# Colorado
## Solar Development Analysis

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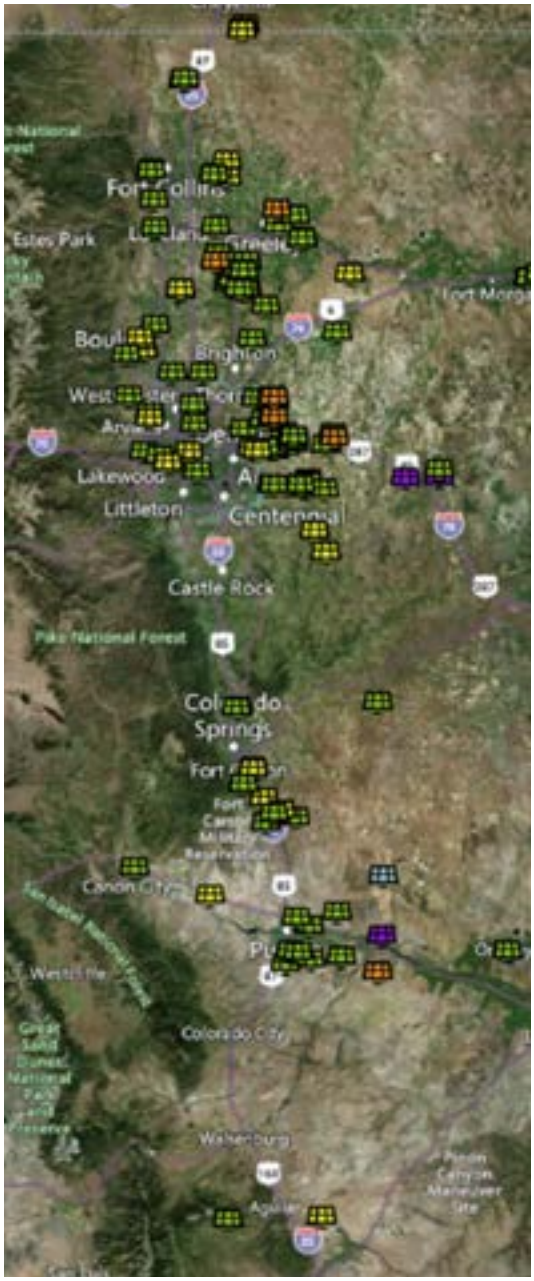
# Colorado Solar Development

# ANALYSIS

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



# Colorado Solar Energy
# ACTIVITY

| Status | CO Solar Farm Count | CO Solar Farm Capacity (MWac) | CO Solar Farm Generation (MWh) |
|---|---|---|---|
| Operating | 151 | 2,263 | 309,105 |
| Under Construction | 9 | 780 | 8,743 |
| Planned | 14 | 901 | 354,581 |
| Queued Projects | 1 | 250 | 93,928 |
| Site Control (Lease Options) | 11 | 1,745 | 149,867 |

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

As of June 2024, Colorado has 151 operational solar farms with a current capacity of 2,263 MW and a current electricity generation of 309,105 MWh. Colorado has 9 solar farms under construction with 780 MW capacity total and 14 planned solar farms with 901 MW1 capacity. Colorado has 11 solar projects in the site control stage, estimated to add 149,867 MWh of generation. Colorado has a low amount of Utility-Scale queued solar farms compared to the other states in the US, with 1 queued projects.

Overall, if all planned and under construction farms go into operating status, Colorado will expand its capacity by 1,681 MW.

Colorado's energy landscape is evolving significantly, with renewable energy, particularly solar power, playing an increasingly prominent role in the state's electricity generation. Colorado ranks 12th nationwide in total installed solar capacity, with solar energy contributing 9.9% to the state's overall electricity production. SEIA data highlights Colorado's impressive solar growth, marked by a substantial increase in installations since 2021, especially utility scale projects. Colorado is projected to add 3.1 GW of solar capacity from planned projects by 2026. This shift from a traditional reliance on fossil fuels to a robust embrace of renewable energy underscores Colorado's dedication to clean energy. The state's favorable conditions for solar power and the decreasing costs of solar technology have been pivotal in accelerating this transition.


Colorado is a leading state in installed solar energy capacity, with remarkable growth in 2023. The state plans to maintain that growth as the state's investment in solar initiatives is strengthened by favorable state and federal policies. Incentives like the Federal Investment Tax Credit (ITC) and state-level programs have significantly boosted investment in renewable projects, resulting in job creation and economic growth throughout Colorado. Currently, the state supports 7,626 solar jobs and has 414 companies actively involved in the solar industry. Over the next five years, Colorado is expected to add approximately 3,428 MW of solar capacity (EIA). With its ambitious clean energy targets and a robust policy framework, Colorado is committed to a sustainable energy future, standing out as a leader in the Southeast and nationally for its energy efficiency efforts.

# Utility-Scale vs. Community **SOLAR**

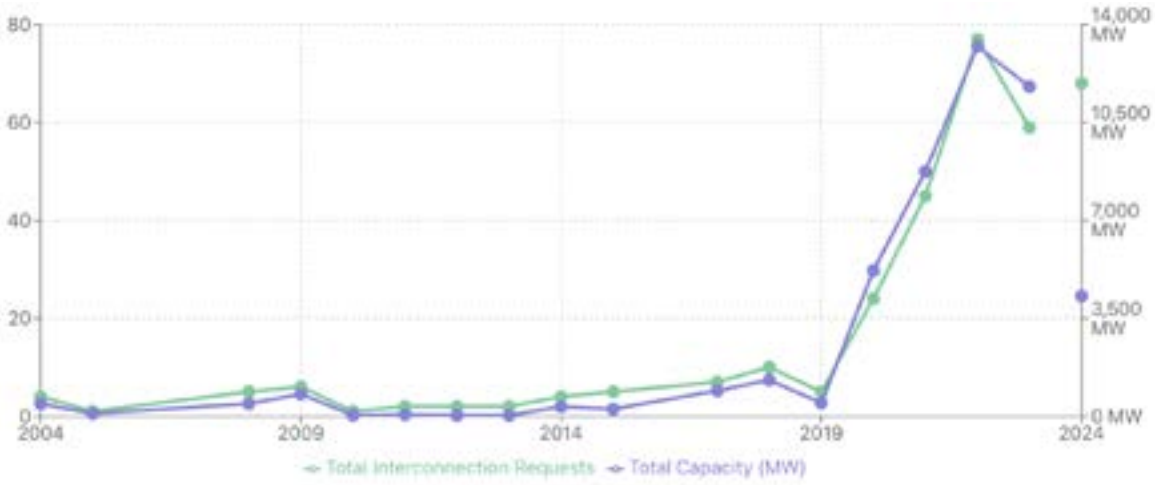
Utility-scale solar refers to solar farms often created and managed by utilities, independent power producers, or energy firms. These projects aim to produce electricity on a large scale and deliver it directly into the distribution grid. These solar farms generally have more than 10 MW in capacity. 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

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 Colorado is **40 months**. As per the Generator Interconnection Queue, Colorado will add 16 solar farms into the queue by 2026, totalling **1.1 GW** in capacity.

## Projects Queued for Development in Colorado

**Total Solar Project Applications in Colorado (2004-2023)**




## 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 11 project leases with an estimated capacity of 1,334 MW. 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 queues?

**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.

# Commercial, Community & Behind-the-Meter Solar Farms

Colorado is primarily regulated by Xcel Energy, Black Hills Energy, and rural electric cooperatives for small-scale community solar farms. Colorado's regulatory framework has allowed the state to see considerable growth in Community and Distributed generation. The state is currently building out a pipeline for small scale solar project development and has paved the path through policies like the Community Solar Gardens Act, which allows multiple subscribers to share the benefits of a single solar installation. These community solar gardens can be up to 2 megawatts in size and allow participants to receive credits on their electricity bills for their share of the solar power produced.

Colorado has a tradition of cooperative utilities, which are member-owned and often more responsive to local interests. This structure can facilitate community solar projects as cooperative utilities are more inclined to support community initiatives. These programs typically 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.

| Key Installations in Colorado | | |
|---|---|---|
| **Project** | **Utility/Cooperative** | **Project Details** |
| Poudre Valley Solar | Poudre Valley REA | • 1.95 MW capacity<br>• Located in Larimer County<br>• Powers approximately 300 homes |
| Garfield Clean Energy | Xcel Energy | • 4.5 MW capacity<br>• Located in Garfield County<br>• Generates around 7,200 MWh annually |
| San Miguel Power Association | San Miguel Power Association | • 1.1 MW capacity<br>• Located in San Miguel County<br>• Powers approximately 175 homes |
| Adams County Community Solar | United Power | • 8 MW capacity<br>• Located in Adams County<br>• Generates around 13,000 MWh annually |
| Boulder Community Solar Garden | Xcel Energy | • 2 MW capacity<br>• Located in Boulder County<br>• Powers approximately 320 homes |

# Colorado
# 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.

**Colorado saw the average LMP price decrease by 41.35% in the past 3 years with an average price of 37.08$/MWh in 2024.** This price is expected to increase by 3.5% in 2025 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 Colorado. The current commercial electricity rate is 11.65 ¢/kWh which is a 20% increase compared to the commercial electricity rate of 9.68 ¢/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.

# Colorado
# LMP Scorecard


| | |
|---|---|
| **Merchant Energy Pricing:**<br>**Market: Non ISO**<br>**Hub: Colorado.Hub** | |
| Number of price nodes active: | **239** |
| Average LMP price as of 07/01/24:<br>Average LMP for 2024 (including current and forecasted): $38.40 | **$37.08** |
| Current commercial electricity rate | **11.65¢/kWh** |
| Percentage change in average LMP for 2025 | **+3.5%** |
| Commercial electricity rate change in January 2020 | **9.68¢/kWh** |

# Average LMP Prices: Historical & Forecasts

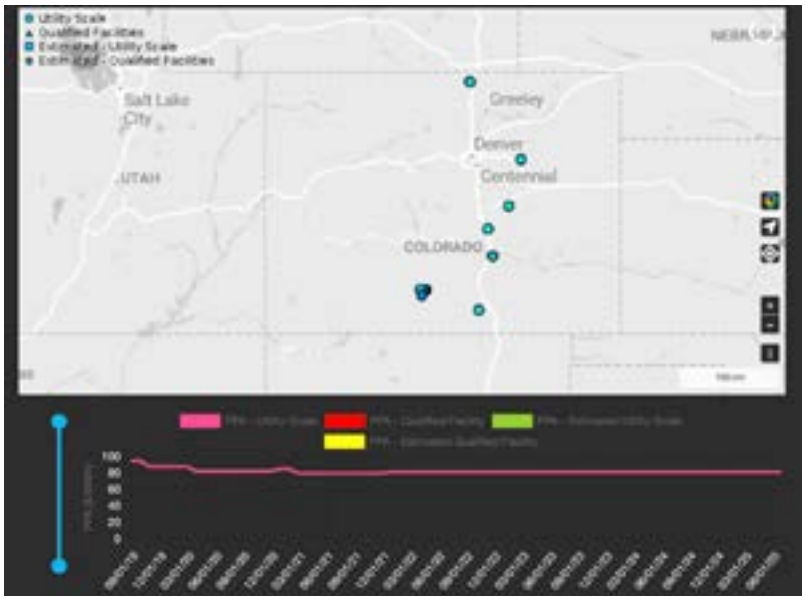
| Year | Avg LMP Price ($/MWh) |
|---|---|
| 2019 | $18.15 |
| 2020 | $15.90 |
| 2021 | $63.57 |
| 2022 | $32.18 |
| 2023 | $21.67 |
| 2024 | $37.08 |
| 2025 (est.) | $38.40 |
| 2026 (est.) | $39.82 |

# Colorado
# 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 estimated Utility-Scale PPA price in Colorado is $81.47/MWh. This price has increased by just 1.8% over the past 3 years**. In Colorado, 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 Colorado, making them a reliable and competitive option for both commercial and residential consumers.

# Colorado
# PPA Scorecard




| | |
|---|---|
| Average PPA price 2024: | **$81.47** (Utility Scale) |
| Average Utility-Scale PPA price change in the last 3 years | **+1.8%** |
| Largest PPA buyer: | **Amazon** |

## Average PPA Prices:

| Year | Price ($/MWh) |
|---|---|
| 2020 | $82.24 |
| 2021 | $79.97 |
| 2022 | $81.47 |
| 2023 | $81.47 |
| 2024 | $81.47 |

## Federal & Colorado State

# Tax Incentives for Solar Developers

There are several federal and state incentives available for solar development in Colorado, 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.

| CO Solar Development Incentive | Type | About |
|---|---|---|
| Renewable Portfolio Standard (RPS) | State | Colorado's RPS requires that investor-owned utilities (IOUs) generate 30% of their retail electricity sales from renewable sources by 2020, with a 3% distributed generation requirement. For cooperative utilities serving 100,000 or more meters, the requirement is 20%, and for those serving fewer, the requirement is 10%. By 2040, 100% of the state's electricity generation must come from renewable energy sources |
| Federal Solar Tax Credit, Solar Tax Credit (ITC) | Federal | The ITC allows for a 30% tax credit on the cost of solar system installation, applicable through 2032. Furthermore, solar panel installations are exempt from sales tax and any value-added property tax that may be levied from it. |
| Renewable Electricity Production Tax Credit (PTC) | Federal | The PTC is an inflation-adjusted per-kilowatt-hour (kWh) tax credit for electricity generated by qualified energy resources, which includes solar, and sold by the taxpayer to an unrelated person during the taxable year. The credit duration is 10 years after the facility is placed in service. |
| Residential Renewable Energy Tax Credit | State | Colorado residents can claim 30% of the cost of solar system installation as a state tax credit. This credit is available for systems installed before December 31, 2032. |

| | | |
|---|---|---|
| Sales and Use Tax Exemption for Renewable Energy Equipment | State | This exemption eliminates sales and use tax on the purchase, storage, and use of components used in the production of renewable energy, including solar energy. |
| Property Tax Exemption for Residential Renewable Energy Equipment | State | Solar energy systems installed on residential properties are exempt from property tax assessments, which helps in reducing the overall cost burden for homeowners. |
| Net Metering | State | Colorado mandates net metering for investor-owned utilities (IOUs), municipal utilities, and electric cooperatives. This allows solar energy system owners to receive credits on their utility bills for excess energy generated and returned to the grid, usually at the full retail electricity price. |
| Colorado RENEW Loan Program | State | The RENEW (Residential Energy Network for Energy Works) loan program provides financing options for renewable energy projects, including solar installations, for homeowners. This program supports the installation of renewable energy systems and energy efficiency measures for K-12 school districts |
| Xcel Energy Solar Rewards Program | State | Xcel Energy's Solar Rewards Program compensates homeowners per kilowatt-hour (kWh) produced by their solar system. |

The combination of federal incentives, state-specific programs, and financing options make solar energy projects significantly more accessible and financially attractive in Colorado. These incentives are designed to encourage the adoption of solar power, reduce greenhouse gas emissions, and support the transition to a more sustainable energy future.

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