects:</p> <ul style="list-style-type: none"> • Evaluation criteria include strong preferences for brownfields, landfills, areas of historic fill, rooftops, and parking canopies. There is a large environmental justice component to the program, with at least 51% of program capacity being dedicated to LMI communities: <ul style="list-style-type: none"> ○ In late 2019, NJBPU awarded 78 MW_{DC} of capacity in the first year of the pilot program: <ul style="list-style-type: none"> ▪ Among Year 1 awards, nine projects (with 33 MW_{DC} of combined capacity) were on landfills, and one project of 2 MW_{DC} was on a brownfield. In total, this means that 45% of all Year 1 capacity was on RE-Powering sites. ○ Among total program Year 2 awards of 165 MW_{DC}, nine projects⁷ (with 36 MW_{DC} of combined capacity) were on landfills, and one project of 5 MW_{DC} was on a brownfield. In total, this means that 25% of all Year 2 capacity was on RE-Powering sites. 	<p>https://njcleanenergy.com/renewable-energy/programs/community-solar</p> <p>https://www.nj.gov/bpu/pdf/boardorders/2019/20191220/12-20-19-8D.pdf</p> <p>https://nj.gov/bpu/pdf/boardorders/2021/20211028/8J%20OR%20DER%20Community%20Solar%20PY2%20Awards.pdf</p>

⁷ One of the projects in this landfill total is on a site listed as a hybrid landfill/brownfield/area of historic fill.

Topic	New Jersey Data	Sources
	<ul style="list-style-type: none"> ○ See the Direct Financial Incentives section above for information on compensation for community solar projects. <p>New Jersey issued a proposal with draft rules for a permanent Community Solar Energy Program, with comments due in May 2023:</p> <ul style="list-style-type: none"> • Earlier “stakeholder feedback received on [project siting] supports the continued use of land-use and siting restrictions set in the Pilot. Specifically, the development of community solar projects on preferred sites [rooftops, parking lots, floating solar, brownfields, areas of historic fill, or properly closed sanitary landfill facilities].” • For the permanent program, NJBPU “Staff recommends updating the definition of ‘brownfields, areas of historic fill, or properly closed sanitary landfill’ to conform to the new definition of ‘contaminated site or landfill’ included in the Solar Act of 2021. As part of the new definition, Staff notes that it now allows siting of preferred resources on associated disturbed areas,” with limitations. <p>New Jersey’s largest electric utility, Public Service Electric & Gas (PSE&G), is nearing the conclusion of its implementation of a 158-MW_{DC} program, Solar 4 All[®], to place solar projects on preferred sites in its territory. Landfills and brownfields are among the preferred site types:</p> <ul style="list-style-type: none"> • Solar 4 All[®] projects have been certified through the Solar Act’s Subsection (t) process. <p>Through late 2019, six of the 34 Solar 4 All[®] projects were on landfills, with five others on brownfields. These 11 projects on RE-Powering sites have a combined capacity of more than 80 MW_{DC}.</p>	<p>https://njcleanenergy.com/renewable-energy/programs/community-solar</p> <p>https://nj.gov/bpu/pdf/publicnotice/Notice%20%20Community%20Solar%20Straw%20Proposal%20with%20Draft%20Rules.pdf</p> <p>https://www3.epa.gov/swerrims/module5/story_content/external_files/20.%20PSEG%20solar4all factsheet%20.pdf</p> <p>https://nj.pseg.com/newsroom/newsrelease104</p>
<p>Streamlined Permitting & Environmental Reviews</p>	<p>The NJDEP Office of Permitting and Project Navigation (OPPN) coordinates various federal and state environmental reviews, as well as the overall environmental permitting process of large and complex projects across NJDEP programs. Doing so improves time efficiency, internal and external consistency, and the predictability of permitting:</p>	<p>https://www.nj.gov/dep/pcer/</p>

Topic	New Jersey Data	Sources
	<ul style="list-style-type: none"> • A centerpiece of OPPN is a permit coordination meeting that helps the renewable developer ascertain the timeline and the necessary steps for obtaining permits for a project: <ul style="list-style-type: none"> ○ The OPPN process includes a Permit Readiness Checklist form. ○ Renewable energy projects typically have a single NJDEP point of contact throughout the permitting process. • New Jersey also has a statute allowing solar on a closed landfill as an approved use regardless of the zoning, allowing projects to bypass variance processes and go straight to the local Planning Board for site plan review and approval. 	https://www.nj.gov/dep/dshw/wp/solarguidance.pdf
Site Identification & Development Support	<p>New Jersey makes available a variety of databases, mapping tools, and a guide to aid in site identification and evaluation:</p> <ul style="list-style-type: none"> • The databases include those for contaminated sites, landfills, and abandoned mines. • The mapping tools include the New Jersey Community Solar PV Siting Tool, which integrates utility “hosting capacity” information (the ability of the utility grid to absorb new generation capacity at various points of interconnection) among its many data layers: <ul style="list-style-type: none"> ○ An example from this community solar PV tool is on the next page. 	https://www.state.nj.us/dep/srp/kcsnj/ https://www.nj.gov/dep/dshw/lrm/landinfo.htm https://njdep.maps.arcgis.com/home/gallery.html?view=grid&sortOrder=desc&sortField=modified

Topic	New Jersey Data	Sources
	 <p>The screenshot displays a web-based mapping tool titled "New Jersey Community Solar PV Siting Tool". The map shows a landfill in Bellmawr, NJ, with a nearby interconnection hosting capacity of approximately 2,000 kW (2 MW). A legend indicates preferred and not-preferred sites based on solar suitability and public utility hosting capacity.</p> <ul style="list-style-type: none"> Landfill Parcel Groups greater than 35 acres NJDEP Solar Siting Analysis <ul style="list-style-type: none"> Preferred (Green) Not-Preferred (Red) Public Service Electric & Gas Hosting Capacity <ul style="list-style-type: none"> AVAILABLE kW <ul style="list-style-type: none"> > 5,000 kW (Green) 2,500 kW – 5,000 kW (Light Green) 1,000 kW – 2,500 kW (Yellow) 100 kW – 1,000 kW (Orange) < 100 kW (Red) 	<p>https://njdep.maps.arcgis.com/apps/webappviewer/index.html?id=c3a9466eb7e54badbb41a90794bd0349</p> <p>https://www.state.nj.us/dep/aqes/solar-siting.html</p> <p>https://www.state.nj.us/dep/aqes/SSAFINAL.pdf</p>
<p>Education & Outreach</p>	<p>NJDEP’s Division of Solid and Hazardous Waste publishes Guidance for the Permitting of Solar Energy Systems on New Jersey Landfills:</p> <ul style="list-style-type: none"> This document includes descriptions of the step-by-step permitting process, NJDEP’s “one-stop” permit coordination, elements of closure and post-closure plans, and special issues faced by solar projects. 	<p>https://www.nj.gov/dep/dshw/wp/solarguidance.pdf</p>
<p>General Brownfield Reuse</p>	<p>New Jersey has several programs that encourage brownfield reuse without a specific emphasis on renewables. These programs include a financial incentive, loans and grants, an assistance hub, and a unique community partnership model:</p>	<p>https://www.njeda.gov/brownfield-redevelopment-incentive/</p>

Topic	New Jersey Data	Sources
	<ul style="list-style-type: none"> • The Brownfield Redevelopment Incentive is a competitive program that will provide tax credits for the remediation of brownfields: <ul style="list-style-type: none"> ○ Individual projects are eligible for 50% to 60% of actual or projected remediation costs up to a \$4 million maximum tax credit (or up to \$8 million in distressed areas). ○ The program budget is \$50 million per year, and the program is administered by NJEDA. ○ The Brownfields Loan Program, with similar overall goals, closed to new applications in April 2021. • The Brownfields Impact Fund is a program administered by NJEDA that provides loans and grants for the remediation of brownfields. The grant portion is currently closed. This program is supported by an EPA Brownfields Revolving Loan Fund Grant. • Brownfields Planning and Assessment Services is another program administered by NJEDA, and it provides free assessments for properties with known or suspected contamination. This program is supported by an EPA Brownfields Assessment Grant: <ul style="list-style-type: none"> ○ Eligible activities include Phase I environmental site assessments, preliminary assessments, site investigations, and/or remedial investigations. Both privately and publicly owned properties are eligible for this program. • NJ Brownfields Assistance Center @ NJIT is managed by the New Jersey Institute of Technology (NJIT) and offers tools and resources for reclamation and redevelopment of brownfield sites: <ul style="list-style-type: none"> ○ Leadership of the NJ Brownfields Assistance Center is shared with “NJIT’s federally funded program called Technical Assistance to Brownfield Communities, formed in 2008.” • The Community Collaborative Initiative is an innovative, hands-on program that assigns NJDEP staff to work closely with communities to design and implement creative reuse and revitalization plans for complex local environmental problems: 	<p>https://www.nj.gov/governor/news/news/562021/approved/20210208a.shtml</p> <p>https://www.njeda.gov/activeprograms/</p> <p>https://www.njeda.gov/brownfieldsimpactfund/</p> <p>https://www.njeda.gov/brownfields-planning-and-assessment-services/</p> <p>https://www.njit.edu/njbrownfields/</p> <p>https://news.njit.edu/njit-launches-nj-brownfields-assistance-center</p>

Topic	New Jersey Data	Sources
	<ul style="list-style-type: none"> ○ There is a single NJDEP liaison for each participating community. This program involves in-depth and consistent community engagement, which can be necessary to solve complex environmental problems. ○ While renewable energy projects do not appear to be part of the solutions to date, they may be included in future efforts. 	https://www.nj.gov/dep/cci/program.html
Interagency Coordination	<p>There is substantial, proactive interagency coordination among NJBPU, NJDEP, and NJEDA for RE-Powering site renewable energy development:</p> <ul style="list-style-type: none"> • Coordination occurs between NJBPU and NJDEP in sequenced reviews of Subsection (t) applications to the main solar financial incentive program in the state: <ul style="list-style-type: none"> ○ NJBPU and NJDEP also meet monthly to (1) discuss the progress of renewable projects on RE-Powering sites that are known to be in development, and (2) stay abreast of changes in rules, regulations, and technical requirements that may affect RE-Powering sites. • NJDEP and NJEDA perform sequential reviews of applications to the Hazardous Discharge Site Remediation Fund. The initial application is submitted to NJDEP, where a technical review is performed. When approved, NJDEP forwards the recommendation for funding to NJEDA, where a financial review is performed and funds are allocated. • NJDEP, NJBPU, and NJEDA also collaborate to inform their state’s strategic funding plan for Regional Greenhouse Gas Initiative proceeds. 	https://www.nj.gov/dep/ages/opa-solar.html https://www.nj.gov/dep/srp/finance/hdsrf/
Program Best Practices/Success Factors		
Significant Financial Incentives & Procurement Preferences	<p>New Jersey has offered financial incentive and procurement programs for RE-Powering sites for a decade and has maintained and adapted its site preferences through three major evolutions of its solar incentive program—from SREC to TREC to the SuSI Program. The level and consistency of direct financial and procurement support for landfill and brownfield solar projects, along with the complementary Solar 4 All® program of the state’s largest utility, are the main reasons that New Jersey has the second most RE-Powering projects and capacity of any state.</p>	

Topic	New Jersey Data		Sources
Establishment of Programs with Flexibility	New Jersey established and managed the Subsection (t) program in a manner that has supported steady growth of the solar market in general and the specific market for solar on preferred site types. New Jersey has also prevented the crowding out of residential and commercial solar projects by larger utility-scale projects and maintained attractive and predictable levels of SREC prices.		
Consistent Emphasis on Land Reuse	New Jersey has the nation’s highest population density of any state, and there is an imperative across state agencies to encourage reuse of RE-Powering sites that can help meet state environmental and economic development goals. To facilitate reuse, New Jersey has implemented numerous programs that can benefit renewable projects on RE-Powering sites, including the Community Solar PV Siting Tool that speeds the identification of promising RE-Powering sites by integrating utility data on available hosting capacity for interconnecting new projects.		
Broad Political & Stakeholder Support	Across administrations of political parties and highly involved stakeholder processes to define successor incentive programs, New Jersey has maintained its focus on a growing, stable solar market with an emphasis on site reuse.		
Extensive Intra-Agency & Interagency Coordination	New Jersey has several coordination mechanisms to carefully track and advance renewable projects on landfills and brownfields. It has a central permit coordination process inside NJDEP, as well as interagency processes to review program applications between NJBPU and NJDEP and between NJEDA and NJDEP.		

Topic	New Jersey Data	Sources
Achievements to Date		
RE-Powering Data on All Renewable Technologies (as of Oct. 2022)	<ul style="list-style-type: none"> • 76 operational projects⁸ (second highest total in the country, trailing only Massachusetts). • 376 MW of capacity (second highest total in the country, trailing only California). <ul style="list-style-type: none"> ○ All of these projects are solar. 	https://www.epa.gov/re-powering/re-powering-tracking-matrix
Comparison with Total Renewable Energy Capacity in the State	<p>As of 2021, New Jersey had the following:</p> <ul style="list-style-type: none"> • 3,418 MW of solar PV capacity.⁹ • 10 MW of wind capacity. <p>As of 2021, RE-Powering projects (with 310 MW of capacity) represent the following:</p> <ul style="list-style-type: none"> • 9% of cumulative solar PV capacity statewide. • 0% of cumulative wind capacity statewide (there are no RE-Powering wind projects identified in the state). 	https://www.eia.gov/electricity/state/newjersey/ https://www.epa.gov/re-powering/re-powering-tracking-matrix

⁸ The number of RE-Powering projects and their capacity for each state is based on EPA's October 2022 *RE-Powering Tracking Matrix*. Since the time of publication, EPA has learned about additional solar projects in New Jersey. EPA is working to include the projects in the next annual update of the *RE-Powering Tracking Matrix*. At the time of this publication, EPA has identified a total of 83 operational projects and additional megawatts of generation capacity for New Jersey.

⁹ As of June 30, 2023, New Jersey has about 4,500 MW of installed solar PV capacity. See NJBPU, *Solar Activity Reports, Installation Report*, <https://www.njcleanenergy.com/renewable-energy/project-activity-reports/project-activity-reports>.

New Jersey Data

Topic

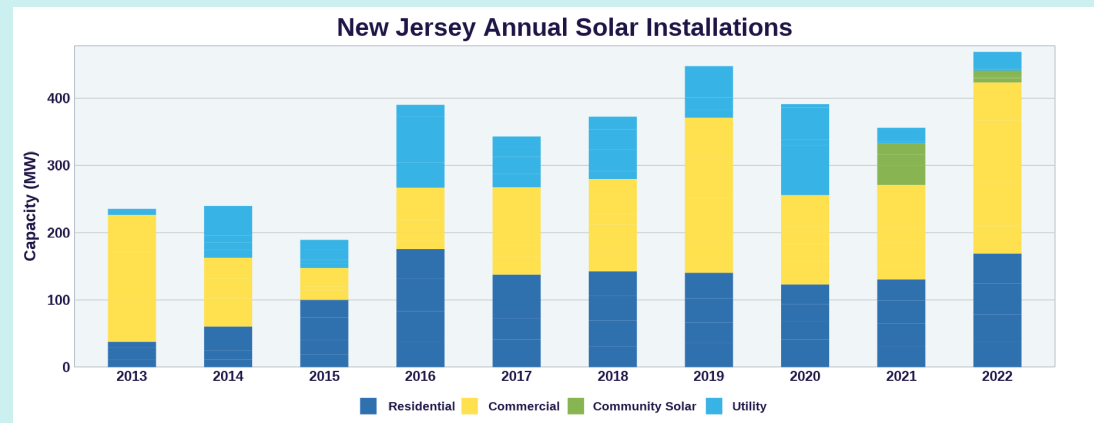
Sources

Solar Deployment Trends in the State

New Jersey has the eighth most total solar capacity of any state. As the overall solar market in New Jersey has grown by approximately 200 to 450 MW annually over the past decade, the share of RE-Powering projects in the market stayed at or above approximately 6% each year. This stability was due to a concerted state effort to maintain the pace of renewable development on landfills and brownfields, as well as the Subsection (t) and PSE&G Solar 4 All® program mechanisms that allow a high degree of control over the timing of new utility-scale projects on these sites.

The remainder of this section contains five charts on deployment trends in New Jersey. All but the first chart were developed by EPA and its contractors based on the *RE-Powering Tracking Matrix* data and EIA overall statewide data.

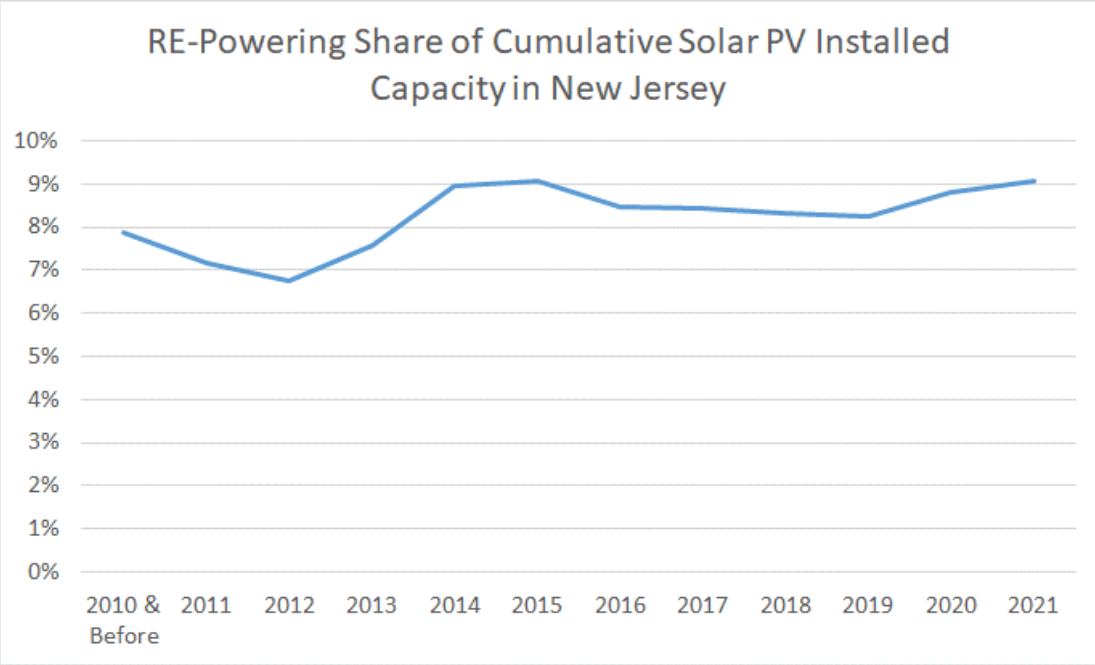
Chart 1: By policy design, New Jersey has had consistent levels of solar deployment from a blend of residential, commercial, and utility-scale projects during the past decade. With the recent launch of a community solar pilot program and its expansion in the SuSI Program, the share of community solar may grow in future years.



https://seia.org/sites/default/files/2023-03/SEIA_Top10_Solar_States_2022-Y1R%20copy.pdf

Solar Energy Industries Association and Wood Mackenzie Power & Renewables, U.S. Solar Market Insight 2022 Year in Review, <https://www.seia.org/state-solar-policy/new-jersey-solar>

Topic	New Jersey Data	Sources																										
	<p>Chart 2: RE-Powering solar projects have represented at least 6% of New Jersey’s overall solar market each year from 2011 through 2021.</p> <table border="1"> <caption>RE-Powering Share of Annual Solar PV Installed Capacity in New Jersey</caption> <thead> <tr> <th>Year</th> <th>Share (%)</th> </tr> </thead> <tbody> <tr> <td>2010 & Before</td> <td>8</td> </tr> <tr> <td>2011</td> <td>7</td> </tr> <tr> <td>2012</td> <td>6</td> </tr> <tr> <td>2013</td> <td>11</td> </tr> <tr> <td>2014</td> <td>19</td> </tr> <tr> <td>2015</td> <td>10</td> </tr> <tr> <td>2016</td> <td>6</td> </tr> <tr> <td>2017</td> <td>8</td> </tr> <tr> <td>2018</td> <td>7.5</td> </tr> <tr> <td>2019</td> <td>7.5</td> </tr> <tr> <td>2020</td> <td>14.5</td> </tr> <tr> <td>2021</td> <td>12</td> </tr> </tbody> </table>	Year	Share (%)	2010 & Before	8	2011	7	2012	6	2013	11	2014	19	2015	10	2016	6	2017	8	2018	7.5	2019	7.5	2020	14.5	2021	12	<p>https://www.epa.gov/re-powering/re-powering-tracking-matrix</p> <p>https://www.eia.gov/electricity/state/newjersey/</p>
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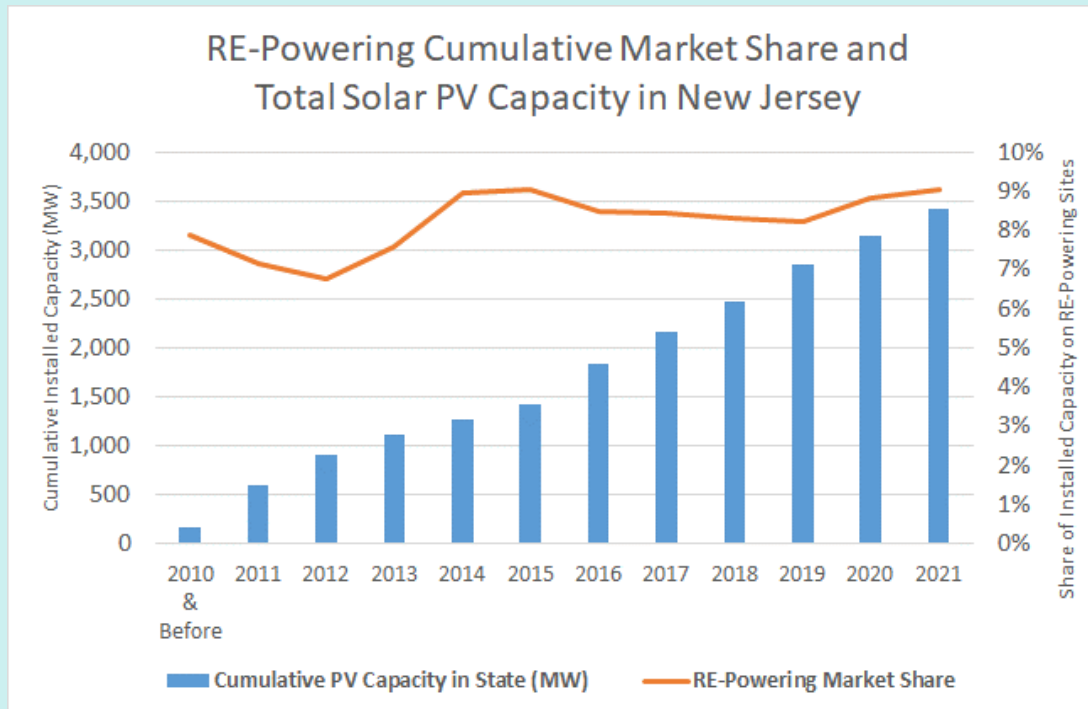
Topic	New Jersey Data	Sources																										
	<p>Chart 3: This graph converts annual data into a cumulative trend, ending with RE-Powering projects representing 9% of cumulative statewide solar capacity in 2021.</p>  <table border="1"> <caption>RE-Powering Share of Cumulative Solar PV Installed Capacity in New Jersey</caption> <thead> <tr> <th>Year</th> <th>Share (%)</th> </tr> </thead> <tbody> <tr> <td>2010 & Before</td> <td>7.8</td> </tr> <tr> <td>2011</td> <td>7.2</td> </tr> <tr> <td>2012</td> <td>6.8</td> </tr> <tr> <td>2013</td> <td>7.5</td> </tr> <tr> <td>2014</td> <td>8.9</td> </tr> <tr> <td>2015</td> <td>9.1</td> </tr> <tr> <td>2016</td> <td>8.4</td> </tr> <tr> <td>2017</td> <td>8.4</td> </tr> <tr> <td>2018</td> <td>8.3</td> </tr> <tr> <td>2019</td> <td>8.2</td> </tr> <tr> <td>2020</td> <td>8.8</td> </tr> <tr> <td>2021</td> <td>9.0</td> </tr> </tbody> </table>	Year	Share (%)	2010 & Before	7.8	2011	7.2	2012	6.8	2013	7.5	2014	8.9	2015	9.1	2016	8.4	2017	8.4	2018	8.3	2019	8.2	2020	8.8	2021	9.0	<p>https://www.epa.gov/re-powering/re-powering-tracking-matrix</p> <p>https://www.eia.gov/electricity/state/newjersey/</p>
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2021	9.0																											

New Jersey Data

Topic

Sources

Chart 4: This graph overlays the trend line of RE-Powering site market share (the same line seen in Chart 3) with bars showing cumulative solar PV capacity in the state on all types of sites. RE-Powering sites continued to represent about 7% to 9% of the overall New Jersey solar market, even as the market grew almost sixfold from 2011 to 2021.



<https://www.epa.gov/re-powering/re-powering-tracking-matrix>

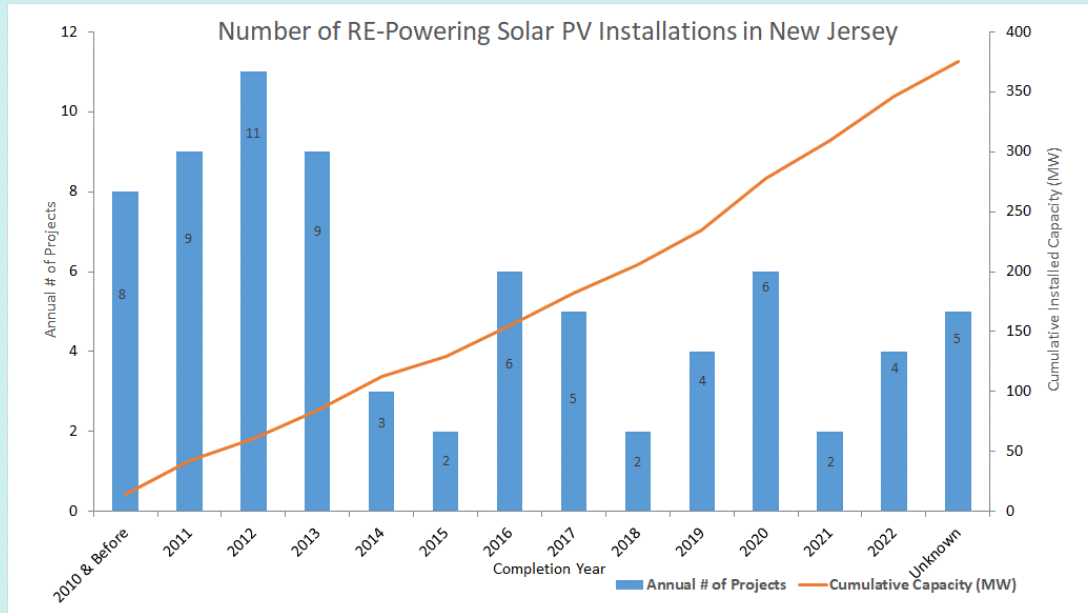
<https://www.eia.gov/electricity/state/newjersey/>

Topic

New Jersey Data

Sources

Chart 5: The annual path taken in New Jersey to reach its total of 376 MW of RE-Powering solar capacity through October 2022 is displayed.



<https://www.epa.gov/re-powering/re-powering-tracking-matrix>

General Electricity Market Factors

Power Prices

New Jersey has higher-than-average retail electricity prices that, other factors being equal, support renewable energy development. The national average **retail** electricity price paid by end-use consumers is 11.1 cents/kWh, while New Jersey’s average price is 26% higher at 14.01 cents/kWh. New Jersey’s retail electricity prices are the 10th highest of the 50 states.

Wholesale electricity prices in the PJM East Region containing New Jersey average 6.6 cents/kWh, which is 12% below the national average of 7.5 cents/kWh.

Retail electricity prices (in 2021):
<https://www.eia.gov/electricity/state/>

Wholesale electricity prices in 2022 (generation-only electricity prices: EIA, Annual Energy Outlook 2023, Reference Case Electric Power Projections by Electricity Market Module Region):
https://www.eia.gov/outlooks/aeo/tables_ref.php

New Jersey		
Topic	Data	Sources
Clean Energy Standard	New Jersey's Executive Order 315, issued in February 2023, establishes that 100% of the state's electricity must come from clean energy sources by 2035.	https://nj.gov/infobank/eo/056murphy/pdf/EO-315.pdf
For More Information		
State Energy Agency POC	B. Scott Hunter, Manager, Division of Clean Energy, New Jersey Board of Public Utilities: benjamin.hunter@bpu.nj.gov	
State Environmental Agency POCs	David Pepe, Director, Office of Permitting and Project Navigation, New Jersey Department of Environmental Protection: david.pepe@dep.nj.gov Frank McLaughlin, Manager, Office of Brownfield & Community Revitalization, New Jersey Department of Environmental Protection: frank.mclaughlin@dep.nj.gov Steve Myers, Supervisor, Clean Energy Section, Climate Change, Clean Energy & Sustainability Element, New Jersey Department of Environmental Protection: stephen.myers@dep.nj.gov	
State Economic Development Agency POC	Elizabeth Limbrick, Director of Brownfields & Sustainable Systems, New Jersey Economic Development Authority: brownfields@njeda.com	

Topic	New York State Data		Sources
Overview			
	<p>New York has the third highest number and sixth highest capacity of renewable projects on RE-Powering sites of any state. This renewable development has been supported by easily accessible direct financial incentives, streamlined permitting and environmental reviews, and a playbook with templates to help municipalities advance solar projects on RE-Powering sites. The financial incentives were increased in recent years, with a focus on sustainability and climate resilience on remediation projects.</p> <p>In July 2019, New York enacted the Climate Act, which mandates that 70% of the state’s electricity will be generated from renewable energy by 2030, 100% of the state’s electricity will be zero emissions by 2040, and at least 35% of the benefits will be directed toward underserved communities. In April 2020, the Benefit Act was passed into law as part of the fiscal year 2020–2021 state budget. The Benefit Act helps New York reach Climate Act goals by accelerating the deployment of large-scale renewable energy projects (often greater than 20 MW of capacity) and ensuring benefits to project host communities. The Benefit Act has an emphasis on siting new projects on underutilized lands.</p> <p>The Benefit Act directed the New York State Energy Research and Development Authority (NYSERDA) to develop and implement the Build-Ready Program to advance large-scale renewable energy projects on underutilized lands, including, but not limited to, landfills and brownfields, and to deliver benefits to project host communities. The Build-Ready Program identifies, vets, and progresses underutilized sites until they can be competitively auctioned as low-risk renewable energy projects for construction and operation by the private market. This poses an opportunity and a challenge for landfills and brownfields; the opportunity is major development assistance from a well-funded and experienced state agency, and the challenge is identifying RE-Powering sites greater than approximately 50 acres that are good candidates for Build-Ready. Potential Build-Ready sites started being identified in mid-2020, with several RE-Powering projects currently under active development, and the first completed auction of a 20 MW solar project on a former mine site expected in 2023.</p>		

Topic	New York State Data	Sources
Program Basics		
Direct Financial Incentives	<p>NYSERDA’s NY-Sun Program offers the MW Block incentive (an upfront, capacity-based incentive) that is available to approved solar contractors and developers for projects up to 7.5 MW_{DC} of 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. The adder is 0.15/watt_{DC} (equal to \$150/kilowatt_{DC} [kW_{DC}]).</p> <p>The Build-Ready Program, launched in 2020 and described in more detail in the Site Identification & Development Support section below, can bundle renewable energy credit offtake agreements with renewable projects that it develops for competitive auction to private buyers. These offtake agreements are a form of incentive that create valuable revenue certainty for potential project buyers.</p> <p>Under the recent 10-year re-authorization of the Brownfield Cleanup Program, new renewable energy brownfield redevelopments (and certain other project types) are eligible for enhanced tax credits. See the General Brownfield Reuse section below for additional information on this program.</p>	<p>Click on “Available Incentives” at https://www.nyserra.ny.gov/All-Programs/Programs/NY-Sun/Contractors/Doing-Solar-Business</p> <p>https://www.nyserra.ny.gov/All-Programs/Clean-Energy-Standard/Landowners-and-Local-Governments/Build-Ready-Program</p> <p>https://www.osc.state.ny.us/files/reports/budget/pdf/executive-budget-report-2022-23.pdf</p>

Topic	New York State Data	Sources
Streamlined Permitting & Environmental Reviews	<p>Landfill and brownfield solar projects of 25 acres or fewer can qualify as Type II actions not requiring further evaluation under the State Environmental Quality Review Act (SEQRA). SEQRA is also known as “mini-NEPA” due to its similarities to the National Environmental Policy Act (NEPA):</p> <ul style="list-style-type: none"> • A brownfield site must have a Brownfield Cleanup Program certificate of completion (or be an Environmental Restoration Project site that receives a certificate of completion) to qualify for this expedited process. • SEQRA applies to projects under 20 MW of capacity and those between 20 MW and 25 MW that do not opt into the Office of Renewable Energy Siting permitting process. <p>Landfills, brownfields, and other repurposed commercial or industrial sites receive expedited review from the new Office of Renewable Energy Siting that was established to provide faster, more predictable permit reviews:</p> <ul style="list-style-type: none"> • Complete permit applications for landfills, brownfields, and other repurposed sites are acted on within 6 months, while permit applications for other (not repurposed) sites receive final decisions within 12 months. • All new renewable energy projects above 25 MW of 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. 	<p>https://www.nyscrda.ny.gov/All-Programs/Programs/Clean-Energy-Siting/Solar-Guidebook</p> <p>https://www.nyscrda.ny.gov/All-Programs/Programs/Clean-Energy-Siting/Siting-for-Large-Scale-Renewables/Office-of-Renewable-Energy-Siting</p> <p>https://ores.ny.gov/system/files/documents/2021/03/chapter-xviii-title-19-of-nycrr-part-900-subparts-900-1-through-900-15.pdf</p>

Topic	New York State Data	Sources
Liability Relief	<p>The Brownfield Cleanup Program provides liability protection for applicants who remediate and develop brownfield sites for renewable energy projects (and incentivizes such remediation and redevelopment through tax credits; see the Direct Financial Incentives section above).</p> <p>The New York State Department of Environmental Conservation (NYSDEC) also has provided liability protection to state authorities and solar developers in memoranda of agreement for solar energy generation infrastructure placed on hazardous waste-contaminated sites, with the possibility, although not the certainty, of extending the liability protection to successors and assigns of the parties to the memoranda of agreement.</p>	
Site Identification & Development Support	<p>Build-Ready is a program launched in mid-2020 wherein the state (through NYSERDA) directly advances underutilized sites for large-scale renewable development:</p> <ul style="list-style-type: none"> • The program seeks to avoid competing with the private sector; instead, it is pursuing sites that would otherwise not be developed: <ul style="list-style-type: none"> ○ The official name of the program is the Clean Energy Resources Development and Incentive Program, but it is known as the Build-Ready Program. • Landfills and brownfields are among the underutilized site categories that are eligible for the Build-Ready Program: <ul style="list-style-type: none"> ○ Land-based renewable energy technologies that are eligible for Tier 1 Renewable Energy Certificates (RECs) are eligible for Build-Ready projects. The Build-Ready Program is also pairing battery storage with many renewable energy projects. ○ There is no official minimum site size, but due to the Build-Ready Program’s emphasis on large-scale renewable energy projects, sites will likely be a minimum of 50 acres. 	<p>https://www.nysesda.ny.gov/All%20Programs/Programs/Clean%20Energy%20Standard/Landowners%20and%20Local%20Governments/Build%20Ready%20Program</p> <p>http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId=%7BB0F6CC45-490C-48A7-B0FB-6D3C7924993C%7D</p> <p>https://www.nysesda.ny.gov/All-Programs/Clean-Energy-Standard/Renewable-Generators-and-Developers/RES-Tier-One-Eligibility/Eligibility</p>

Topic	New York State Data	Sources
	<ul style="list-style-type: none"> • The Build-Ready Program takes a multi-tiered diligence approach to identifying, screening, and assessing sites (see graphic on the next page). Sites that appear to be the most viable undergo more detailed assessment and project development activities: <ul style="list-style-type: none"> ○ There is a program goal of competitively auctioning large projects “bundled with contracts for renewable energy payments, to provide a de-risked package for private developers to construct and operate projects.” ○ These activities include not only technical and economic matters, but also close collaboration with the host community to ensure that the municipality and its stakeholders are in support of and benefit from the project under consideration. ○ Auctions occur for late-stage development projects. 	<p>https://www.nysed.gov/All-Programs/Build-Ready-Program</p>

New York State Data

Topic

Sources



For more information: NYSERDA, *Clean Energy Resources Development and Incentives: The Build-Ready Program Annual Progress Report 2022, Final Report*, April 2023.

- **Build-Ready had screened more than 10,800 sites through 2022:**
 - In the table on the next page, sites still advancing through the Build-Ready pipeline are summarized by site type.¹⁰

<https://www.nyseda.ny.gov/All-Programs/Clean-Energy-Standard/Landowners-and-Local-Governments/Build-Ready-Program>

¹⁰ When interpreting the table, contaminated sites include landfills, brownfields, Resource Conservation and Recovery Act sites, and Superfund sites. Also, “it’s important to note that many sites categorized as federal, State, or municipally owned may also have another underlying site characteristic such as contamination; however, if the dominant characteristic is federal, State, or municipally owned, then it’s labeled as such.” NYSERDA, *Clean Energy Resources Development and Incentives: The Build-Ready Program Annual Progress Report 2022, Final Report*, April 2023, p. 4, <https://www.nyseda.ny.gov/All-Programs/Clean-Energy-Standard/Landowners-and-Local-Governments/Build-Ready-Program>.

New York State Data

Topic

Sources

Site Type	Number of Sites
Commercial/Industrial	152
Contaminated Site	120
Mine	50
Underutilized	51
Federal, State or Municipally Owned	39
Electric Generating Site	15

This table shows that 120 contaminated sites and 50 mines are in the program’s pipeline as of the end of 2022. The program’s annual report also describes specific projects that are under active development, including the following:

- Three solar projects on publicly owned landfills, with a combined capacity of 52 MW, each with a site control memorandum of understanding (MOU) with NYSERDA and that have completed some environmental studies and interconnection assessments.
- In addition, NYSERDA has completed site control MOUs and certain environmental investigations and feasibility assessments for two 10 MW solar projects, one on a brownfield and the other on a former mine.
- A 20 MW solar project sited on an unused mine tailings pile at Benson Mines Inc., a privately owned former iron-ore mine in St. Lawrence County, is the most advanced project in the Build-Ready pipeline and is targeted for auction to the private market in 2023.

Topic	New York State Data	Sources
	<ul style="list-style-type: none"> • Pre-construction development activities led by NYSERDA can include site control via a lease option agreement, preliminary project design, project permitting, progressing interconnection, and developing a Host Community Benefits package to provide local benefits: <ul style="list-style-type: none"> ○ The Host Community Benefits package for each project will be determined in close consultation with the community and could include payment in lieu of taxes (PILOT) agreements, financial support for local improvement projects, workforce development and training, utility bill discounts to local residents, or other needs identified by the community. • Build-Ready estimated up to \$71.8 million in total expenditures in its first 5 years and has obtained approval for an allocation of \$50 million from the state’s Clean Energy Fund to initiate the program: <ul style="list-style-type: none"> ○ Through 2022, Build-Ready expended a total of \$5.5 million. ○ It is anticipated that any difference between estimated expenditures and initial state funding should be covered by the project auction fees that are expected to start arriving in 2023. • Build-Ready auction proceeds will be used to reimburse the initial funding from the Clean Energy Fund and, once repaid, will be reinvested into the program. • Six new full-time equivalent positions were called for at Build-Ready program creation, covering specialties including “project management, prospecting, project development, permitting, and legal support.” The program also can access a larger group of contractor staff. This significant in-house and contractor personnel commitment reflects the importance of accelerating large-scale renewable development for meeting New York’s renewable energy goal and the state’s strong desire to encourage renewables beyond greenfield sites to achieve land use and community development objectives. 	<p>https://www.nyserda.ny.gov/All-Programs/Clean-Energy-Standard/Landowners-and-Local-Governments/Build-Ready-Program</p>

Topic	New York State Data	Sources
	<p>In addition to Build-Ready, NYSDEC maintains databases to aid in the identification of RE-Powering sites for reuse and the DECinfo Locator site mapping tool with numerous data layers.</p> <p>Hazardous waste sites across all NYSDEC remediation programs are evaluated on a site-specific basis to determine the feasibility for renewable energy implementation.</p>	<p>https://www.dec.ny.gov/chemical/8437.html</p> <p>https://www.dec.ny.gov/pubs/109457.html</p>
<p>Education & Outreach</p>	<p>The <i>Municipal Solar Procurement Toolkit</i> is intended for “local governments looking to lease existing underutilized land for solar development”:</p> <ul style="list-style-type: none"> • This step-by-step guide includes a Request for Proposals template, model local laws for solar development, and information on PILOT agreements. • PILOT agreements are particularly relevant because New York Real Property Tax Law § 487 “provides a 15-year real property tax exemption for properties located in New York State with renewable energy systems,” applicable to renewable system added value. A local government not opting out of the property tax exemption can still benefit financially from renewable systems through PILOT agreements. <p><i>Photovoltaic Solar Projects Located at Closed Solid Waste Landfills</i> “describes the procedure and considerations ... when reviewing PV solar projects located at closed solid waste landfills and identifies the required information that must be provided for review and approval of these projects.”</p> <p><i>Solar Panel Construction Stormwater Permitting/SWPPP Guidance</i> outlines the construction general permit and Stormwater Pollution Prevention Plan (SWPPP) design requirements for different types of solar projects.</p>	<p>https://www.nysed.nys.gov/All-Programs/Programs/NYS-Sun/Communities-and-Local-Governments/Solar-Guidebook-for-Local-Governments</p> <p>https://www.dec.ny.gov/docs/materials_minerals_pdf/dmmlfsolar.pdf</p> <p>https://www.garnetenergycenter.com/wp-content/uploads/2021/06/Appendix-23-4.-NYSDEC-Solar-Panel-Construction-Stormwater-Permitting-and-SWPPP-Guidance.pdf</p>

Topic	New York State Data	Sources
<p>General Brownfield Reuse</p>	<p>The Brownfield Cleanup Program administered by NYSDEC removes “some of the barriers to and provides tax incentives for the redevelopment of urban brownfields”:</p> <ul style="list-style-type: none"> • The program connects to an expedited SEQRA environmental review process (see the Streamlined Permitting & Environmental Reviews section above). • Although this program has not frequently been used for renewable energy reuse to date, it can complement the funding available from direct renewable energy incentives for brownfield sites (e.g., NY-Sun MW Block incentive and adder for landfill/brownfield solar projects) to improve net economics for qualifying renewable projects. See the Direct Financial Incentives section above for additional information on the program. <p>The Brownfield Opportunity Area Program, administered by the New York Department of State, provides grants that can cover a variety of assessment, planning, and local law change activities:</p> <ul style="list-style-type: none"> • Designated Brownfield Opportunity Areas allow developers in the Brownfield Cleanup Program to (1) receive a tax credit increase if the redevelopment plan is consistent with state and community goals, and (2) receive “priority and preference for some state grant programs.” <p>The State Superfund Program also advances renewable energy projects through the cleanup of hazardous waste sites:</p> <ul style="list-style-type: none"> • Renewable energy projects can be incorporated within the design and construction phase to power the construction of the remedy and/or operation of the remedy itself (i.e., soil or groundwater treatment). 	<p>https://www.dec.ny.gov/chemical/8450.html</p> <p>https://www.dec.ny.gov/chemical/101350.html</p> <p>https://dos.ny.gov/system/files/documents/2020/03/dos-boa-fact-sheet_2020.pdf</p>

New York State		
Topic	Data	Sources
Interagency Coordination	Interagency coordination occurs among NYSDEC, NYSERDA, the New York Power Authority, and New York State Canals (as well as with municipal agencies) to help ensure that collective renewable energy goals are met. For example, coordination with New York State Canals on the potential reuse of navigable dredge material as remedial backfill can help make grades suitable and/or attractive for solar project development.	
Program Best Practices/Success Factors		
Focus on Barriers to Project Development	<p>Build-Ready (as well as the fast-track reviews for landfills and brownfields in the Office of Renewable Energy Siting) addresses the development costs and risks of large-scale projects on underutilized sites by using state resources to identify and advance the best of these sites until they are de-risked and then auctioning them to the private market for construction and operation:</p> <ul style="list-style-type: none"> This program takes advantage of the considerable scale of NYSERDA, which goes beyond energy agencies in many states. <p>The <i>Municipal Solar Procurement Toolkit</i> (with document templates and model laws) is an actionable toolkit for developing underutilized lands for solar. Along with providing information about expedited SEQRA reviews for landfills and brownfields, it supports the development of solar projects of various sizes by providing templates and resources that can help reduce contractual and permitting time, cost, and complexity barriers.</p>	
Significant Financial Incentives	<p>For solar projects on brownfield and landfill sites (especially those with relatively large capacity), the MW Block incentive adder of 15 cents/watt_{DC} is an important contributor to economic returns.</p> <p>The Build-Ready Program's ability to include a Renewable Energy Credit Agreement as part of a project's auction package provides a significant financial incentive for the private market.</p>	
Broad Political & Stakeholder Support	Build-Ready was enabled by a combination of support from the governor, legislature, renewable developers, and environmental organizations (especially those emphasizing land use issues). It was developed in the context of the state's 70% renewable electricity by 2030 requirement.	

Topic	New York State Data	Sources
Achievements to Date		
RE-Powering Data on All Renewable Technologies (as of Oct. 2022)	<ul style="list-style-type: none"> • 50 operational projects (third highest total in the country). • 169 MW of capacity (sixth highest total in the country). • Two Steel Winds projects (at a former steel mill) have a combined capacity of 35 MW; the other projects with capacity listed consist of 46 solar PV projects and 1 small geothermal project:¹¹ <ul style="list-style-type: none"> ○ As is the case in many other states, individual RE-Powering wind projects in New York tend to be much larger than RE-Powering solar projects, with the two Steel Winds projects having 26% as much capacity as the 46 RE-Powering solar projects in the state combined. 	https://www.epa.gov/re-powering/re-powering-tracking-matrix
Comparison with Total Renewable Energy Capacity in the State	<p>As of 2021, New York had the following:</p> <ul style="list-style-type: none"> • 3,620 MW of solar PV capacity. • 2,200 MW of wind capacity. <p>As of 2021, RE-Powering projects (with 125 MW of solar capacity and 35 MW of wind capacity) comprise the following:</p> <ul style="list-style-type: none"> • 3% of cumulative solar PV capacity statewide. • 2% of cumulative wind capacity statewide. 	<p>https://www.eia.gov/electricity/state/newyork/</p> <p>https://www.epa.gov/re-powering/re-powering-tracking-matrix</p>

¹¹ There is one additional wind project without capacity listed in the *RE-Powering Tracking Matrix*.

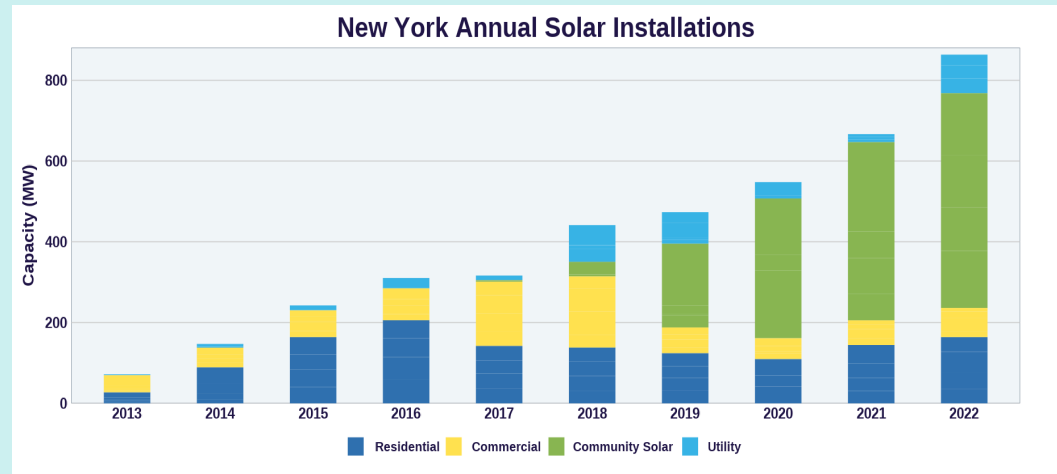
Topic	New York State Data	Sources
Solar Deployment Trends in the State	<p>New York has seen steady deployment of RE-Powering solar projects over the past decade, with three to six new projects in most years. This has led to New York consistently being one of the top states in RE-Powering activity. However, the overall solar market in New York greatly accelerated between 2015 and 2021 (New York now has the 10th most solar capacity of any state), decreasing the relative share of RE-Powering projects in the market.</p> <p>The remainder of this section contains five charts on deployment trends in New York. All but the first chart were developed by EPA and its contractors based on <i>RE-Powering Tracking Matrix</i> data and EIA overall statewide data.</p>	<p>https://seia.org/sites/default/files/2023-03/SEIA_Top10_Solar_States_2022-YIR%20copy.pdf</p>

New York State Data

Topic

Sources

Chart 1: Historically, the overall pace of utility-scale solar development has lagged behind other types of solar projects in New York. However, utility-scale deployment accelerated starting in 2018. Community solar projects reflect a rapidly growing market segment in the state, and the overall solar market continues to grow year-over-year in New York.



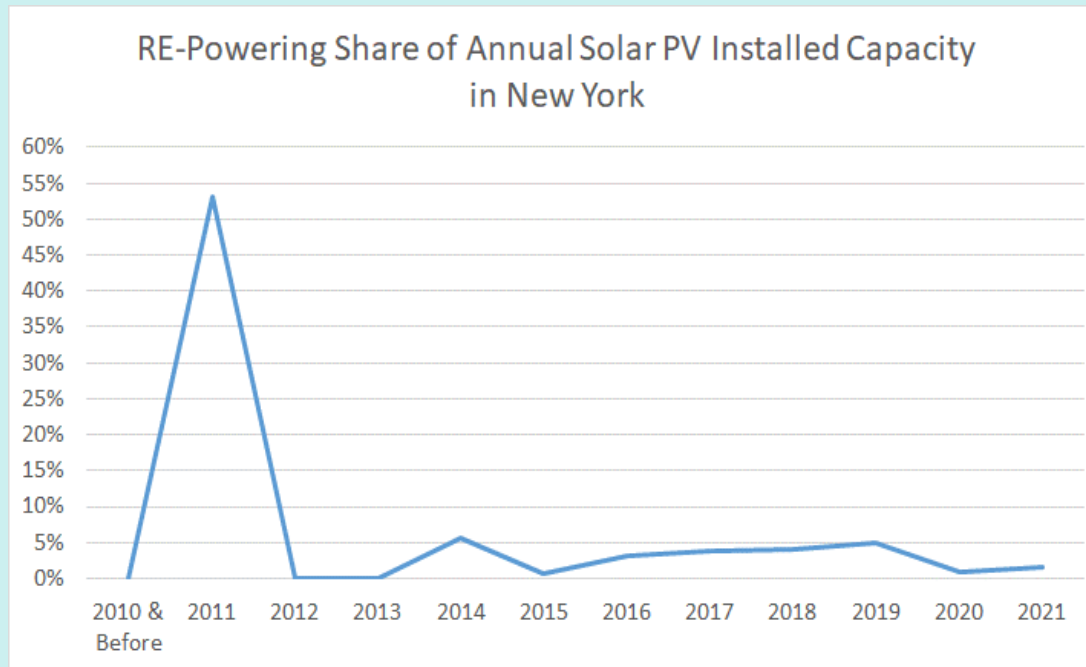
Solar Energy Industries Association and Wood Mackenzie Power & Renewables, U.S. Solar Market Insight 2022 Year in Review, <https://www.seia.org/state-solar-policy/new-york-solar>

New York State Data

Topic

Sources

Chart 2: RE-Powering solar projects represented a large share of the New York solar market when it was emerging in 2011. In recent years, RE-Powering projects have represented about 2% to 5% of new solar installations in the state.



<https://www.epa.gov/re-powering/re-powering-tracking-matrix>

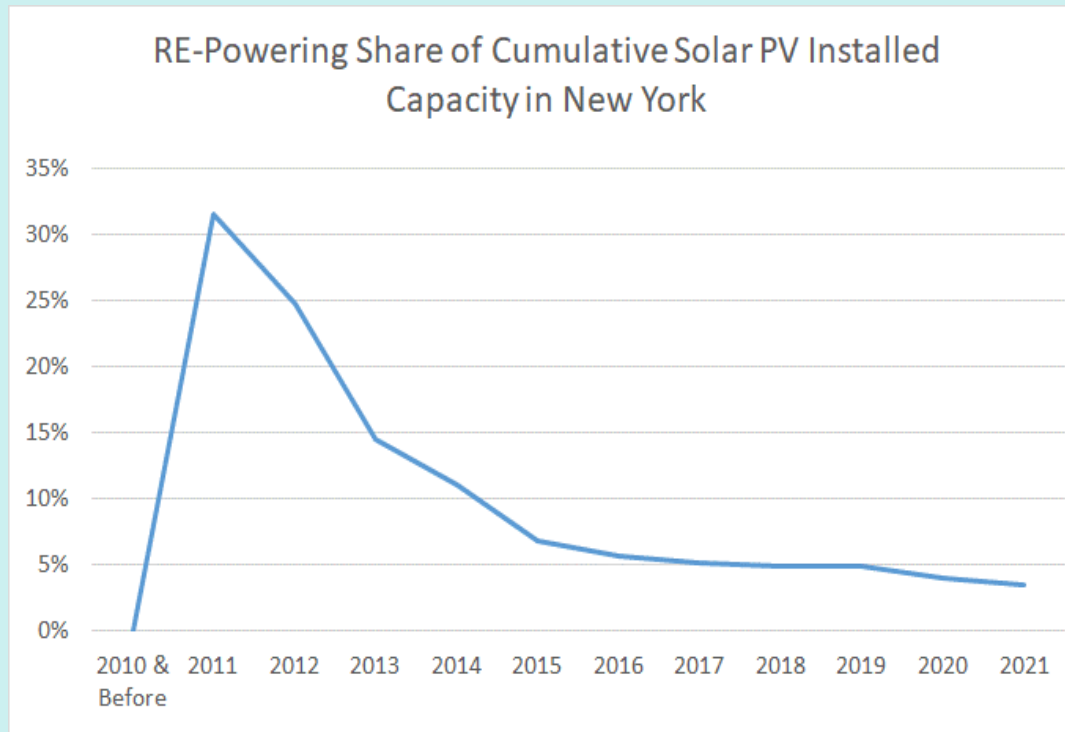
<https://www.eia.gov/electricity/state/newyork/>

New York State Data

Topic

Sources

Chart 3: This graph converts annual data into a cumulative trend, ending with RE-Powering projects representing just under 4% of cumulative statewide solar capacity by 2021.



<https://www.epa.gov/re-powering/re-powering-tracking-matrix>

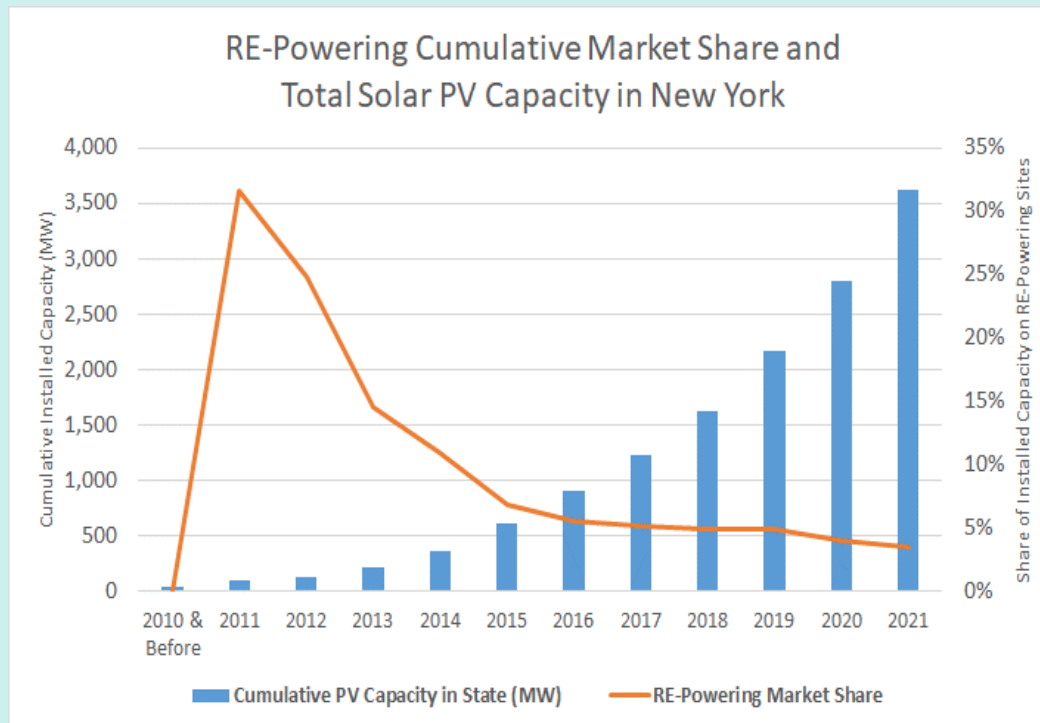
<https://www.eia.gov/electricity/state/newyork/>

New York State Data

Topic

Sources

Chart 4: This graph overlays the trend line of RE-Powering site market share (the same line seen in Chart 3) with bars showing cumulative solar PV capacity in the state on all types of sites.



<https://www.epa.gov/re-powering/re-powering-tracking-matrix>

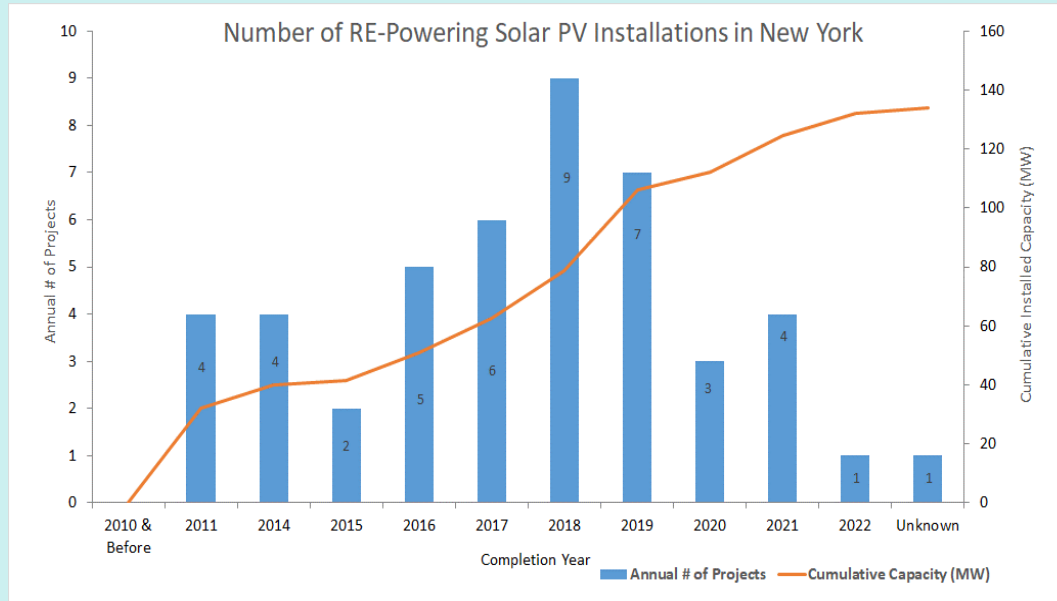
<https://www.eia.gov/electricity/state/newyork/>

New York State Data

Topic

Sources

Chart 5: The annual path taken in New York to reach its total of 134 MW of RE-Powering solar capacity through October 2022 is displayed. With one exception, four to nine new RE-Powering solar projects were installed each year between 2014 and 2019. No RE-Powering solar projects were installed in New York in 2012 or 2013, which is why no bars are displayed for those years.



<https://www.epa.gov/re-powering/re-powering-tracking-matrix>

New York State		
Topic	Data	Sources
General Electricity Market Factors		
Power Prices	<p>New York has higher-than-average retail electricity prices that, other factors being equal, support renewable energy development. The national average retail electricity price paid by end-use consumers is 11.1 cents/kWh, while New York’s average price is 45% higher at 16.11 cents/kWh. New York’s retail electricity prices are the ninth highest of the 50 states.</p> <p>Wholesale electricity prices in Upstate New York average 6.2 cents/kWh, and they average 7.5 cents/kWh in the New York City/Long Island area. Upstate New York wholesale prices are about 17% below the national average of 7.5 cents/kWh, while prices in New York City and Long Island are equal to the national average.</p>	<p>Retail electricity prices (in 2021): https://www.eia.gov/electricity/state/</p> <p>Wholesale electricity prices in 2022 (generation-only electricity prices: EIA, Annual Energy Outlook 2023, Reference Case Electric Power Projections by Electricity Market Module Region): https://www.eia.gov/outlooks/aeo/tables_ref.php</p>
Clean Energy Standard	<p>New York has a 70% renewable electricity by 2030 mandate under its Clean Energy Standard. It also has a 100% zero-emission electricity by 2040 requirement.</p>	<p>https://www.nyserdera.ny.gov/All-Programs/Clean-Energy-Standard</p> <p>https://climate.ny.gov/resources/scoping-plan/</p>
For More Information		
State Energy Agency POC	<p>Emily Chessin, Program Manager, Build-Ready Program, New York State Energy Research and Development Authority: emily.chessin@nyserdera.ny.gov</p>	
State Environmental Agency POCs	<p>Jenelle Gaylord, Division of Environmental Remediation, New York State Department of Environmental Conservation: jenelle.gaylord@dec.ny.gov</p> <p>Payson Long, Division of Environmental Remediation, New York State Department of Environmental Conservation: payson.long@dec.ny.gov</p>	

Topic	Rhode Island Data		Sources
Overview			
	<p>As the state with the earliest 100% renewable electricity requirement in the country and with the smallest land area of any state, siting issues for renewable energy projects have been at the forefront in Rhode Island. There has been particular concern that “solar farms are becoming a source of forest loss to achieve Rhode Island’s clean energy goals.”¹²</p> <p>Rhode Island has instituted multiple programs to encourage the use of RE-Powering sites as part of the state’s renewable growth and has achieved a high proportion of RE-Powering projects, especially given the state’s total electricity market (46th most electricity generation of any state). Rhode Island ranks seventh nationally in the number of RE-Powering projects and ninth in RE-Powering capacity.</p> <p>Rhode Island’s RE-Powering programs include a direct financial incentive (Brownfields Solar PV Program) with more than 40 MW of awarded capacity, a list of remediated sites with solar potential, solar siting guidance documents for local governments, and an inventory of local solar ordinances. The latter materials reflect the main role that local policies play in siting decisions.</p> <p>In implementing these programs, Rhode Island has coordinated among five of its state agencies, drawing from the respective energy, environmental, economic development, finance, and planning specialties of each.</p>		
Program Basics			
Direct Financial Incentives	<p>The Brownfields Solar PV Program within the Renewable Energy Fund (REF) has been making annual awards since 2019 and provides grants to eligible solar PV or solar PV combined with energy storage projects on brownfield sites:</p> <ul style="list-style-type: none"> • Award amounts are \$1.00/watt for projects directly owned by the site owner and 75 cents/watt for third party-owned projects: <ul style="list-style-type: none"> ○ The maximum award per project is \$250,000 for those directly owned by the host and \$175,000 for those that are third party-owned. 		https://commerceri.com/financing/renewable-energy-fund/

¹² Rhode Island Department of Environmental Management, *Rhode Island 2020 Forest Action Plan*, p. 30, <https://dem.ri.gov/sites/g/files/xkgbur861/files/programs/bnatres/forest/pdf/forest-action-plan/forest-action-plan.pdf>.

Topic	Rhode Island Data	Sources
	<ul style="list-style-type: none"> • 16 projects have received program awards, totaling more than \$3 million and with a total capacity of more than 40 MW. Not all awarded projects have been installed to date due largely to the long development times of utility-scale solar projects. • The Brownfields Solar PV Program is jointly managed by the Rhode Island Office of Energy Resources (OER) and the Rhode Island Commerce Corporation (RI Commerce): <ul style="list-style-type: none"> ○ The Rhode Island Department of Environmental Management (RIDEM) also plays a key role in the program by performing an initial eligibility review of applications: <ul style="list-style-type: none"> ▪ RIDEM checks that the site has a qualifying brownfield designation and that the site and its owner do not have past environmental compliance issues or other factors that may pose undue risks to the state. The RIDEM review is typically completed very quickly. • Funding from the Brownfields Solar PV Program can be combined with some, but not all, other state funding sources for brownfields and renewables: <ul style="list-style-type: none"> ○ “Projects [awarded from this program] cannot apply for both the Commercial REF program and the Brownfield PV Program. Projects cannot utilize REF funding with the Renewable Energy Growth (REG) program administered by [the utility] National Grid.” ○ Green energy projects may seek grants from the Brownfields Remediation and Economic Development Fund, which is supported through Rhode Island’s Green Economy Bonds. 	<p>https://commerceri.com/wp-content/uploads/2021/05/Brownfield-RFP-FINAL-4.28.20.pdf</p> <p>https://dem.ri.gov/sites/g/files/xkgbur861/files/programs/benviron/waste/pdf/bbrfp.pdf</p>

Topic	Rhode Island Data	Sources
	<p>Rhode Island recently enacted legislative changes to two major programs through which renewable energy projects are developed in the state—the Net Metering and Renewable Energy Growth Programs. Among other objectives, the legislation is intended to both reduce deforestation associated with solar project development and encourage renewable development on preferred site types, including landfills, brownfields, Superfund sites, gravel pits and quarries, roadway median strips, parking canopies, and rooftops.</p>	<p>http://webserver.rilegislature.gov/BillText/BillText23/HouseText23/H5853A.pdf</p> <p>http://webserver.rilegislature.gov/BillText/BillText23/SenateText23/S0684A.pdf</p>
<p>Site Identification & Development Support</p>	<p>Rhode Island has several databases, mapping tools, and analyses related to RE-Powering sites:</p> <ul style="list-style-type: none"> • RIDEM “maintains an inventory of sites and files in its various programs.” Many of these data inventories are general in nature (not specific to renewable energy); however, the first inventory below is specific to solar development and covers several hundred sites. A non-comprehensive list of site inventory names follows the potential solar source: <ul style="list-style-type: none"> ○ Remediated Sites: Potential Solar <ul style="list-style-type: none"> ▪ This is a list of sites that have been remediated under RIDEM’s Remediation Regulations. The inventory does not mean that all of the properties on the list are suitable for solar use; however, these are the properties where the remediation issues have been satisfied. ○ List of Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) and state sites in Rhode Island. ○ Waste Management Sites with Environmental Land Use Restrictions. ○ Active/Inactive Waste Management Facilities. • RIDEM publishes an Environmental Resource Map with numerous data layers: <ul style="list-style-type: none"> ○ This resource “is a ‘catch-all’ that includes most map layers of interest to [RIDEM] Customers and Business Partners.” 	<p>https://dem.ri.gov/environmental-protection-bureau/land-revitalization-and-sustainable-materials-management/inventories</p> <p>https://dem.ri.gov/sites/g/files/xkgbur861/files/programs/benviron/waste/inventories/rem-sites-potential-solar.pdf</p> <p>https://www.arcgis.com/home/item.html?id=87e104c8adb449eb9f905e5f18020de5#</p>

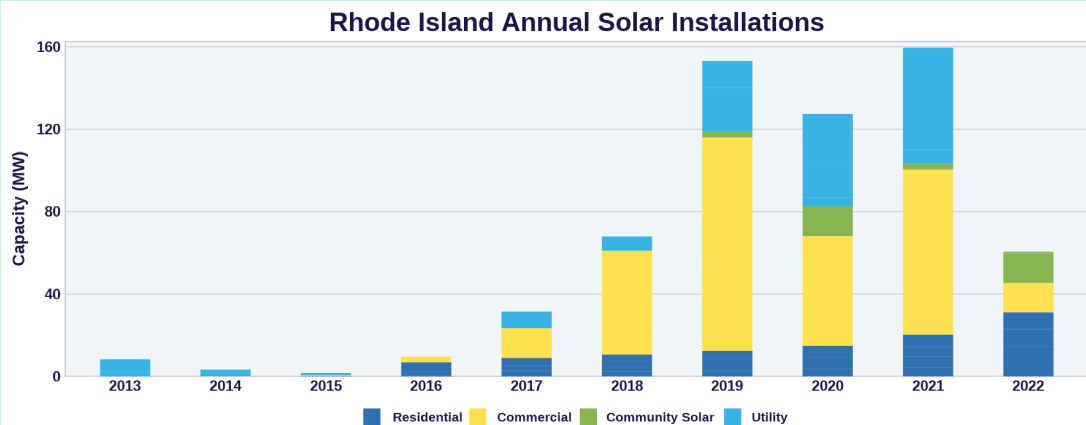
Topic	Rhode Island Data	Sources
	<ul style="list-style-type: none"> OER issued the <i>Solar Siting Opportunities for Rhode Island</i> report in 2020 that analyzed solar potential across six site types, including landfills and brownfields. The report includes maps and methodologies of landfill and brownfield solar potential by municipality. 	https://www.synapse-energy.com/sites/default/files/Solar_Siting_Opportunities_for_Rhode_Island_19-076.pdf
Education & Outreach	<p>The siting of renewable energy systems is a particularly important issue in Rhode Island due to its combination of significant policy commitments (100% renewables by 2033) and land constraints arising from population density, which is the second highest of any state. To help address siting, the Division of Statewide Planning and OER produced a series of siting and planning analyses and voluntary guidance documents related to solar¹³ in 2019:</p> <ul style="list-style-type: none"> An overview document (<i>Comprehensive Plans & Solar Energy Systems</i>) sets forth the state’s 13 principles for renewable energy siting, including “encourage renewable energy development on commercial and industrial zoned land, on already developed land, and in other locations with environmental alterations such as closed landfills, brownfields, parking lots, commercial and residential rooftops, sand and gravel pits.” 	https://governor.ri.gov/press-releases/governor-mckee-signs-historic-legislation-requiring-100-rhode-islands-electricity-be https://energy.ri.gov/renewable-energy/solar/solar-guidance-and-model-ordinance-development https://energy.ri.gov/sites/g/files/xkgbur741/files/documents/renewable/Comp_Plan_Solar_Siting_Report_Feb_2019.pdf

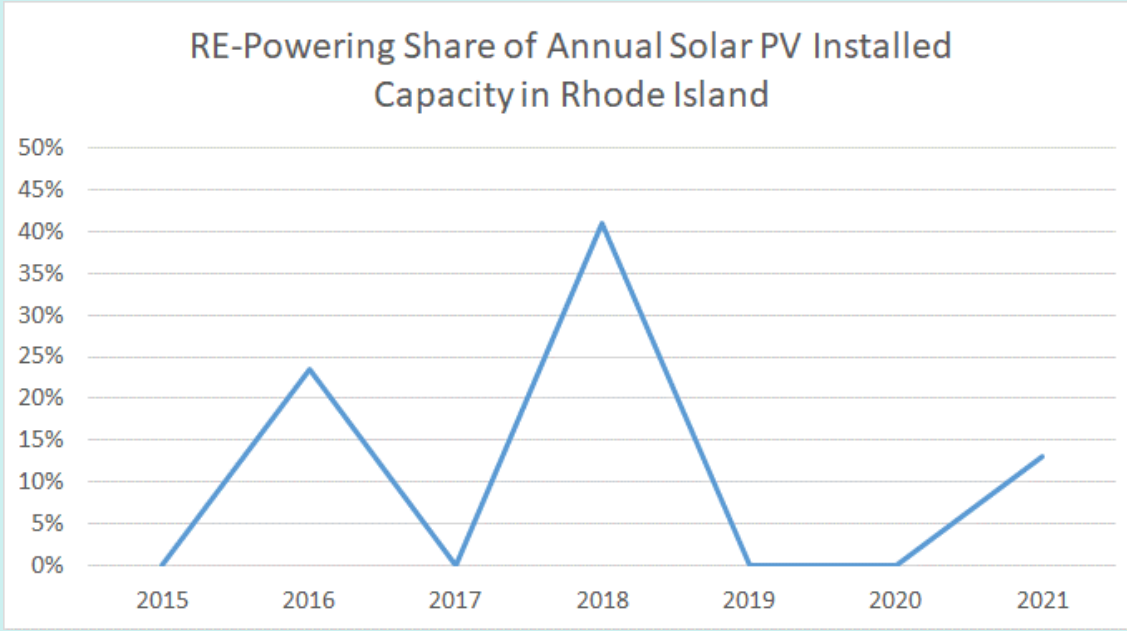
¹³ “Standards for wind energy systems were previously issued by the Statewide Planning Program and the Office of Energy Resources.” See State of Rhode Island, *Comprehensive Plans & Solar Energy Systems*, p. 4, https://energy.ri.gov/sites/g/files/xkgbur741/files/documents/renewable/Comp_Plan_Solar_Siting_Report_Feb_2019.pdf, and OER, *Rhode Island Land-Based Wind Siting Guidelines*, <https://planning.ri.gov/sites/g/files/xkgbur826/files/documents/LU/2019/OER-Wind-Siting-Guidelines-2017.pdf#:~:text=This%20document%20reviews%20major%20siting%20considerations%20for%20wind,the%20siting%20of%20wind%20turbines%20through%20zoning%20ordinances>.

Topic	Rhode Island Data	Sources
	<ul style="list-style-type: none"> • The state also published model local zoning and taxation ordinances for solar energy systems: <ul style="list-style-type: none"> ○ While these model ordinances can be instructive, and OER and the Division of Statewide Planning can also provide technical assistance on applying them to local circumstances, they are voluntary. “Rhode Island State Statute leaves solar development regulation to local governments; the State does not pre-empt or guide solar development except for enabling local governments to regulate through development regulations that must be consistent with their community comprehensive plan.” • To complement and add specificity to the model ordinances, the state provides an inventory of local solar ordinances in Rhode Island: <ul style="list-style-type: none"> ○ The inventory describes several attributes of 39 such local ordinances. 	<p>https://energy.ri.gov/sites/g/files/xkgbur741/files/documents/renewable/Renewable_Energy_Guidelines_Solar_Energy_Systems_Model_Templates_Zoning_and_Taxation_Feb_2019.pdf</p> <p>https://energy.ri.gov/sites/g/files/xkgbur741/files/documents/renewable/2021-RI-MuniSolar-Ordinances_1-19-2021%5B2%5D.pdf</p>
<p>General Brownfield Reuse</p>	<p>There are funding programs administered by RIDEM that can benefit renewable energy, as well as many other types of reuse of contaminated sites. To date, the RIDEM programs have been utilized for small to mid-size solar projects.</p> <ul style="list-style-type: none"> • The Brownfields Remediation and Economic Development Fund “provides assistance for remedial investigation, redevelopment, remedial design, construction of remedies, and other associated work” through the following: <ul style="list-style-type: none"> ○ Site preparation grants. ○ Redevelopment grants. <p>RIDEM also offers a Targeted Brownfields Assessment (TBA) Program to “fund Phase I and Phase II Environmental Site Assessments and Remedial” Action Work Plans.</p>	<p>https://dem.ri.gov/environmental-protection-bureau/land-revitalization-and-sustainable-materials-management/state-site</p> <p>https://dem.ri.gov/environmental-protection-bureau/land-revitalization-and-sustainable-materials-management/state-site</p>
<p>Interagency Coordination</p>	<p>There is significant multi-agency coordination in the state among OER, RI Commerce, RIDEM, Rhode Island Infrastructure Bank, and the Division of Statewide Planning to review and advance potential RE-Powering projects:</p>	

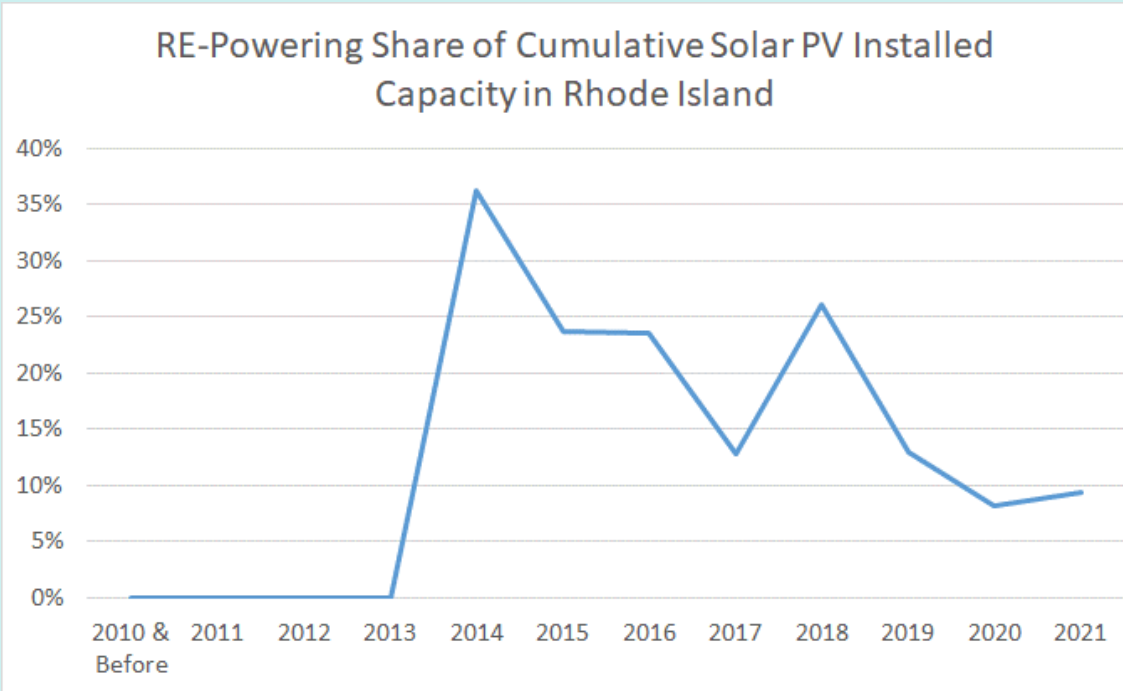
Rhode Island		
Topic	Data	Sources
	<ul style="list-style-type: none"> • OER, RI Commerce, and RIDEM formally collaborate in application reviews and administration of the Brownfields Solar PV Program within the REF that has awarded funds to more than 40 MW of RE-Powering projects. • OER and the Division of Statewide Planning collaborated on a series of solar siting publications. 	https://commerceri.com/financing/renewable-energy-fund/ https://energy.ri.gov/renewable-energy/solar/solar-guidance-and-model-ordinance-development
Program Best Practices/Success Factors		
Building on Existing Renewables Programs	The Brownfields Solar PV Program is part of the well-established Renewable Energy Fund, which has additional incentive programs applicable to other site types. Building on existing programs is a best practice for incentives that has been followed by other states to simplify and hasten program development and realize administrative efficiencies compared with having stand-alone incentive programs for RE-Powering sites.	
Consistent Emphasis on Land Reuse	<p>As the state with the second highest population density, Rhode Island has been attuned to land reuse as a key part of its strategy to meet its substantial renewable energy requirements while mitigating disruption to greenfield sites and forests. It has several statewide databases, mapping tools, and funding programs that can assist in redeveloping brownfields and other RE-Powering sites.</p> <p>The state’s emphasis on land reuse continues with the 2023 legislative updates to the Renewable Energy Growth and Net Metering Programs, providing preferences for several types of sites, including landfills, brownfields, and Superfund sites.</p>	
Attention to Local Issues	The municipalities of Rhode Island manage key zoning, taxation, and permitting activities related to renewable energy development. To assist local governments in navigating these activities, the state published voluntary, statewide guidance documents and offers technical assistance. Rhode Island also assembled a list of local solar ordinances meant to capture the diversity of approaches that municipalities are taking on siting issues. Close attention and deference to local issues is a characteristic of several successful RE-Powering state-level programs.	

Topic	Rhode Island Data		Sources
Extensive Interagency Coordination	Across multiple programs affecting renewables on RE-Powering sites, several Rhode Island agencies apply their specialties to increase the speed and quality of program outcomes. Extensive interagency coordination is a national best practice that has also been followed in Massachusetts, New Jersey, and New York, the states with the most RE-Powering projects.		
Achievements to Date			
RE-Powering Data on All Renewable Technologies (as of Oct. 2022)	<ul style="list-style-type: none"> • 14 operational projects (seventh highest total in the country). • 55 MW of capacity (ninth highest total in the country). <ul style="list-style-type: none"> ○ All of these projects are solar PV, except a 1.5 MW wind project. 		https://www.epa.gov/re-powering/re-powering-tracking-matrix
Comparison with Total Renewable Energy Capacity in the State	<p>As of 2021, Rhode Island had the following:</p> <ul style="list-style-type: none"> • 571 MW of solar PV capacity. • 103 MW of wind capacity. <p>As of 2021, RE-Powering projects (with 54 MW of solar capacity and 1.5 MW of wind capacity) represent the following:</p> <ul style="list-style-type: none"> • 9% of cumulative solar PV capacity statewide. • 1% of cumulative wind capacity statewide. 		https://www.eia.gov/electricity/state/rhodeisland/ https://www.epa.gov/re-powering/re-powering-tracking-matrix
Solar Deployment Trends in the State	<p>Overall, Rhode Island has the 31st most total solar capacity of any state. As context for that ranking, Rhode Island has the 46th most total electricity generation of any state.</p> <p>Rhode Island has reached its relatively high level of solar deployment through a variety of mechanisms, including a high Renewable Portfolio Standard (RPS), a widely used VNM program, and direct renewable incentive programs (such as REF and the Renewable Energy Growth Program) offering long-term, tariff-based offtake contracts.</p>		https://seia.org/states-map https://energy.ri.gov/renewable-energy/wind/renewable-energy-growth-program-reg-program https://energy.ri.gov/renewable-energy/wind/net-metering

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	<p>The remainder of this section contains five charts on deployment trends in Rhode Island. All but the first chart were developed by EPA and its contractors based on <i>RE-Powering Tracking Matrix</i> data and EIA overall statewide data.</p>																																																																			
	<p>Chart 1: Rhode Island has achieved high levels of solar deployment over the past 5 years given its population and land size. The commercial segment has been the largest part of the market, which may be driven, in part, by the state’s VNM law that allows government agencies, schools, hospitals, and nonprofits to install VNM projects of up to 10 MW of capacity.</p>  <table border="1"> <caption>Rhode Island Annual Solar Installations (MW)</caption> <thead> <tr> <th>Year</th> <th>Residential</th> <th>Commercial</th> <th>Community Solar</th> <th>Utility</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>2013</td> <td>0</td> <td>0</td> <td>0</td> <td>~10</td> <td>~10</td> </tr> <tr> <td>2014</td> <td>0</td> <td>0</td> <td>0</td> <td>~5</td> <td>~5</td> </tr> <tr> <td>2015</td> <td>0</td> <td>0</td> <td>0</td> <td>~2</td> <td>~2</td> </tr> <tr> <td>2016</td> <td>~5</td> <td>~5</td> <td>0</td> <td>~2</td> <td>~12</td> </tr> <tr> <td>2017</td> <td>~10</td> <td>~20</td> <td>0</td> <td>~5</td> <td>~35</td> </tr> <tr> <td>2018</td> <td>~15</td> <td>~40</td> <td>0</td> <td>~5</td> <td>~60</td> </tr> <tr> <td>2019</td> <td>~15</td> <td>~70</td> <td>0</td> <td>~15</td> <td>~100</td> </tr> <tr> <td>2020</td> <td>~15</td> <td>~45</td> <td>~10</td> <td>~30</td> <td>~100</td> </tr> <tr> <td>2021</td> <td>~20</td> <td>~70</td> <td>~5</td> <td>~60</td> <td>~160</td> </tr> <tr> <td>2022</td> <td>~30</td> <td>~10</td> <td>~10</td> <td>0</td> <td>~50</td> </tr> </tbody> </table>	Year	Residential	Commercial	Community Solar	Utility	Total	2013	0	0	0	~10	~10	2014	0	0	0	~5	~5	2015	0	0	0	~2	~2	2016	~5	~5	0	~2	~12	2017	~10	~20	0	~5	~35	2018	~15	~40	0	~5	~60	2019	~15	~70	0	~15	~100	2020	~15	~45	~10	~30	~100	2021	~20	~70	~5	~60	~160	2022	~30	~10	~10	0	~50	<p>Solar Energy Industries Association and Wood Mackenzie Power & Renewables, <i>U.S. Solar Market Insight 2022 Year in Review</i>, https://www.seia.org/state-solar-policy/rhode-island-solar</p>
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Topic	Rhode Island Data	Sources																
	<p>Chart 2: RE-Powering projects have represented a sizable share of the overall Rhode Island solar market several times in the past 6 years.¹⁴</p>  <table border="1"> <caption>RE-Powering Share of Annual Solar PV Installed Capacity in Rhode Island</caption> <thead> <tr> <th>Year</th> <th>Share (%)</th> </tr> </thead> <tbody> <tr> <td>2015</td> <td>0%</td> </tr> <tr> <td>2016</td> <td>23%</td> </tr> <tr> <td>2017</td> <td>0%</td> </tr> <tr> <td>2018</td> <td>41%</td> </tr> <tr> <td>2019</td> <td>0%</td> </tr> <tr> <td>2020</td> <td>0%</td> </tr> <tr> <td>2021</td> <td>13%</td> </tr> </tbody> </table>	Year	Share (%)	2015	0%	2016	23%	2017	0%	2018	41%	2019	0%	2020	0%	2021	13%	<p>https://www.epa.gov/re-powering/re-powering-tracking-matrix</p> <p>https://www.eia.gov/electricity/state/rhodeisland/</p>
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¹⁴ This chart begins in 2015 because there is a 2-year anomaly in how RE-Powering solar project installations in the state were recorded compared with how total solar installations in the state were recorded. The anomaly does not affect cumulative results; however, it would have presented an unusual pattern in the earlier years when the Rhode Island market had modest amounts of installed solar capacity.

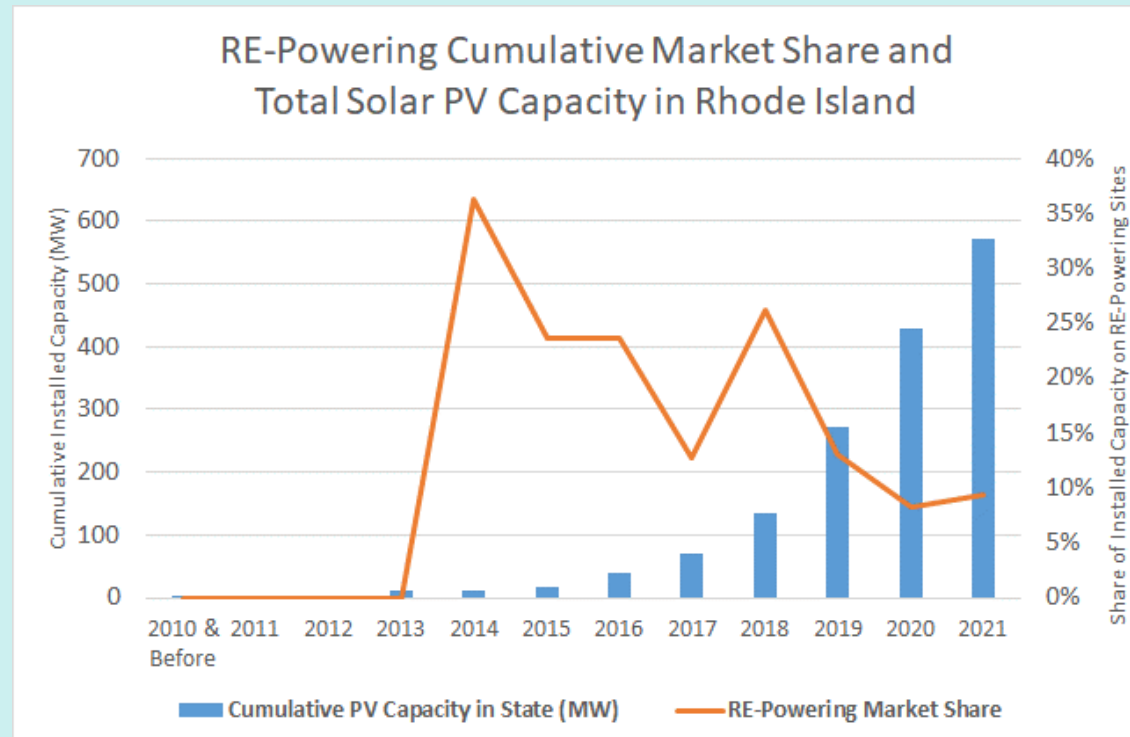
Topic	Rhode Island Data	Sources																										
	<p>Chart 3: This graph converts annual data into a cumulative trend, ending with RE-Powering projects representing 9% of cumulative statewide solar capacity in 2021. The RE-Powering solar market share has been at or above 8% in Rhode Island for all years since 2014.</p>  <table border="1"> <caption>RE-Powering Share of Cumulative Solar PV Installed Capacity in Rhode Island</caption> <thead> <tr> <th>Year</th> <th>Share (%)</th> </tr> </thead> <tbody> <tr><td>2010 & Before</td><td>0%</td></tr> <tr><td>2011</td><td>0%</td></tr> <tr><td>2012</td><td>0%</td></tr> <tr><td>2013</td><td>0%</td></tr> <tr><td>2014</td><td>36%</td></tr> <tr><td>2015</td><td>24%</td></tr> <tr><td>2016</td><td>24%</td></tr> <tr><td>2017</td><td>13%</td></tr> <tr><td>2018</td><td>26%</td></tr> <tr><td>2019</td><td>13%</td></tr> <tr><td>2020</td><td>8%</td></tr> <tr><td>2021</td><td>9%</td></tr> </tbody> </table>	Year	Share (%)	2010 & Before	0%	2011	0%	2012	0%	2013	0%	2014	36%	2015	24%	2016	24%	2017	13%	2018	26%	2019	13%	2020	8%	2021	9%	<p>https://www.epa.gov/re-powering/re-powering-tracking-matrix</p> <p>https://www.eia.gov/electricity/state/rhodeisland/</p>
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Rhode Island Data

Topic

Sources

Chart 4: This graph overlays the trend line of RE-Powering site market share (the same line seen in Chart 3) with bars showing cumulative solar PV capacity in the state on all types of sites. By 2021, 571 MW of solar had been installed in Rhode Island on all types of sites.



<https://www.epa.gov/re-powering/re-powering-tracking-matrix>

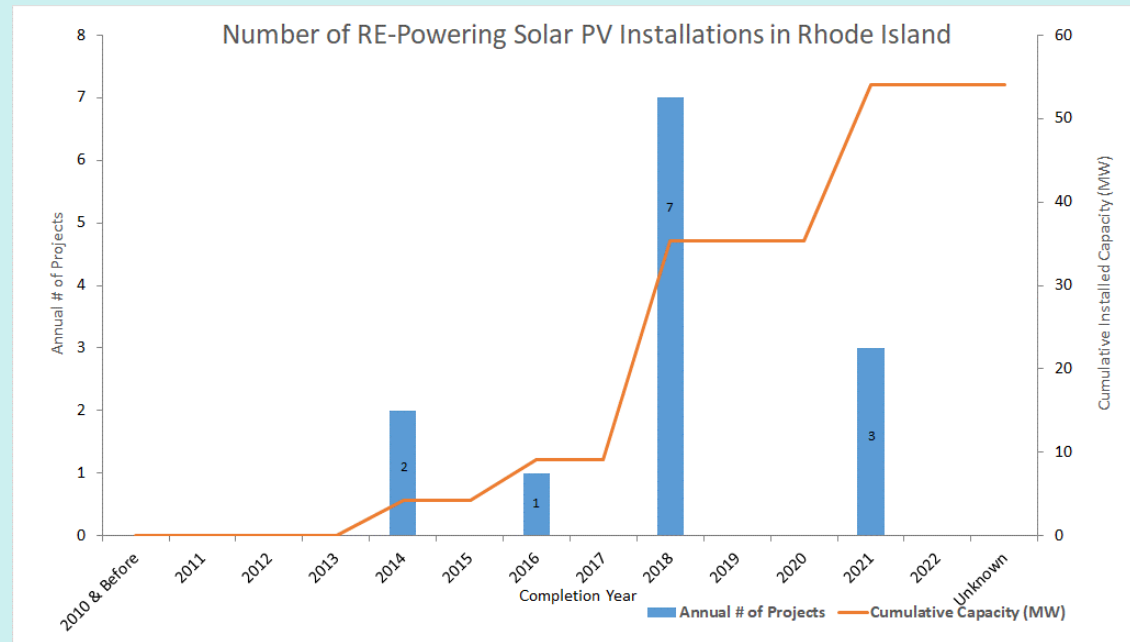
<https://www.eia.gov/electricity/state/rhodeisland/>

Rhode Island Data

Topic

Sources

Chart 5: The annual path taken in Rhode Island to reach its total of 54 MW of RE-Powering solar capacity through October 2022 is displayed.



<https://www.epa.gov/re-powering/re-powering-tracking-matrix>

Topic	Rhode Island Data		Sources
General Electricity Market Factors			
Power Prices	<p>Rhode Island has higher-than-average electricity prices that, other factors being equal, support renewable energy development. The national average retail electricity price paid by end-use consumers is 11.1 cents/kWh, while Rhode Island’s average price is 66% higher at 18.44 cents/kWh. Rhode Island’s retail electricity prices are the fifth highest of the 50 states.</p> <p>Wholesale electricity prices in the New England region containing Rhode Island average 10.1 cents/kWh, which is 35% above the national average of 7.5 cents/kWh.</p>		<p>Retail electricity prices (in 2021): https://www.eia.gov/electricity/state/</p> <p>Wholesale electricity prices in 2022 (generation-only electricity prices: EIA, <i>Annual Energy Outlook 2023</i>, Reference Case Electric Power Projections by Electricity Market Module Region): https://www.eia.gov/outlooks/aeo/tables_ref.php</p>
Renewable Portfolio Standard	<p>Rhode Island’s Renewable Energy Standard requires that 100% of electricity come from renewable sources by 2033.</p>		<p>http://webserver.rilin.state.ri.us/BillText/BillText22/HouseText22/H7277A.pdf</p>

Topic	Rhode Island Data	Sources
For More Information		
State Energy Agency POC	Shauna Beland, Director, Energy Programs and Policy, Rhode Island Office of Energy Resources: shauna.beland@energy.ri.gov	
State Environmental Agency POCs	<p>Ashley Blauvelt, Environmental Engineer IV, Office of Land Revitalization and Sustainable Materials Management, Rhode Island Department of Environmental Management: ashley.blauvelt@dem.ri.gov</p> <p>Mark Dennen, Supervising Environmental Scientist, Rhode Island Department of Environmental Management: mark.dennen@dem.ri.gov</p> <p>Kelly Owens, Associate Supervising Engineer, Office of Land Revitalization and Sustainable Materials Management, Rhode Island Department of Environmental Management: kelly.owens@dem.ri.gov</p>	
State Economic Development Agency POC	Karen Stewart, Renewable Energy Fund Program Manager, Rhode Island Commerce Corporation: karen.stewart@commerceri.com	

Topic	Colorado Data		Sources
Overview			
	<p>Colorado has deployed a substantial amount of renewable capacity to date, with almost 1,800 MW of solar and 5,000 MW of wind installed through 2021, to help meet the state’s 2020 RPS and pave the way for the state’s largest utility to meet its 100% clean energy by 2050 requirement.</p> <p>Between 2010 and 2017, nine RE-Powering solar projects were installed in Colorado, and RE-Powering projects represented roughly 1% to 5% of the state’s overall cumulative solar capacity during that period. Since then, no new RE-Powering projects have been recorded by EPA in the state. Potential barriers to new RE-Powering projects are local government restrictions and land use controls on RE-Powering sites, especially in rural areas of the state where it might be relatively easy for developers to lease unused greenfield sites. In addition, the general pressure on land use choices for renewables may be lower in Colorado than in the other states profiled in this document because Colorado has a relatively low population density (38th highest of all states), while the other profiled states vary from having the 1st to the 13th highest population density in the country.¹⁵</p> <p>However, Colorado does have RE-Powering programs available. For example, there is a mapping tool that integrates numerous factors relevant to solar and wind projects for sites that include landfills and mines. Colorado also has a substantial brownfield revolving loan fund and other general brownfield funding programs that could be used to support site redevelopment for renewables.</p>		
Program Basics			
Site Identification & Development Support	<p>The COLORADO BRIGHTFIELDS mapping application combines more than 100 datasets and includes data relevant to renewable energy redevelopment on more than 4,000 marginalized properties across 10 counties. “Former land uses may include mining, oil and gas processing, and landfills, as well as industrial, manufacturing, and commercial enterprises.” This mapping application is meant to simplify and accelerate the process of identifying marginalized sites that are candidates for renewable energy redevelopment.</p>		https://brightfields.colorado.gov/Brightfields/

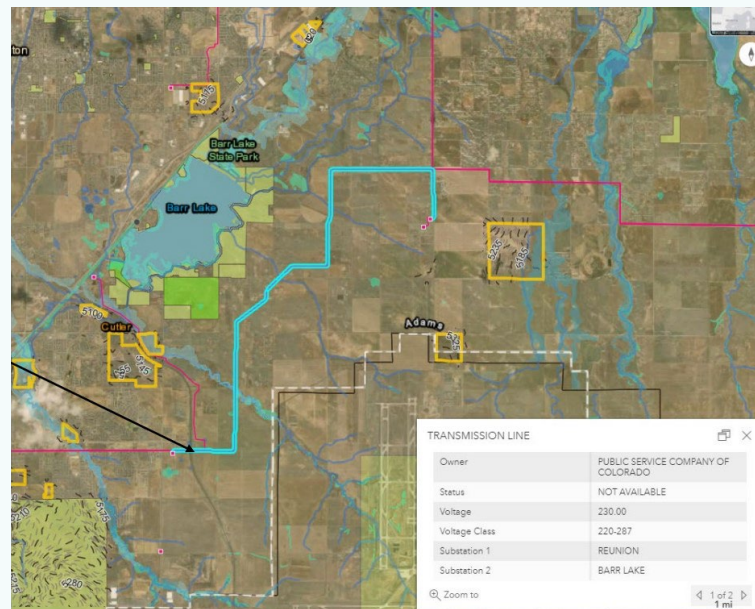
¹⁵ See U.S. Census Bureau, *Historical Population Density Data (1910–2020)*, <https://www.census.gov/data/tables/time-series/dec/density-data-text.html>.

Colorado Data

Topic

Sources

- In addition to a range of land parcel information, the COLORADO BRIGHTFIELDS mapping application includes many data fields specifically related to renewable energy development potential, such as the distance to the nearest electric substation and transmission line, solar resource, tree canopy, wind speed, and electric utility territory. An example from the COLORADO BRIGHTFIELDS mapping application, with details on the nearest transmission line to a land parcel, is found below.



- The COLORADO BRIGHTFIELDS mapping application was developed by a consortium, including the University of Denver and Colorado State University, with an advisory committee that includes representatives from the Colorado Department of Public Health and Environment (CDPHE), other state offices, the National Renewable Energy Laboratory, EPA, a local electric utility, a renewable industry association, and nonprofits.

https://coloradolab.org/wp-content/uploads/2021/05/Colorado-Brightfields-Report_Final.pdf

<https://brightfields.colorado.gov/Brightfields/assets/brightfields-user-guide.pdf>

https://coloradolab.org/wp-content/uploads/2021/05/Colorado-Brightfields-Report_Final.pdf

Topic	Colorado Data	Sources
	<p>In addition to the COLORADO BRIGHTFIELDS mapping application, Colorado offers several more general databases and mapping resources that cover RE-Powering sites but that are not specific to renewable energy potential. Many of these mapping resources are integrated into the COLORADO BRIGHTFIELDS mapping application.</p> <ul style="list-style-type: none"> • Colorado has maps or data layers for site types, including, but not limited to, municipal landfills, Superfund sites, uranium mill tailings, voluntary cleanup and redevelopment programs, and Resource Conservation and Recovery Act (RCRA) features. • Colorado also publishes a county-level list of brownfields. 	<p>https://cdphe.colorado.gov/hm-gis-data</p> <p>https://cdphe.colorado.gov/brownfields-listed-county</p>
<p>General Brownfield Reuse</p>	<p>Colorado provides several funding programs that support brownfield site reuses that include, but are not limited to, renewable energy. To date, these programs, three of which are summarized below, have not been extensively used for renewable projects:</p> <ul style="list-style-type: none"> • The Brownfields Revolving Loan Fund offers “financing with reduced interest rates, flexible loan terms and flexibility in acceptable forms of collateral. The fund also can provide cleanup grants to qualifying local governments and nonprofits.” • The Brownfields Tax Credit is “for qualifying entities that perform environmental remediation associated with capital improvements or redevelopment projects”: <ul style="list-style-type: none"> ○ In rural areas, the maximum tax credit is \$675,000, while the maximum tax credit is \$525,000 in non-rural areas. • Colorado also provides a program for Targeted Brownfields Assessment or Voluntary Cleanup Assistance to “help communities revitalize land perceived to be a drain on the local economy.” 	<p>https://cdphe.colorado.gov/brownfields</p> <p>https://www.chfainfo.com/getattachment/180b0d11-b9b4-4fef-8786-ed538fc631a2/BrownfieldsFlyer.pdf</p> <p>https://cdphe.colorado.gov/brownfields</p> <p>https://cdphe.colorado.gov/hm/co-brnfrlds-tax-credit-notif-reqs</p> <p>https://cdphe.colorado.gov/brownfields</p>

Topic	Colorado Data		Sources
Program Best Practices/Success Factors			
Build Programs by Extending Existing Data Sources	The COLORADO BRIGHTFIELDS mapping application draws from numerous site databases and maps that CDPHE and other agencies already maintain, thereby increasing the speed and lowering the cost and complexity of program creation.		
Achievements to Date			
RE-Powering Data on All Renewable Technologies (as of Oct. 2022)	<ul style="list-style-type: none"> • Nine operational projects (12th highest total in the country). • 9 MW of capacity (23rd highest total in the country). <ul style="list-style-type: none"> ○ All of these projects are solar PV. 		https://www.epa.gov/re-powering/re-powering-tracking-matrix
Comparison with Total Renewable Energy Capacity in the State	<p>As of 2021, Colorado had the following:</p> <ul style="list-style-type: none"> • 1,787 MW of solar PV capacity. • 4,994 MW of wind capacity. <p>As of 2021, RE-Powering projects (with 9 MW of capacity) represent the following:</p> <ul style="list-style-type: none"> • 1% of cumulative solar PV capacity statewide. • 0% of cumulative wind capacity statewide (there are no RE-Powering wind projects identified in the state). 		https://www.eia.gov/electricity/state/colorado/ https://www.epa.gov/re-powering/re-powering-tracking-matrix

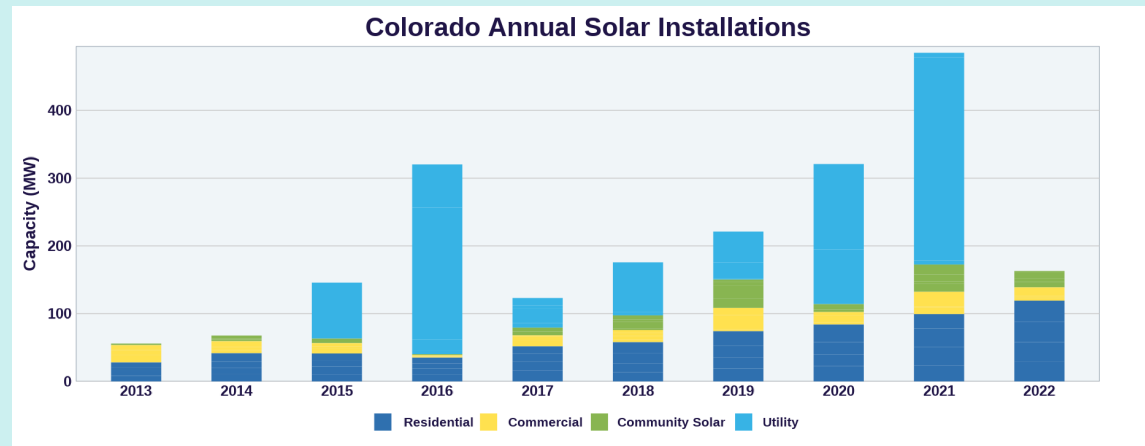
Topic	Colorado Data	Sources
Solar Deployment Trends in the State	<p>Overall, Colorado has the 13th most total solar capacity of any state. While the residential, commercial, and community solar segments have been relatively steady parts of the market for the past decade, the utility-scale market has been the biggest contributor to solar growth over the past 6 years. Many of the recent utility-scale solar projects in Colorado are very large and go beyond the typical capacity of RE-Powering solar projects.</p> <p>Colorado does have numerous ground-mounted projects of up to 5 MW, which is the most common size for RE-Powering solar projects as part of utility community solar programs. However, the emphasis on solar production per megawatt of capacity for developers in these programs creates some economic challenges for landfill-sited projects. That is because landfill projects can only accommodate single-axis tracking systems (which increase production compared with fixed-tilt systems) at additional ballast and engineering costs compared with greenfield projects.</p> <p>The remainder of this section contains five charts on deployment trends in Colorado. All but the first chart were developed by EPA and its contractors based on <i>RE-Powering Tracking Matrix</i> data and EIA overall statewide data.</p>	<p>https://www.eia.gov/electricity/state/colorado/</p> <p>https://seia.org/states-map</p>

Colorado Data

Topic

Sources

Chart 1: The Colorado solar market has recently been led by the utility-scale segment, although with dozens of megawatts of residential solar also deployed each year and relatively consistent community solar and commercial deployment. The varying pattern of utility-scale deployment is likely driven by the procurement schedules of major utilities in the state.



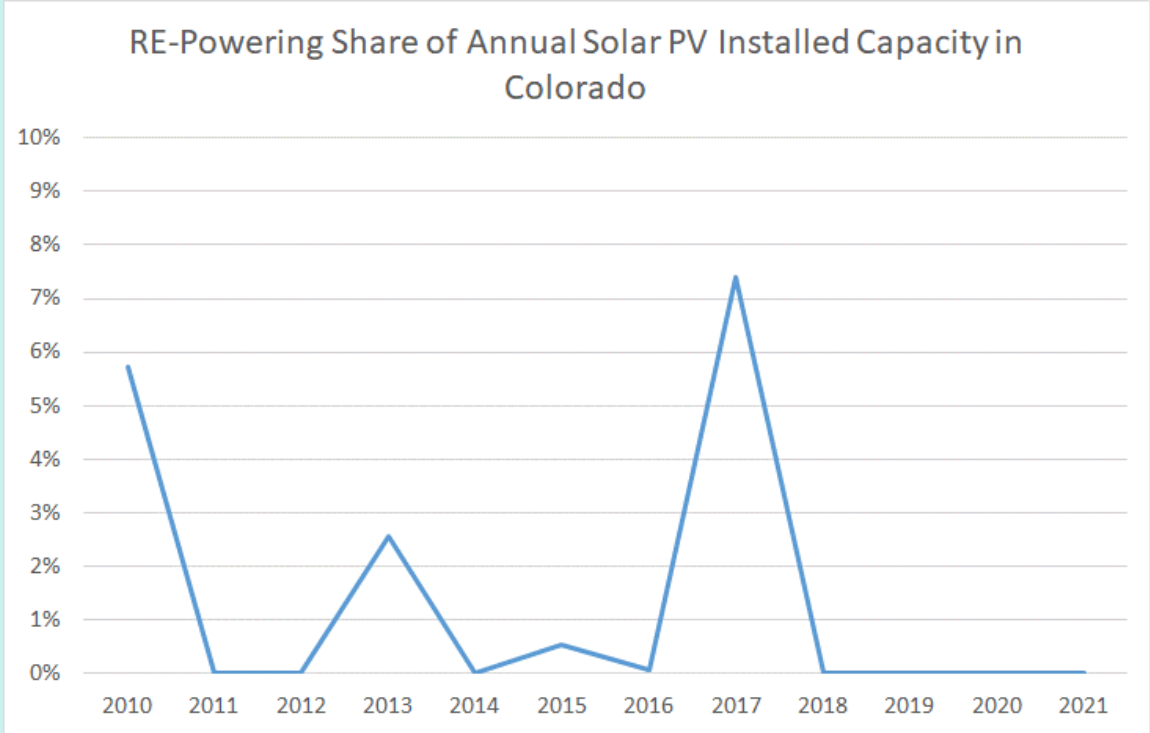
Solar Energy Industries Association and Wood Mackenzie Power & Renewables, *U.S. Solar Market Insight 2022 Year in Review*, <https://www.seia.org/state-solar-policy/colorado-solar>

Colorado Data

Topic

Sources

Chart 2: The share of RE-Powering project capacity within the overall Colorado solar market has varied widely from year to year, with a peak of 7% in 2017 and no new RE-Powering projects in the state in the past several years.



<https://www.epa.gov/re-powering/re-powering-tracking-matrix>

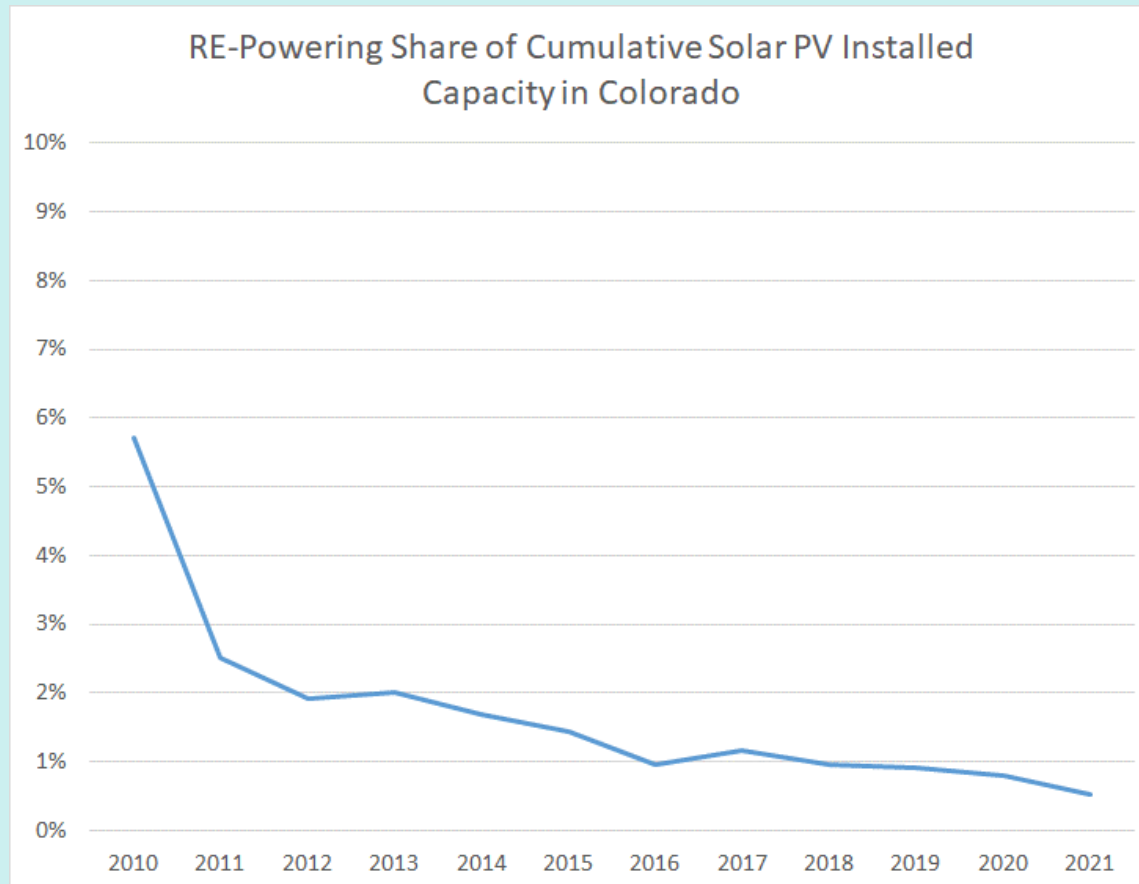
<https://www.eia.gov/electricity/state/colorado/>

Colorado Data

Topic

Sources

Chart 3: This graph converts annual data into a cumulative trend, ending with RE-Powering projects representing just under 1% of cumulative statewide solar capacity in 2021.



<https://www.epa.gov/re-powering/re-powering-tracking-matrix>

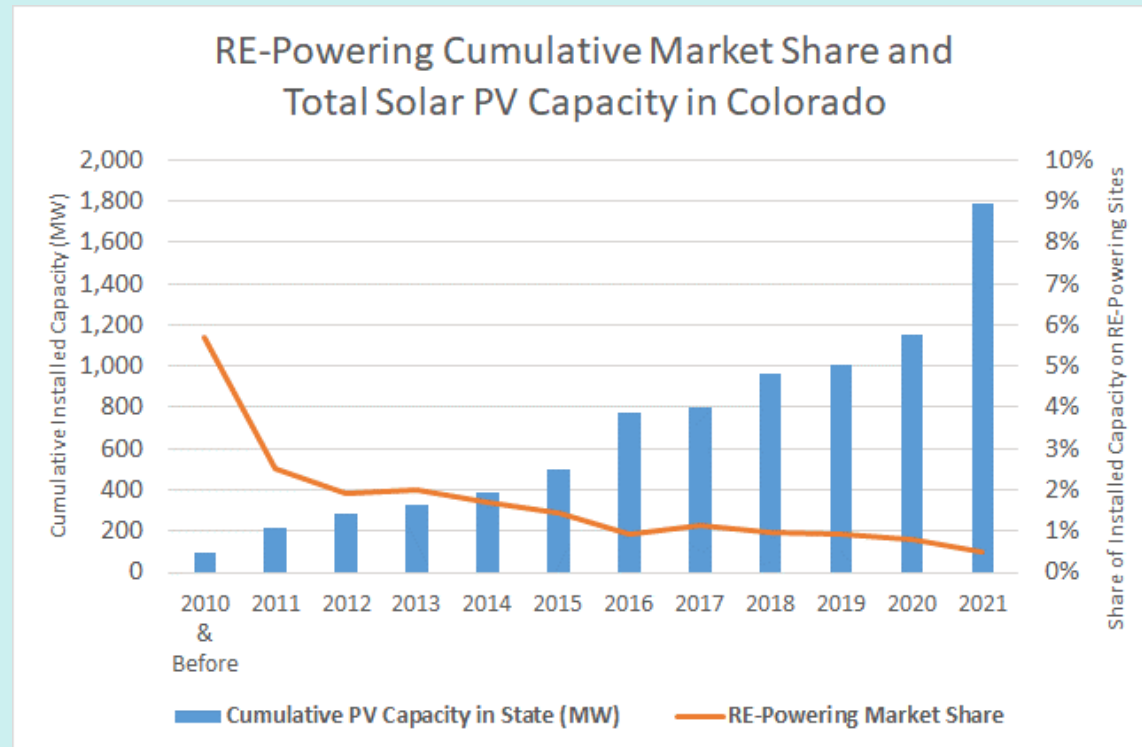
<https://www.eia.gov/electricity/state/colorado/>

Colorado Data

Topic

Sources

Chart 4: This graph overlays the trend line of RE-Powering site market share (the same line seen in Chart 3) with bars showing cumulative solar PV capacity in the state on all types of sites. By 2021, 1,787 MW of solar had been installed in Colorado on all types of sites.

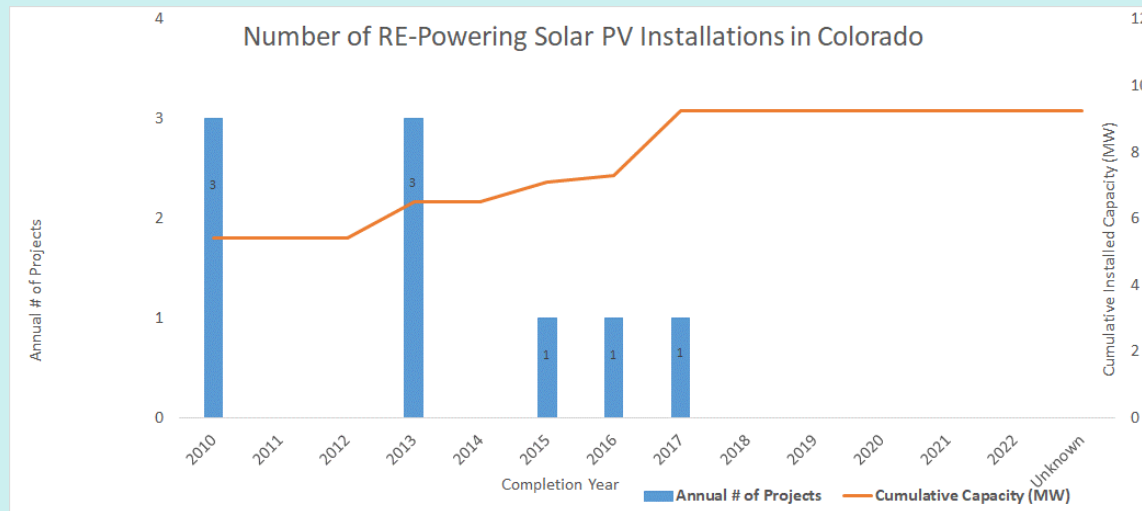


<https://www.epa.gov/re-powering/re-powering-tracking-matrix>

<https://www.eia.gov/electricity/state/colorado/>

Topic	Colorado Data	Sources
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Chart 5: The annual path taken in Colorado to reach its total of 9 MW of RE-Powering solar capacity through October 2022 is displayed. There have been no new RE-Powering projects in Colorado since 2017 that have been recorded by EPA.



<https://www.epa.gov/re-powering/re-powering-tracking-matrix>

General Electricity Market Factors

Power Prices

Colorado has slightly lower-than-average retail electricity prices. The national average **retail** electricity price paid by end-use consumers is 11.1 cents/kWh, while Colorado’s average price is 2% lower at 10.9 cents/kWh.

Wholesale electricity prices in the Western Electricity Coordinating Council/Rockies region containing Colorado average 6.2 cents/kWh, which is 17% below the national average of 7.5 cents/kWh.

Retail electricity prices (in 2021):
<https://www.eia.gov/electricity/state/>

Wholesale electricity prices in 2022 (generation-only electricity prices: EIA, *Annual Energy Outlook 2023*, Reference Case Electric Power Projections by Electricity Market Module Region):
https://www.eia.gov/outlooks/aeo/tables_ref.php

Colorado		
Topic	Data	Sources
Renewable Portfolio Standard	<p>Colorado has an RPS of 30% by 2020 for investor-owned utilities (and lower percentages for municipal and electric cooperative utilities). Colorado also requires that the largest investor-owned utility in the state that serves more than one-half of the state's population reach 100% electricity from clean energy sources by 2050.</p> <p>In addition, the state has a roadmap to 100% renewable electricity by 2040.</p>	<p>https://programs.dsireusa.org/system/program/detail/133/renewable-energy-standard</p> <p>https://leg.colorado.gov/sites/default/files/documents/2019A/bills/2019a_236_enr.pdf</p> <p>https://drive.google.com/file/d/1K_anGQpEf-edqhjz5b6D3LJlSfFV3mI3/view</p>
For More Information		
State Environmental Agency POC	<p>Doug Jamison, Superfund/Brownfields Unit Leader, State of Colorado, Department of Public Health and Environment: doug.jamison@state.co.us</p>	

Topic	Illinois Data	Sources
Overview		
	<p>Illinois is representative of several states that have existing projects on RE-Powering sites and have created or enlarged programs geared specifically toward increasing renewable energy capacity on RE-Powering sites. It is also representative in that its RE-Powering programs have been complementary pieces of broader legislation raising the state’s overall renewable energy goals.</p> <p>Illinois has new large solar projects on landfills and brownfields being developed that arose from the Future Energy Jobs Act (FEJA) of 2017, which is legislation that requires at least 2% of all new utility-scale solar output to come from brownfields. This legislation’s definition of “brownfields” also includes solid waste landfills. The first successful auction for these sites occurred in 2019.</p> <p>In September 2021, Illinois passed the Climate and Equitable Jobs Act (CEJA), which increased the minimum proportion of utility-scale solar on RE-Powering sites from 2% to 3%, expanded the definition of “eligible sites” to also include closed coal mines, and included other provisions encouraging the reuse of RE-Powering sites for renewables. These provisions of FEJA and CEJA have supported the development of community solar on brownfields beyond the utility-scale percentages noted above.</p> <p>In addition to the solar procurement requirements noted above, Illinois has databases, technical assistance, a brownfields loan program, and a climate-focused interagency collaboration mechanism that support the development of RE-Powering sites.</p>	
Program Basics		
Procurement Preferences or Requirements	<p>FEJA substantially updated the state’s RPS to include new procurement requirements for RECs specific to solar and wind projects, as well as other programs (e.g., the Adjustable Block Program [for distributed PV generation and community solar] and the Illinois Solar for All program [for low-income residential distributed generation and community solar]):</p> <ul style="list-style-type: none"> One FEJA procurement requirement was that at least 2% of new solar RECs must be obtained from brownfield sites (that are not part of FEJA’s community renewables projects). These RECs are obtained from utility-scale projects. 	<p>https://www.ilga.gov/legislation/publicacts/99/PDF/099-0906.pdf</p> <p>https://ipa.illinois.gov/renewable-resources.html</p> <p>https://illinoisabp.com/</p> <p>https://www.illinoissfa.com/</p>

Topic	Illinois Data	Sources
	<ul style="list-style-type: none"> • Eligible brownfields under FEJA were those at federally regulated Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) or RCRA sites, or Illinois Environmental Protection Agency (Illinois EPA)-regulated Site Remediation Program or Solid Waste Program sites. Therefore, sites typically thought of as “landfills” are included in FEJA’s definition of “brownfields.” • The initial FEJA brownfield solar procurements were not successful, so the Illinois Power Agency (IPA) made certain adjustments to the procurement guidelines and conducted another procurement event in July 2019. The 2019 procurement was approved by the Illinois Commerce Commission and successfully obtained RECs from two selected projects. • FEJA’s specific procurement requirement led to construction of large RE-Powering projects (for example, a 13 MW landfill solar project in Belleville, Illinois). <p>CEJA, passed on September 15, 2021, increased the share of new solar RECs that must come from brownfields from 2% to 3% and expanded the definition of “eligible sites” to include closed coal mines:¹⁶</p> <ul style="list-style-type: none"> • CEJA contains numerous provisions aimed at expanding the overall size of the renewable energy market in Illinois. • IPA hosted two procurements in 2022 and a summer 2023 procurement, all of which include brownfield solar projects: <ul style="list-style-type: none"> ○ The Spring 2022 procurement included one winning brownfield project of approximately 5 MW of capacity. ○ The Fall 2022 procurement included four winning brownfield projects, totaling approximately 28 MW of capacity. 	<p>https://www.ipa-energyrfp.com/wp-content/uploads/2023/04/Indexed-REC-RFP_Process-and-Rules_FINAL_28-APR-2023.pdf</p> <p>https://ipa-energyrfp.com/wp-content/uploads/2019/08/Summer-2019-Brownfield-RFP-Results-AUG-1-2019.pdf</p> <p>https://www.aes.com/belleville-landfill-project</p> <p>https://ilga.gov/legislation/publicacts/102/PDF/102-0662.pdf</p> <p>https://www.illinois.gov/news/press-release.23893.html</p> <p>https://ipa-energyrfp.com/wp-content/uploads/2022/05/5-12-22-Public-Notice-of-May-2022-Wind-Solar-and-Brownfield-Indexed-REC-Procurement-Results.pdf</p> <p>https://ipa-energyrfp.com/wp-content/uploads/2022/12/Fall-2022-Indexed-REC-RFP-Results-15-Dec-2022-posted.pdf</p>

¹⁶ CEJA defines “eligible parcels” as “located at the site of a coal mine that has permanently ceased coal production, permanently halted any re-mining operations, and is no longer accepting any coal combustion residues; has both completed all clean-up and remediation obligations under the federal Surface Mining and Reclamation Act of 1977 and all applicable Illinois rules.” See CEJA, <https://ilga.gov/legislation/publicacts/102/PDF/102-0662.pdf>.

Topic	Illinois Data	Sources
	<ul style="list-style-type: none"> ○ The Summer 2023 procurement included three winning brownfield projects, totaling approximately 39 MW of capacity. • CEJA also included provisions for the selection of community solar projects that consider site location. The “built environment” scoring criteria for the Traditional Community Solar program includes points for proposed projects located on brownfields, contaminated lands, and other preferred sites, such as rooftops. • In addition, although not under a specific requirement or preference program based on site type, two community solar projects located on landfills, totaling about 4 MW of capacity, have been developed under the Illinois Solar for All program. The Solar for All program supports solar for low-income households and communities. 	<p>https://www.ipa-energyrfp.com/wp-content/uploads/2023/06/Summer-2023-Indexed-REC-RFP-Results-29-Jun-2023.pdf</p> <p>https://illinoisshines.com/wp-content/uploads/2022/10/Final-TCS-Scoring-Guidelines-7-Oct-2022.pdf</p> <p>https://www.illinoissfa.com/app/uploads/2022/02/Selected-Project-Summaries.pdf</p>
Site Identification & Development Support	<p>The Illinois EPA maintains three databases of RE-Powering sites:</p> <ul style="list-style-type: none"> • Site Remediation Program: <ul style="list-style-type: none"> ○ “Identifies the status of all voluntary remediation projects administered through the Pre-Notice Site Cleanup Program (1989 to 1995) and the Site Remediation Program (1996 to the present).” This database has 6,489 entries. • Leaking Underground Storage Tanks: <ul style="list-style-type: none"> ○ “Identifies the status of all Illinois (Leaking Underground Storage Tanks) incidents reported to the Illinois Emergency Management Agency and to the Illinois EPA.” This database has 30,372 entries. • State Response Action Program: <ul style="list-style-type: none"> ○ “Identifies the status of all sites under the responsibility of the Illinois EPA’s State Sites Unit.” This database has 531 entries. 	<p>https://www2.illinois.gov/epa/topics/cleanup-programs/bol-database/Pages/default.aspx</p>

Topic	Illinois Data	Sources
	<p>While Illinois does not have renewable energy-specific databases or maps of its RE-Powering sites, these overall RE-Powering site databases can help renewable developers identify locations and owners for reuse.</p> <p>Technical assistance: While the Illinois EPA does not have a technical assistance program specifically for renewable energy reuse, agency brownfields representatives do meet with city leaders to review cleanup options, help cities secure financial assistance, and guide potential loan recipients through redevelopment. Agency staff will also meet with renewable project developers to explain the requirements (e.g., how a proposed renewable system design might interact with ongoing maintenance and remediation processes):</p> <ul style="list-style-type: none"> • Meetings with renewable developers often pertain to the process for obtaining “No Further Remediation (NFR)” letters. An “NFR letter acknowledges that a site owner or operator has satisfied the respective Bureau of Land statutory and regulatory requirements.” • In 2018, the Illinois EPA issued its first permit for a solar landfill project. This was a 2.4 MW project in Zion: <ul style="list-style-type: none"> ○ The agency has issued permits for additional solar development projects atop nonhazardous solid waste landfills since that time. The permits include those for the Freeport Municipal Landfill and Belvidere Municipal Landfill in 2019 and the Belleville Landfill in 2020. 	<p>https://epa.illinois.gov/topics/cleanup-programs/brownfields.html</p> <p>https://epa.illinois.gov/topics/cleanup-programs/taco/factsheets/no-further-remediation-letters.html#faq-what-is-a-no-further-remediation-letter-faq</p> <p>https://www.chicagotribune.com/suburbs/lake-county-news-sun/ct-ins-zion-solar-project-st-0905-20200904-o45k4wfstbh2fpf4mxisobslye-story.html</p>
<p>Education & Outreach</p>	<p>Illinois EPA maintains a Renewable Energy Development on Former Landfills and Cleanup Sites webpage with links to numerous federal and state government and trade association information sources:</p> <ul style="list-style-type: none"> • Beyond this webpage dedicated to renewable energy reuse, there are numerous Illinois EPA webpages for general landfill, brownfield, and mine site programs and activities that can be applicable to renewable reuse, as well as other types of reuse. 	<p>https://epa.illinois.gov/topics/energy/renewable-energy/renewable-energy-development-landfills-cleanup.html</p>

Topic	Illinois Data	Sources
<p>General Brownfield Reuse</p>	<p>“The Illinois Brownfields Redevelopment Loan Program offers low interest loans to support efforts by local governments and private parties to clean up brownfields sites that have already been assessed for contamination. These cleanups take place under the Illinois EPA’s voluntary Site Remediation Program”:</p> <ul style="list-style-type: none"> • “Loans may be used to pay for limited site investigation and demolition and remediation costs at brownfields sites.” • The maximum loan amount for any single application is \$500,000 and \$1 million per project. • This program is not designed specifically for renewable energy development; however, that is one type of reuse that it can support. 	<p>https://epa.illinois.gov/topics/cleanup-programs/brownfields.html</p> <p>https://www2.illinois.gov/epa/Documents/epa-forms/land/brownfields/brownfield-loan-app.pdf</p>
<p>Interagency Coordination</p>	<p>In conjunction with Illinois joining the U.S. Climate Alliance in 2019, the Illinois Climate Working Group was created to increase data and programmatic coordination among state partners to reduce greenhouse gas emissions and advance Illinois’ attainment of its U.S. Climate Alliance commitments.</p> <ul style="list-style-type: none"> • The Illinois EPA was the organizing agency of 17 agencies that are members of the Illinois Climate Working Group. This working group is not a public body under the Illinois Open Meetings Act. • The working group’s broad participation and goals, as well as the role of the Illinois EPA in the group, are consistent with expanding RE-Powering site reuse for renewables. 	

Topic	Illinois Data	Sources
Program Best Practices/Success Factors		
Need for Flexibility in Implementing Procurement Requirements	<p>The initial FEJA brownfield solar procurements were not successful, so the IPA made modifications and successfully obtained RECs from two large projects in 2019. The State of Illinois also expanded the definition of “brownfields” to include closed mines under the CEJA legislation, and IPA conducted two 2022 procurements and a 2023 procurement to seek additional brownfield RECs. The procurements conducted under the provisions of CEJA have been successful.</p> <p>Especially in markets where RE-Powering projects are less common, there is a need to adapt program implementation as renewable developers, program administrators, site owners, and other stakeholders become more knowledgeable about local costs, permitting processes, and timelines.</p>	
Broad Political & Stakeholder Support	<p>Illinois passed two significant legislative bills in the past 6 years updating the state’s long-run clean energy plans. The provisions in the bills that explicitly addressed RE-Powering sites warranted attention from many stakeholders as cost, land use, environmental justice, and decarbonization objectives were balanced.</p>	
Existence of Complementary Programs	<p>Although Illinois does not appear to have programs that focus exclusively on placing renewables on RE-Powering sites, apart from its solar procurement requirements and an educational webpage, it does have several programs addressing brownfield and landfill reuse more broadly that can be readily utilized by developers and communities interested in renewables. The existence of these complementary programs is a hallmark of states that have grown their RE-Powering capacity.</p>	

Topic	Illinois Data	Sources
Achievements to Date		
RE-Powering Data on All Renewable Technologies (as of Oct. 2022)	<ul style="list-style-type: none"> • Seven operational projects (13th highest total in the country). <ul style="list-style-type: none"> ○ Six solar PV projects and a 1 MW wind project. • 37 MW of capacity (12th highest total in the country). 	https://www.epa.gov/re-powering/re-powering-tracking-matrix
Comparison with Total Renewable Energy Capacity in the State	<p>As of 2021, Illinois had the following:¹⁷</p> <ul style="list-style-type: none"> • 1,424 MW of solar PV capacity. • 7,180 MW of wind capacity. <p>As of 2021, RE-Powering projects (with 33 MW of solar capacity and 1 MW of wind capacity) represent the following:</p> <ul style="list-style-type: none"> • 2% of cumulative solar PV capacity statewide. • Less than 0.1% of cumulative wind capacity statewide. 	https://www.eia.gov/electricity/state/illinois/ https://www.epa.gov/re-powering/re-powering-tracking-matrix

¹⁷ Significant amounts of additional solar capacity were installed in Illinois in 2022; data in this section for Illinois and the other profiled states are from 2021 for consistency with the most recent EIA State Electricity Profiles (<https://www.eia.gov/electricity/state/>).

Topic	Illinois Data	Sources
Solar Deployment Trends in the State	<p>Illinois’ solar market began growing rapidly in 2019 as the policies enacted in FEJA, which took effect in 2017, resulted in new installed solar projects. Almost as much new solar capacity was installed in Illinois in 2019 as in all prior years combined.¹⁸ FEJA has already incentivized the development of more than 35,000 renewable energy projects between all associated programs and procurements.</p> <p>FEJA contained a requirement that at least 2% of new utility-scale solar output be from brownfields (including landfills in its definition of “brownfields”). Additional solar projects on RE-Powering sites are being developed in the state’s new community solar program, without a specific requirement that such sites be used.</p> <p>CEJA, passed in September 2021, expands the FEJA brownfields solar requirement from 2% to 3%, makes former coal mine sites eligible within that requirement, and includes several provisions to grow the overall Illinois clean energy market, including a significant increase in the RPS from 25% in 2025 to 50% by 2040. CEJA advances equity goals for brownfield solar projects by requiring that these projects participate in the Equity Accountability System.</p> <p>Overall, Illinois has the 15th most total solar capacity of any state. The remainder of this section contains four charts on deployment trends in Illinois. All but the first chart were developed by EPA and its contractors based on <i>RE-Powering Tracking Matrix</i> data and EIA overall statewide data.</p>	<p>https://www.eia.gov/electricity/state/illinois/</p> <p>https://ipa.illinois.gov/content/dam/soi/en/web/ipa/documents/ipafactsheet_publicact102-0662_12122.pdf</p> <p>https://seia.org/states-map</p>

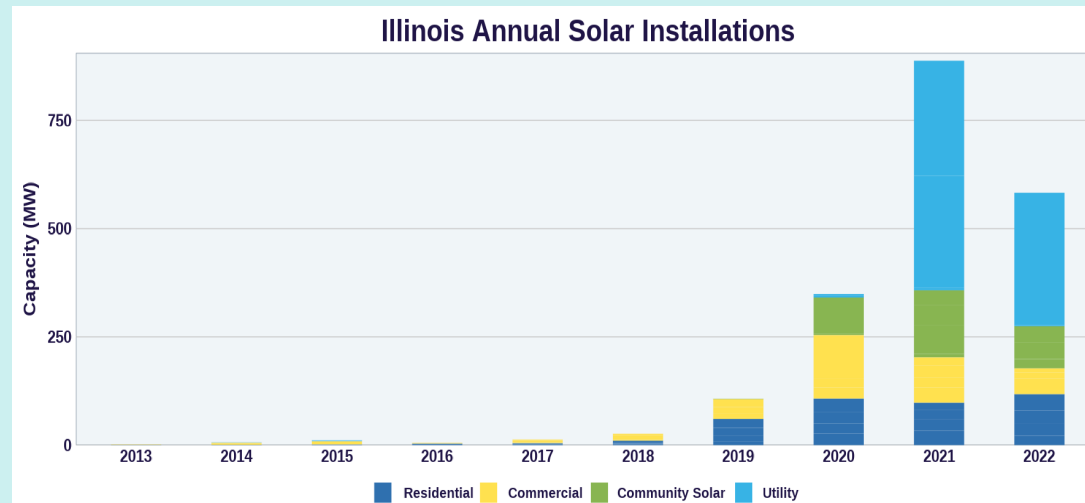
¹⁸ FEJA also contributed to strong growth in the Illinois utility-scale wind market.

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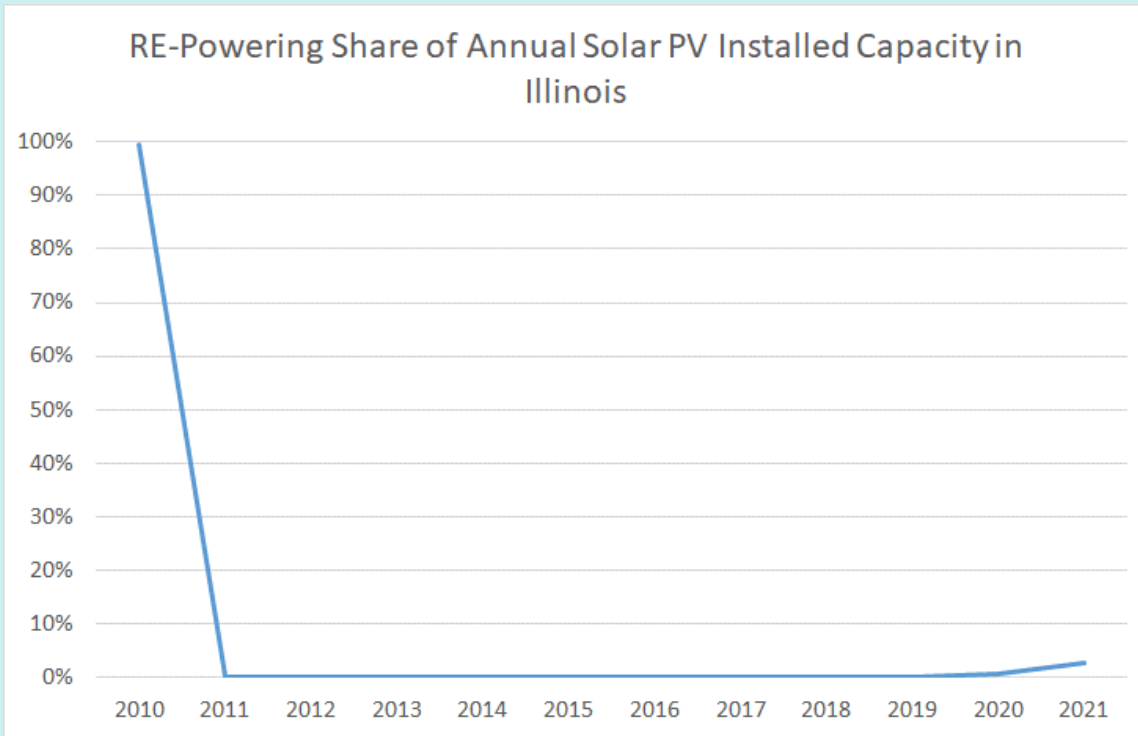
Illinois Data

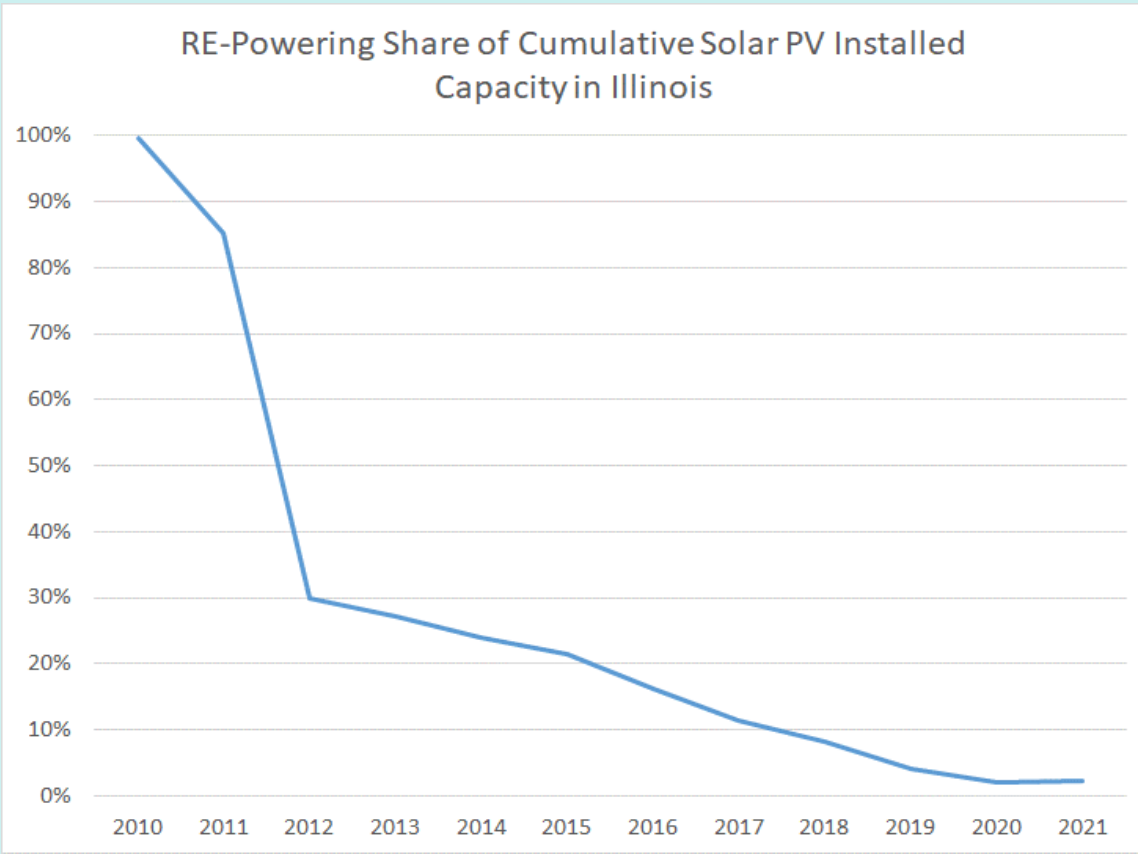
Sources

Chart 1: Solar deployment was at relatively low levels in Illinois until FEJA, passed in 2017, began to affect solar installations shortly thereafter. Utility-scale projects often have 3-year or longer lead times, and the utility-scale segment is expected to continue being a significant share of the market in the near future.



Solar Energy Industries Association and Wood Mackenzie Power & Renewables, *U.S. Solar Market Insight 2022 Year in Review*, <https://www.seia.org/state-solar-policy/illinois-solar>

Topic	Illinois Data	Sources																										
	<p>Chart 2: The first large-scale solar project in Illinois was installed by the utility Exelon in 2010 on a brownfield site in the Chicago area, leading to 100% market share for RE-Powering sites at that time. No additional RE-Powering solar projects were installed between 2011 and 2019 in the state, one new solar project on a RE-Powering site was installed in 2020, and three were installed in 2021, based on EPA’s records.</p>  <table border="1"> <caption>RE-Powering Share of Annual Solar PV Installed Capacity in Illinois</caption> <thead> <tr> <th>Year</th> <th>Share (%)</th> </tr> </thead> <tbody> <tr> <td>2010</td> <td>100</td> </tr> <tr> <td>2011</td> <td>0</td> </tr> <tr> <td>2012</td> <td>0</td> </tr> <tr> <td>2013</td> <td>0</td> </tr> <tr> <td>2014</td> <td>0</td> </tr> <tr> <td>2015</td> <td>0</td> </tr> <tr> <td>2016</td> <td>0</td> </tr> <tr> <td>2017</td> <td>0</td> </tr> <tr> <td>2018</td> <td>0</td> </tr> <tr> <td>2019</td> <td>0</td> </tr> <tr> <td>2020</td> <td>~0.5</td> </tr> <tr> <td>2021</td> <td>~2</td> </tr> </tbody> </table>	Year	Share (%)	2010	100	2011	0	2012	0	2013	0	2014	0	2015	0	2016	0	2017	0	2018	0	2019	0	2020	~0.5	2021	~2	<p>https://www.epa.gov/re-powering/re-powering-tracking-matrix</p> <p>https://www.eia.gov/electricity/state/illinois/</p>
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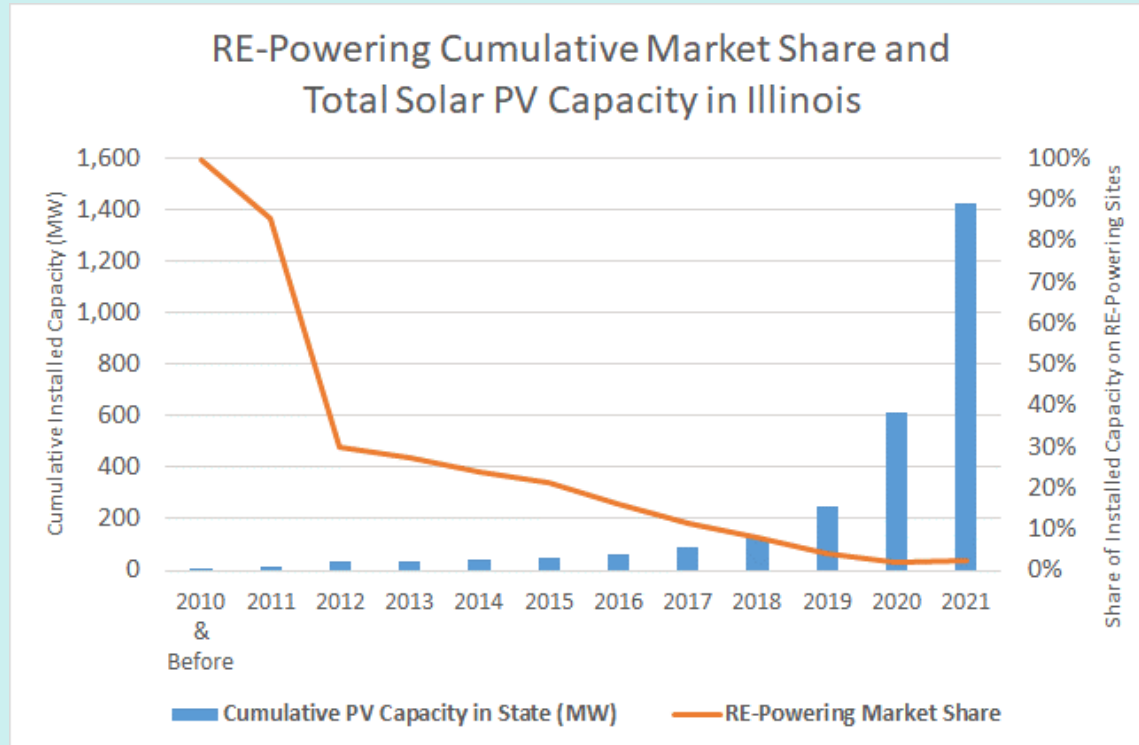
Topic	Illinois Data	Sources																										
	<p>Chart 3: This graph converts annual data into a cumulative trend, ending with RE-Powering projects representing approximately 2% of cumulative statewide solar capacity in 2021. The trendline declined between 2011 and 2019 because no new RE-Powering projects were recorded during those years when the state’s overall solar market grew.</p>  <p>The graph shows the percentage share of RE-Powering projects within the total cumulative solar PV capacity in Illinois from 2010 to 2021. The share starts at 100% in 2010, drops to about 85% in 2011, then sharply to 30% in 2012. It continues a steady decline to approximately 2% by 2021.</p> <table border="1"> <caption>RE-Powering Share of Cumulative Solar PV Installed Capacity in Illinois</caption> <thead> <tr> <th>Year</th> <th>Share (%)</th> </tr> </thead> <tbody> <tr><td>2010</td><td>100</td></tr> <tr><td>2011</td><td>85</td></tr> <tr><td>2012</td><td>30</td></tr> <tr><td>2013</td><td>28</td></tr> <tr><td>2014</td><td>25</td></tr> <tr><td>2015</td><td>22</td></tr> <tr><td>2016</td><td>18</td></tr> <tr><td>2017</td><td>12</td></tr> <tr><td>2018</td><td>8</td></tr> <tr><td>2019</td><td>4</td></tr> <tr><td>2020</td><td>2</td></tr> <tr><td>2021</td><td>2</td></tr> </tbody> </table>	Year	Share (%)	2010	100	2011	85	2012	30	2013	28	2014	25	2015	22	2016	18	2017	12	2018	8	2019	4	2020	2	2021	2	<p>https://www.epa.gov/re-powering/re-powering-tracking-matrix</p> <p>https://www.eia.gov/electricity/state/illinois/</p>
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2021	2																											

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Data

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Chart 4: This graph overlays the trend line of RE-Powering site market share (the same line seen in Chart 3) with bars showing cumulative solar PV capacity in the state on all types of sites. By 2021, 1,424 MW of solar had been installed in Illinois on all types of sites.



<https://www.epa.gov/re-powering/re-powering-tracking-matrix>

<https://www.eia.gov/electricity/state/illinois/>

Topic	Illinois Data	Sources
General Electricity Market Factors		
Power Prices	<p>Illinois has lower-than-average retail electricity prices. The national average retail electricity price paid by end-use consumers is 11.1 cents/kWh, while Illinois' average price is 9% lower at 10.14 cents/kWh. Illinois' retail electricity prices are the 25th highest of the 50 states.</p> <p>Wholesale electricity prices in the PJM/Commonwealth Edison area around Chicago average 6.9 cents/kWh, and they average 7.2 cents/kWh in the Midcontinent Independent System Operator Central Region, which is pertinent to much of the rest of Illinois. These levels are approximately 8% and 4%, respectively, below the national average of 7.5 cents/kWh.</p>	<p>Retail electricity prices (in 2021): https://www.eia.gov/electricity/state/</p> <p>Wholesale electricity prices in 2022 (generation-only electricity prices: EIA, Annual Energy Outlook 2023, Reference Case Electric Power Projections by Electricity Market Module Region): https://www.eia.gov/outlooks/aeo/tables_ref.php</p>
Clean Energy Standard	Under CEJA, signed in September 2021, Illinois has a 40% by 2030 and 50% by 2040 renewable energy standard.	https://www.illinois.gov/news/press-release.23893.html
For More Information		
State Power Agency POC	Megha Hamal, Chief Communications and Strategy Officer, Illinois Power Agency: ¹⁹ megha.hamal@illinois.gov	
State Environmental Agency POC	Heather Nifong, Associate Director, Illinois Environmental Protection Agency: heather.nifong@illinois.gov	

¹⁹ The Illinois Power Agency is an independent state agency created in 2007 to prepare annual electricity procurement plans and manage power purchases on behalf of residential and small commercial customers of Illinois electric utilities, implement the state's RPS, drive the development of renewable energy, and develop and implement other procurement plans to support at-risk nuclear plants.

List of Acronyms and Abbreviations

AC	Alternating Current
Benefit Act	Accelerated Renewable Energy Growth and Community Benefit Act (New York)
CDPHE	Colorado Department of Public Health and Environment
CEJA	Climate and Equitable Jobs Act (Illinois)
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERP	Clean Energy Results Program
Climate Act	Climate Leadership and Community Protection Act (New York)
DC	Direct Current
DOER	Massachusetts Department of Energy Resources
EIA	U.S. Energy Information Administration
EPA	U.S. Environmental Protection Agency
FEJA	Future Energy Jobs Act (Illinois)
Illinois EPA	Illinois Environmental Protection Agency
IPA	Illinois Power Agency
kWh	Kilowatt-hour
LMI	Low- and moderate-income
MassDEP	Massachusetts Department of Environmental Protection
MOU	Memorandum of Understanding
MW	Megawatt
MWh	Megawatt-hour
NEPA	National Environmental Policy Act
NFR	No Further Remediation
NIMBY	Not In My Backyard
NJ SREC-II	Solar Renewable Energy Certificate generated by New Jersey's SuSI Program
NJBPU	New Jersey Board of Public Utilities
NJDEP	New Jersey Department of Environmental Protection
NJEDA	New Jersey Economic Development Authority
NJIT	New Jersey Institute of Technology

NYSDEC	New York State Department of Environmental Conservation
NYSERDA	New York State Energy Research and Development Authority
OER	Rhode Island Office of Energy Resources
OPPN	Office of Permitting and Project Navigation (in the New Jersey Department of Environmental Protection)
PILOT	Payment in Lieu of Taxes
PSE&G	Public Service Electric & Gas
PV	Photovoltaic
RCRA	Resource Conservation and Recovery Act
REC	Renewable Energy Certificate
REF	Renewable Energy Fund (in Rhode Island)
RE-Powering	RE-Powering America's Land Initiative
RI Commerce	Rhode Island Commerce Corporation
RIDEM	Rhode Island Department of Environmental Management
RPS	Renewable Portfolio Standard
SEQRA	State Environmental Quality Review Act
SMART	Solar Massachusetts Renewable Target
SREC	Solar Renewable Energy Certificate
SREC-I	Solar Renewable Energy Certificate generated by the first solar RPS carve-out program in Massachusetts and an abbreviated name for the program itself
SREC-II	Solar Renewable Energy Certificate generated by the second solar RPS carve-out program in Massachusetts and an abbreviated name for the program itself
SuSI Program	Successor Solar Incentive Program (in New Jersey)
SWPPP	Stormwater Pollution Prevention Plan
TBA	Targeted Brownfields Assessment
TREC	Transition Renewable Energy Certificate
VNM	Virtual Net Metering