Missouri
Solar Development Analysis

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Table of Contents

Missouri Solar Development

ANALYSIS

The state of solar development in Missouri can be evaluated by key factors such as federal and local regulations, incentives, grid interconnection and integration. The current state of development activity in Missouri 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 Missouri 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.

Missouri Solar Energy
ACTIVITY

Status	MO Solar Farm Count	MO Solar Farm Capacity (MWac)	MO Solar Farm Generation (MWh)
Operating	25	88.9	10,600
Under Construction	2	8	1,680 (est.)
Planned	1	10	2,610 (est.)
Queued Projects	25	3,820.43	267,282 (est.)
Site Control (Lease Options)	18	775	7,752 (est.)

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

As of August 2023, Missouri has 25 solar farms already operating with a current capacity of 90.9 MW and a current electricity generation of 10,600 MWh. Missouri has a significant amount of operating solar farms compared to the other states in the US, and it has a development of solar farms with 2 solar farms under construction of 8 MW capacity total, 1 planned solar farms with 10 MW1 capacity, as well as 25 Utility-Scale Queued projects and 18 site control projects. Overall, if all planned and under construction farms go into operating status, Missouri will expand its capacity by 18 MW. That's a 24% growth in capacity for the state. In Missouri, the average solar farm size is 24 acres producing 3.5 MW of electricity under ideal conditions. So a solar farm in Missouri needs an average of 6.8 acres per MW of capacity.

Utility-Scale vs. Community-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

Missouri is a state for solar development where the state is regulated by MISO and SPP.

Projects Queued for Development in Missouri

ISO	Number of Solar Farms	Capacity (MWac)
MISO	25	3,820.43
SPP	16	1,050

Withdrawn Status: 13 Projects

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 Missouri is **39 months**. As per the projected in-service dates for the current projects in queue, Missouri will most likely add **4 GW** of Utility Scale farms by the end of 2025.

In addition, solar providers in Missouri are ramping up development of solar farms. Ameren Missouri plans to open four solar farms by 2026 capable of powering a combined 95,000 homes. Ameren said in a release it would build or purchase the four solar farms, which would have a combined capacity of 550 megawatts. Mark Birk, Ameren Missouri's chairman and president, said the company was taking advantage of new federal incentives meant to encourage renewable development.

"These projects support our ongoing generation transformation toward more clean energy while maintaining the reliability, resiliency and affordability our customers expect," Birk said.

The first of the planned solar farms is expected to open in Cass County, Illinois, in 2024. Ameren hopes to add another in Vandalia in 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 4 project leases with an estimated capacity of 339 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.

Commercial, Community & Behind-the-Meter Solar Farms

Community Solar offers an easy way to participate in solar energy without installing panels at home or business. In Missouri, Ameren is the largest utility provider, along with Columbia, Evergy, and Liberty Utility. The state has net metering, allowing credits for excess electricity from small customer-sited solar panels. Legislation for a state-recognized community solar program, SB 824, was proposed but not acted upon in 2022.

SB 824 establishes a 3-year community solar pilot program from 2023-2025. Retail electric suppliers must continue their pilot programs until solar demand from subscribers equals 2% of their previous year's electricity sales. The Public Service Commission sets bill credit values. Columbia Water & Light has its community solar framework, offering locally-developed solar accessibility.

SB 824 has not been officially signed into law in Missouri. Penned by Senator Bill White (R-Joplin), SB 824 proposes the state would implement a community solar pilot program which runs for a three-year phase, from 2023 through 2025. The legislation calls for electric utilities to honor the pilot program until the total solar demand from community program subscribers equals 2% of the electric utility's sales for the previous year. Missourians participating in the community program would also receive a credit to offset their electric bill, with the value of that credit to be determined by the PSC. Credits would be determined based on the value of a kilowatt hour of energy. Another credit would also be established for low-to-moderate income residents.

While shared community solar projects are not yet mainstream across the state, Ameren has just started operating two community sites under its Community Solar program, with one in Lambert, Mo. (0.9 MW) adjacent to St. Louis Lambert International Airport, and another in Montgomery County (5.7 MW). The company plans to continue investing in renewable energy hubs and customer accessibility across the state over

the next several years as part of its commitment to minimizing its carbon footprint.

Missouri is a state with a lower population density and its terrain is also spaced out in a manner where utility scale solar is the preferred option to community solar. This is true across the United States in states with similar terrain. We can see this with the PPA and LMP data for utility scale farms in Missouri that it will be far more favorable for solar developers to pursue developing utility scale farms over community solar.

More than three-fourths of Missouri's solar power comes from customer-sited, small-scale generating systems, many of which are installed on rooftops at both businesses and homes. The following table contains some noteworthy solar projects in the state.

Key Solar Installations in Missouri

Project Name	Project Details
Truman Solar in Columbia	Capacity: 14 MW Developer: DEPCOM This project went live in 2021 and produces enough electricity to power 1,628 homes.
Nixa Solar in Nixa	Capacity: 11.2 MW Developer: Gardner Capital This solar project went live in 2017 and has enough electric capacity to power more than 1,302 homes.
IKEA's project in St. Louis	Capacity: 1.3 MW This project in St. Louis is one of the largest corporate projects in the state as IKEA, Toyota, and ALDI have all gone solar in Missouri.

Missouri
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 (nodes) 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.

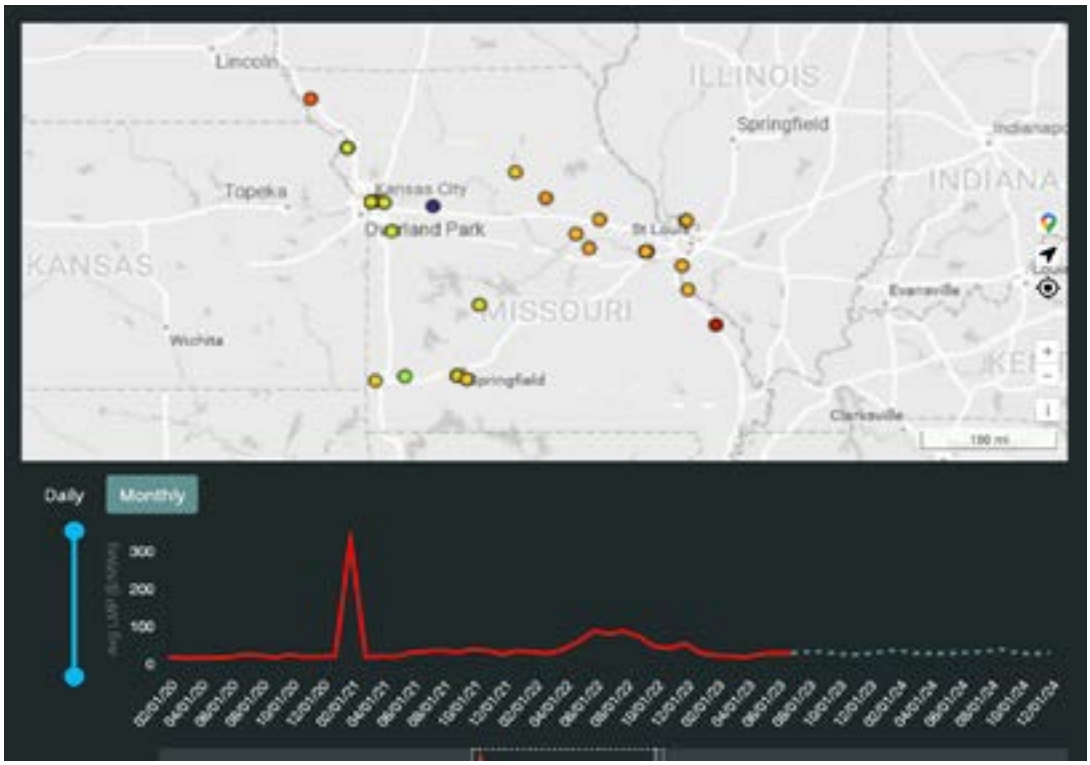
Missouri saw the average LMP price increase by 19.6% in the past 3 years with an average price of 30.53$/MWh in 2023. This price is expected to increase by 8.5% in 2024 and attract several renewable energy developers for utility and community scale solar projects. Similarly, consumer electricity purchase cost has also increased for the past few years in Missouri. The current commercial electricity rate is 11.75 ¢/kWh which is a 23.68% increase compared to the commercial electricity rate of 9.5 ¢/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.

By offering participants in community solar more potential power bill savings, higher LMP pricing can improve the value proposition. Greater adoption of community solar may result from community solar projects situated in regions with higher LMP prices being more economically feasible and appealing to potential members.

Missouri

LMP Scorecard



Merchant Energy Pricing: **Market: MISO & SPP** **Hub: Missouri.Hub**	
Number of price nodes active:	**40**
Average LMP price as of 07/01/23:	**$30.53**
Average retail price as of 07/01/23 (how much a community solar farm or behind the meter electricity generation sales electricity for + consumer purchase cost)	**11.75¢/kWh** Current commercial electricity rate **9.50¢/kWh** Rate in January 2020
Percentage change in average LMP in the past 3 years	**+19.6%**
Forecasted percentage change in average LMP Price for 2024:	**+8.5%**

Average LMP Prices: Historical & Forecasts

Year	Avg LMP Price ($/MWh)
2018	$29.97
2019	$24.21
2020	$25.51
2021	$35.27
2022	$81.69
2023	$30.53
2024 (est.)	$33.13
2025 (est.)	$37.56

Based on the LMP and ISOs data in Missouri, the 2024 average LMP is estimated to be $33.13/MWh, increasing by 9% compared to 2023.

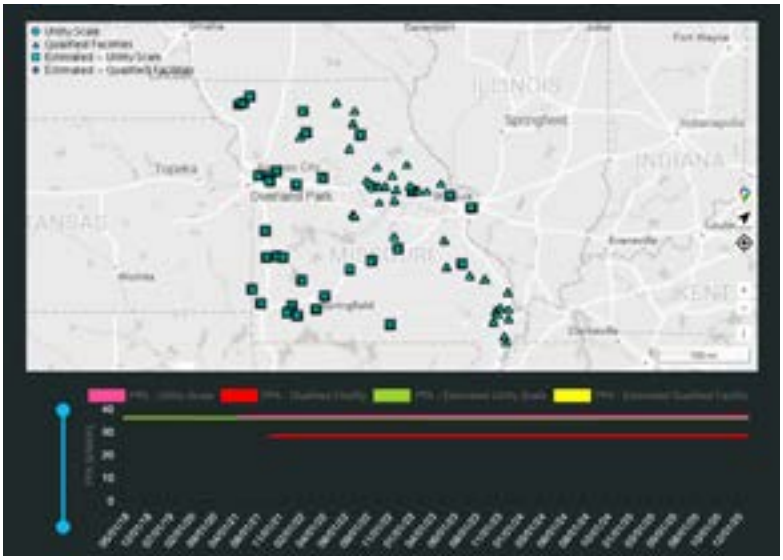
Missouri
PPA Data

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 Missouri is $36.72/MWh. This price has remained unchanged over the past 3 years. In Missouri, due to this consistent price, consumers enjoy the benefits of price stability, investor confidence, and long-term planning. The stable PPA price ensures that consumers can anticipate and budget for their energy costs, which is particularly valuable for businesses and industries requiring cost predictability in their operations. Additionally, the consistent PPA price fosters confidence among developers and investors, making them more willing to invest in renewable energy projects, thereby promoting the growth of green initiatives in the state. This stability supports the maintenance and expansion of renewable energy sources in Missouri, making them a reliable and competitive option for both commercial and residential consumers.

Missouri

PPA Scorecard



Average PPA price 2023:	**$36.72/MWh**
Average PPA price change in the last 3 years	**+0%**
Largest PPA buyers:	**Meta**

Federal & Missouri State

Tax Incentives for Solar Developers

There are several federal and state incentives available for solar development in Missouri, 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
Solar Renewable Energy Certificates (SRECs)	State	Missouri's SRECs are a financial boon for those generating clean electricity through solar power. By participating in this program, solar system owners not only contribute to a greener future but also enjoy economic benefits, making the transition to solar energy even more appealing.
Net Metering	State	Net metering is a billing mechanism that credits solar energy system owners for the electricity they add to the grid. For example, if a residential customer has a PV system on their roof, it may generate more electricity than the home uses during daylight hours.
PACE Program	State	PACE is a simple and effective way to finance energy efficiency and renewable energy upgrades to buildings. PACE can pay for new heating and cooling systems, lighting improvements, solar panels, water pumps, insulation, and more for almost any property – homes, commercial, industrial, and agricultural.
Federal Solar Tax Credit (ITC)	Federal	Developers can claim 30% of the installation cost as a credit on their federal income taxes.

Solar Renewable Energy Certificates

Missouri's SRECs are a program meant to benefit solar system owners and not just aim for a greener future but also reap economic benefits, making the transition to solar energy even more appealing for solar system owners in Missouri. These are the SREC's offered in Missouri.

Net Metering

Net metering allows homeowners that create excess energy to use it as a credit on their next electric bill. Although net metering is not mandatory in Missouri, many providers take advantage of it and offer fair rates. House Bill 1370 is the legislation that was recently passed that stops incentivizing Missouri citizens from choosing net metering options as they don't have a 1-1 payout for the credits anymore.

RPS Goals

In November 2004, voters in Columbia, Missouri, approved a proposal to adopt a local renewable portfolio standard (RPS). (The state renewable electricity standard adopted by ballot initiative in November 2008 does not apply to municipal utilities such as Columbia Water & Light.) The city's municipal utility Columbia Water & Light is required to generate or purchase 30% of its electricity from eligible renewable energy resources by the end of 2028. Nearly 7% of all energy sources for 2013 were renewable according to the most recent renewable energy report. **The goal was revised in 2014 to increase the 2017 goal to 15% from 10%, the 2022 goal from 15% to 25%, and to set a goal of 30% by December 31, 2028.**

Federal Solar Tax Credit, also known as the Investment Solar Tax Credit (ITC)

Federal Solar Tax Credit (ITC) is 30% until 2032 which can be claimed in Missouri as well. 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.

Property Assessed Clean Energy (PACE) Program

Missouri also has the Property Assessed Clean Energy (PACE) program where property owners can use PACE financing for a solar project. PACE provides fixed-rate, up-front financing with repayment terms of up to 20 years. It’s a special assessment that gets repaid on annual property tax bills.

Other incentives in the form of rebates

Ameren, Evergy, Columbia, and Liberty utilities all offer rebates to its customers upfront for installing solar systems. Columbia also offers homeowners can also receive $400 for installing a solar water heater. Evergy and Liberty utilities both bases its rebate on the system size installed at $0.25 per watt.

With such a wealth of new data on the state of Solar Development in Missouri, we imagine you might have questions about how to apply these trends, data, and tools to your own solar development efforts in Missouri. 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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