West Virginia
Solar Development Analysis

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West Virginia Solar Development

ANALYSIS

The state of solar development in West Virginia can be evaluated by key factors such as federal and local regulations, incentives, grid interconnection and integration. The current state of development activity in West Virginia is growing and can be seen in this analysis summarizing all facets of solar energy project development.

We will break down the various federal and state incentives available to solar energy developers in West Virginia and how to access them.

LandGate provides key data to the top developers and financiers in the country. To learn more about access to this platform, or to talk about how to apply the information below to your business, book time with a member of our dedicated energy markets team.

West Virginia Solar Energy
ACTIVITY

Status	MO Solar Farm Count	MO Solar Farm Capacity (MWac)	MO Solar Farm Generation (MWh)
Operating	0	0	0
Under Construction	0	0	0
Planned	4	70	85,650 (est.)
Queued Projects	86	6,239.54	488,727.25 (est.)
Site Control (Lease Options)	10	455	46,173 (est.)

*est is the estimated peak total electricity generation that those solar farms will produce once operational

Although West Virginia currently has no operating utility-scale solar farms, the state has one of the largest pipelines for future utility-scale solar development with 70 MW capacity for planned projects, ~6,240 MW capacity for 86 queued projects, and 455 MW capacity for 10 site control projects. Overall, if all planned, queued, and site control farms go into operating status, West Virginia will expand its capacity by ~6,764 MW. In West Virginia, the average solar farm size is 245 acres, producing 69.5MW of electricity under ideal conditions. So a solar farm in West Virginia needs an average of 3.5 acres per MW of capacity.

Historically, West Virginia has been known for their coal production and coal-driven economy. Solar development and the implementation of renewable energy sources was not prioritized as a result, hence the lack of

currently operational utility-scale projects in the state. Solar development in West Virginia was further reduced after 2015 when the state became the first to repeal its Renewable Portfolio Standard (RPS). The RPS would've enabled a deeper integration of solar and renewable energy sources in West Virginia in a three-tier structure, achieving 10% of renewables from 2015 to 2019, 15% renewables from 2020 to 2024 and 25% renewables from 2025 onwards.

However, the recent emergence of state and federal policies have played a significant role in promoting solar development since 2018. The aforementioned spike of utility-scale solar projects added to the queue from 2018 onwards is attributable to implementation of the federal Investment Tax Credit (ITC) and the Inflation Reduction Act (IRA) in 2022. The commercial ITC amounts to 30% of the invested basis in eligible property that initiated construction before the end of 2019. The IRA outlined an ITC extension to 30% for solar system installation. Additionally, in 2020, West Virginia enacted Senate Bill 583, a notable legislative development that allowed electric companies to produce a portion of their electricity using solar installations. West Virginia's strong statewide interconnection standards also make the interconnection process less complex and expensive.

Utility-Scale **SOLAR**

Utility-scale solar refers to solar farms often created and managed by utilities, independent power producers, or energy firms. These projects aim to produce electricity on a large scale and deliver it directly into the distribution grid. These solar farms generally have **more than 10 MW** in capacity. Contrarily, community-scale solar refers to smaller-scale solar power facilities, **under 10 MW**, that are primarily intended to serve local communities or particular user groups. Below is a breakdown of the different types of solar farms and their development statuses.

Utility-Scale

West Virginia is regulated by Pennsylvania-New Jersey-Maryland Interconnection (PJM).

Projects Queued for Development in West Virginia

ISO	Number of Solar Farms	Capacity (MWac)
PJM	86	6,239.54

A project in queue means that the project enters the interconnection queue of that region waiting for regulatory approval. During this period, the analysis of possible engineering and land factors is conducted to determine the feasibility of the project to be constructed and connected to the grid. The average amount of time it takes for a farm to go from queue to operational in West Virginia is **37 months**. As per the projected in-service dates for the current projects in queue, West Virginia will most likely add **4.6 GW** of Utility Scale farms by the end of 2025.

Projects Under Site Control

Site Control is land under lease or under option to lease. Solar developers run an initial assessment of the suitability of parcels for solar farms. After they put the land under option, they need time to run their due diligence and submit the project to the queue. When the solar project is about to be approved by the queue, the solar developer exercises the solar farm option agreement to convert it to a solar farm lease agreement. These site control projects have not entered the interconnection queue yet. Currently there are 10 project leases with an estimated capacity of 455 MW.

Did you know?

LandGate's PowerCapital solution is the only technology suite offering a complete M&A database and research analytics for wind, solar, and CCS project development.

LandGate analyzes county tax & deed assessor records to find lease agreements already in place between developers and landowners. This unique dataset is continuously updated by a process that locates new lease documents within days of new agreements being filed with each county.

How do developers screen and run due diligence for those solar farm projects in site control?

Factors to take into consideration:

- Electricity generation
- Electricity commodity prices (LMP, incentives, PPA)
- Capital costs
- Operating costs
- Timing
- Risks

Using the factors above and a standard solar panel size, the buildable acreage and a land coverage ratio (encompassing row spacing and maintenance spacing) we calculate the maximum number of panels that could fit on the parcel. This helps us estimate the capacity the project lease will add to the grid and calculates a Market Value of the solar project.

Solar PowerVal enables similar capabilities to evaluate land parcels for solar development and get an independent economic report for solar projects of all statuses. This tool allows developers and project financiers to fast-track the process of submitting a feasibility study to the queue for approval through independently produced Engineering & Economic analytics and Solar 8760 reports or evaluate projects and parcels for origination and M&A.

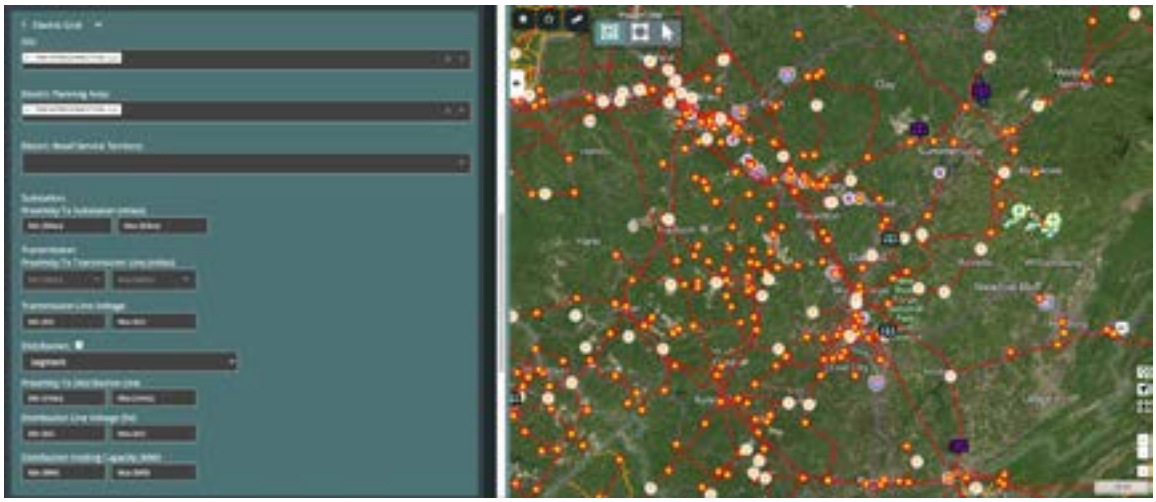
How is a Utility-Scale solar project submitted to the queue to connect to the electric grid?

Typically, the queue submission process within an ISO or Utility area follows similar steps.
The solar developer needs to complete and submit an official interconnection request form provided by the ISO or utility, that captures essential project details and starts the interconnection process. Project specifications should include details like name, location (latitude and longitude), point of interconnection, capacity, expected energy production, environmental impact, technology layout- inverters, solar panels, system layout through a Feasibility study with an 8760 report to help initially assess the project's compatibility with the existing grid infrastructure. The Solar developer will also have to pay an initial payment to secure a position in the interconnection queue and contribute towards the cost of initial studies and evaluations conducted by the ISO/Utility. Post the submission of the form, reports

and payment, the project is now effectively in the queue.

After the project has entered the queue, Injection reliability study and system impact study is conducted. These studies determine the exact impact of the project on existing infrastructure and identifies any potential network updates required to reliably interconnect the solar project to the grid. Once the study is completed, the developer gets a complete picture of the financial cost of the solar farm with regards to the complete CAPEX and Budget. This helps the decision making process of whether to move forward with the development of the solar project or withdraw the application from the queue. If the project seems viable to move forward the developer signs an interconnection agreement with the ISO/Utility and essentially looks to produce Economic and Financial reports for Bankers and Investors to help facilitate the construction of the solar project.

How does a Utility-Scale project connect to the Electric Grid?



These projects are interconnected through transmission lines that carry electricity from one point to another in an electric power system grid. These lines are used to transmit electrical power from power generation sources to distribution centers, which are then distributed to end-users. Through LandGate's accessible transmission line data, developers and landowners can evaluate land parcels based on segments & feeders, proximity to existing distribution lines and distribution hosting capacity.

Commercial Solar & State Legislation

West Virginia is a state where the Northern region is regulated by Allegheny Power and the Southern region is regulated by American Electric Power (AEP) for small-scale solar farms. Below is an analysis of community solar farms and other small-scale solar projects in the queue.

West Virginia is one of the majority of states that has yet to pass legislation enabling community solar. However, there has been much discourse on its implementation. Community solar programs allow consumers to access solar energy without the need to install their own solar systems, typically benefiting from energy generated at an external solar array.

According to experts, community solar can lead to approximately a 10 percent reduction in electricity expenses for residential consumers. Supporters argue that it has the potential to provide affordable renewable energy to individuals with low to moderate incomes, extending the advantages of solar power to those who may not be able or willing to install solar panels on their own property. To align with the Department of Energy's definition of community solar, state legislators would need to authorize a third-party market, which would require project developers and utilities to adhere to regulations for enrolling customers and establishing community solar installations.

Legislators in West Virginia have increasingly cited how community solar lets individuals, businesses and organizations buy a "share" in a community solar project and in turn, receive a credit on their monthly electric bill. Two bills introduced by West Virginia state lawmakers this year, Senate Bill 627 and House Bill 2159, would have made it easier to implement community solar projects.

West Virginia
LMP Data

LMP (Locational Marginal Price) is a pricing mechanism used in wholesale/merchant energy markets to determine the cost of electricity at specific locations (node) within the grid. LMP considers a number of variables, including the cost of generating power, transmission constraints, grid congestion, losses, and load at certain nodes or locations within the electrical grid. The prices at which electricity is bought and sold in the market in real time or on an hourly basis are reflected in its calculation, which is done through market procedures.

West Virginia saw the average LMP price increase by 58% in the past 3 years with an average price of $32.39 $/MWh in 2023. This price is only expected to decrease by 4.56% in 2024 and will continue to attract several renewable energy developers for utility and community scale solar projects. Similarly, consumer electricity purchase cost has also increased drastically for the past few years in West Virginia. The current commercial electricity rate is 10.78 ¢/kWh which is a 21.53% increase compared to the commercial electricity rate of 8.87 ¢/kWh in 2020.

Higher LMP prices correspond to higher electricity costs, which could mean more money for solar installations. When compared to solar projects in areas with lower LMP pricing, locations with higher LMP prices may result in higher revenue. Power purchase agreements (PPAs) and solar project participation in energy markets are both impacted by LMP. The ability to engage in market transactions and maybe land more advantageous PPAs gives solar projects situated in areas with favorable LMP pricing a competitive edge in the electricity markets. LMP can affect the PPAs for solar projects' pricing conditions, lengths, and general allure.

West Virginia

LMP Scorecard

Merchant Energy Pricing: **Market: MISO & PJM** **Hub: West Virginia.Hub**	
Number of price nodes active:	**110**
Average LMP price as of 07/01/23:	**$32.39**
Average retail price as of 02/22/24 (how much a community solar farm or behind the meter electricity generation sales electricity for + consumer purchase cost)	**10.78¢/kWh** Current commercial electricity rate **8.87¢/kWh** Rate in January 2020
Percentage change in average LMP in the past 3 years	**+21.53%**
Forecasted percentage change in average LMP Price for 2024:	**-4.56%**

Average LMP Prices: Historical & Forecasts

Year	Avg LMP Price ($/MWh)
2018	$73.40
2019	$26.43
2020	$23.56
2021	$40.05
2022	$46.19
2023	$37.11
2024 (est.)	$38.14
2025 (est.)	$41.87
2026 (est.)	$47.10

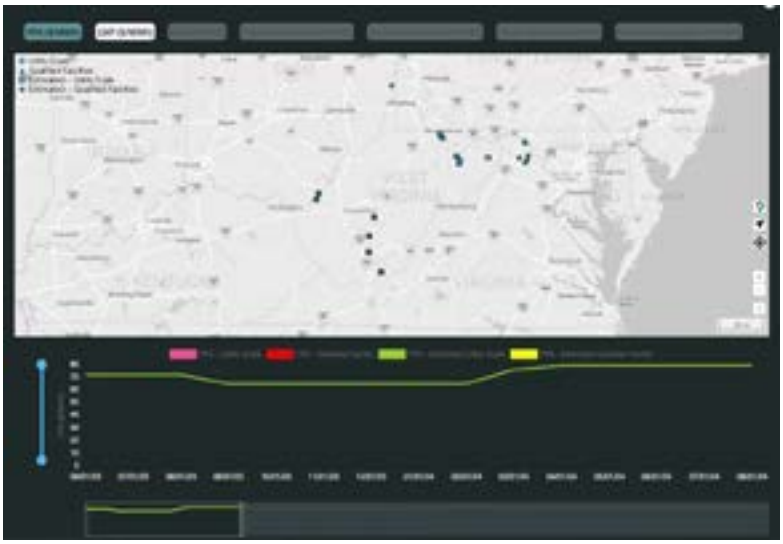
Based on the LMP and ISOs data in West Virginia, the 2024 average LMP is estimated to be $38.13/MWh, increasing by 2.76% compared to 2023.

West Virginia
PPA Data

Utility-scale solar can be integrated into the grid and electricity can be sold at a predetermined price thanks to PPAs (Power Purchase Agreements) with utilities or power purchasers. Even if they are unable to put solar panels on their own homes, PPAs for community-scale solar projects allow local participants to profit from solar energy generation. The time and amount of power sales are governed by the PPA's terms, which guarantees a steady market for the solar installation.

The average Utility-Scale PPA price in West Virginia is $75.42 $/MWh. This price has increased by 10.27% in the past 3 years. A higher PPA price allows for increased revenue and potentially higher profits for developers, making a project more economically viable, especially with higher upfront costs. When the revenue generated from selling electricity is higher, it helps to provide a better return on investment, making projects even more attractive to investors. Electricity consumers may also benefit. Higher PPA prices often provide more stable pricing in the long term, and fixed PPA prices can protect consumers from price fluctuations in other energy markets. Overall, this may incentivize greater solar renewable energy development in West Virginia.

West Virginia
PPA Scorecard



Average PPA price 2023:	**$75.42/MWh**
Average PPA price change in the last 3 years	**+10.27%**
Largest PPA buyers:	**Amazon, Meta**

Average PPA Prices:

Year	Price ($/MWh)
2018	$73.40
2019	$26.43
2020	$23.56
2021	$40.05

Federal & WV State

Tax Incentives for Solar Developers

There are several federal and state incentives available for solar development in West Virginia, intended to encourage the use of solar energy by making solar power more affordable for businesses and organizations that install solar systems. These incentives can improve the financial viability of solar projects since they lower the initial costs and increase the return on investment. Solar project incentives aid in the switch to clean, renewable energy sources, which lower greenhouse gas emissions and slow climate change. Incentives aid in increasing the deployment of solar projects by making solar energy more financially appealing, replacing fossil fuel-based power and lowering the environmental effects related to traditional energy sources.

Solar Development Incentive	Type	About
Net Metering	State	With net metering, consumers are allowed to get retail credit for the surplus electricity generated from local power systems that are sent back to the grid.
Federal Solar Tax Credit (ITC)	Federal	Developers can claim 30% of the installation cost as a credit on their federal income taxes.

Federal Solar Tax Credit, also known as the Investment Solar Tax Credit (ITC): Developers of community-scale and utility-scale solar projects are eligible for the Federal Solar Tax Credit as long as the solar energy systems they install meet the requirements. The tax credit percentage for community-scale solar and utility-scale solar projects is also 30% of the total project cost. This means that developers can claim 30% of the installation cost as a credit on their federal income taxes.

Net Metering: Net metering is a billing arrangement that allows consumers who generate their own electricity from renewable sources to receive credit for any excess electricity they produce and feed back into the grid. In West Virginia, customers who have installed any renewable energy systems, such as solar panels or wind turbines, are credited at the retail rate, the same rate the customer would pay for the electricity if they were to consume from the grid.

With such a wealth of new data on the state of Solar Development in West Virginia, we imagine you might have questions about how to apply these trends, data, and tools to your own solar development efforts in West Virginia. Our dedicated energy markets team can help walk you through how to access and interpret this information in a way that is relevant to your business needs. Schedule time with our team here to talk one on one.

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