Iowa
Solar Development Analysis

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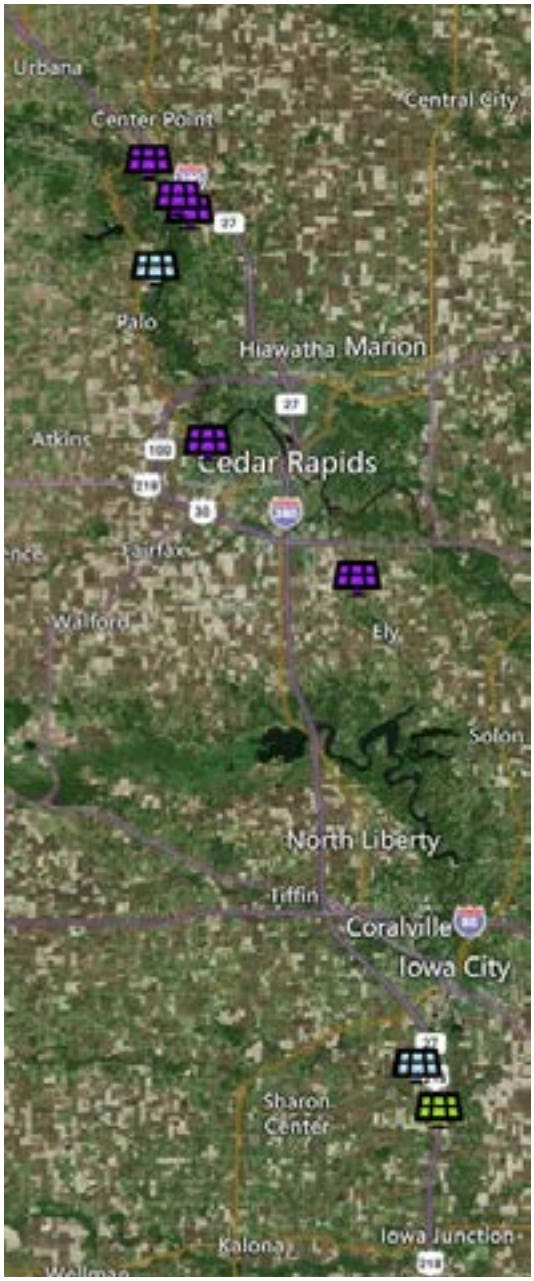
Iowa Solar Development

ANALYSIS

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



Iowa Solar Energy
ACTIVITY

Status	IA Solar Farm Count	IA Solar Farm Capacity (MWac)	IA Solar Farm Generation (MWh)
Operating	11	241.5	45,179
Under Construction	5	20.9	16,311 (est.)
Planned	1	105	2,720 (est.)
Queued Projects	21	2,996	558,938 (est.)
Site Control (Lease Options)	8	172	52,581 (est.)

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

Iowa has a promising pipeline for future utility-scale solar development with 105 MW capacity for 1 planned project, 2,996 MW capacity for 21 queued projects, and 172 MW capacity for 8 site control projects. Overall, if all planned, queued, and site control farms go into operating status, Iowa will expand its capacity by 3,273 MW. In Iowa, the average solar farm size is 34 acres, producing 4.6 MW of electricity under ideal conditions. So a solar farm in Iowa needs an average of 7.4 acres per MW of capacity.

In recent years, the decreasing costs of solar technology have led to a notable increase in solar initiatives and setups throughout Iowa, and the recent emergence of state and federal policies have played a significant role in promoting solar development since 2019. The aforementioned utility-scale solar projects added to the queue from 2019 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.

The adoption of solar energy is particularly prominent in rural regions like Washington County, where farms and rural businesses have taken the lead, while cities such as Cedar Falls and Ames have successfully implemented community solar projects. Furthermore, solar energy has gained traction on a statewide level, evident in the fact that by the end of 2020, every one of Iowa's 99 counties had solar projects that benefited from the state's initial solar tax credit.

The potential for solar energy to assume a more substantial role in Iowa's energy mix has grown significantly in recent years, as indicated by the expanding number of solar projects across the state. By October 2021, Iowa boasted a greater amount of small-scale distributed solar capacity than many neighboring Midwestern and Plains states. As of March 2022, Iowa had approximately 200 MW of installed solar capacity.

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. 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 Illinois is **35 months**! As per the projected in-service dates for the current projects in queue, Illinois will most likely add **5 GW** of Utility Scale farms by the end of 2024, which is a **250%** increase in operational capacity.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.

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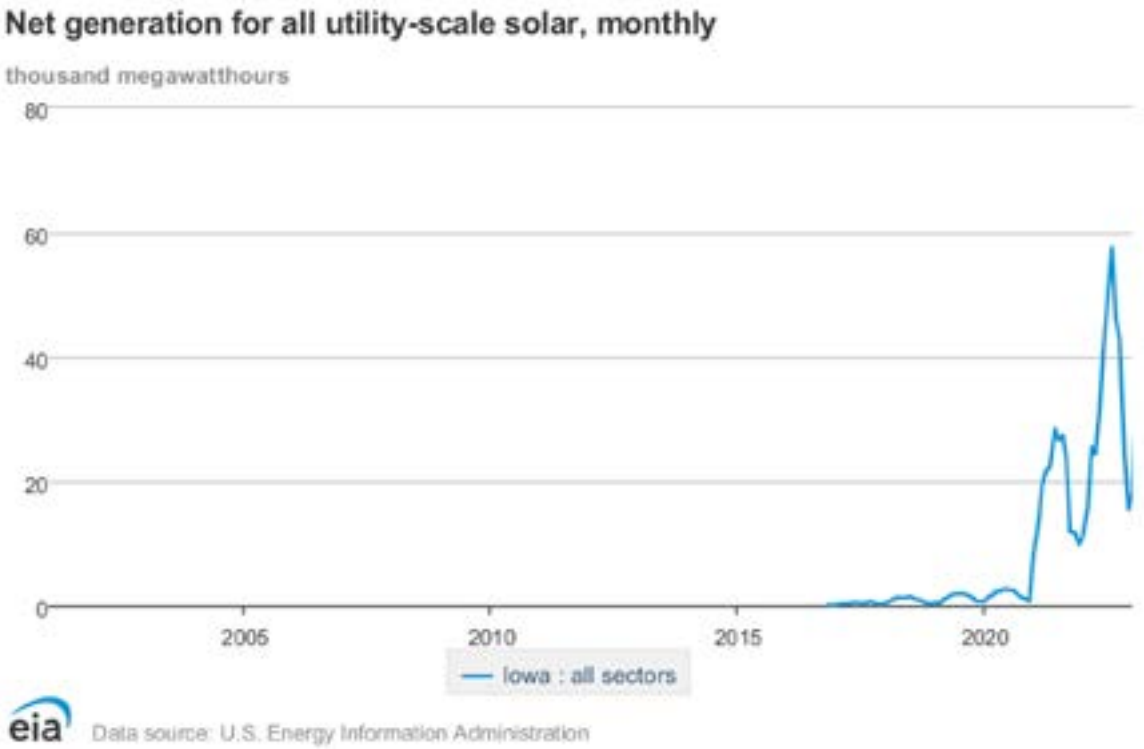
The potential for solar energy to assume a more substantial role in Iowa's energy mix has grown significantly in recent years, as indicated by the expanding number of solar projects across the state. By October 2021, Iowa boasted a greater amount of small-scale distributed solar capacity than many neighboring Midwestern and Plains states. As of March 2022, Iowa had approximately 200 MW of installed solar capacity.



In the context of the U.S. Energy Information Administration (EIA), “net generation” refers to the total electricity produced by an energy source, excluding the power used in the generation process. The EIA gathers and publishes net generation data for various energy sources, such as solar (shown above) providing valuable insights into the U.S. energy production landscape and aiding energy-related decision-making and policy planning. In Iowa specifically, net generation for utility-scale solar projects has dramatically increased as of late, and is projected to continue rising as the aforementioned planned, queued, and site control farms go into operating status.

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. Below is a breakdown of the different types of solar farms and their development statuses.

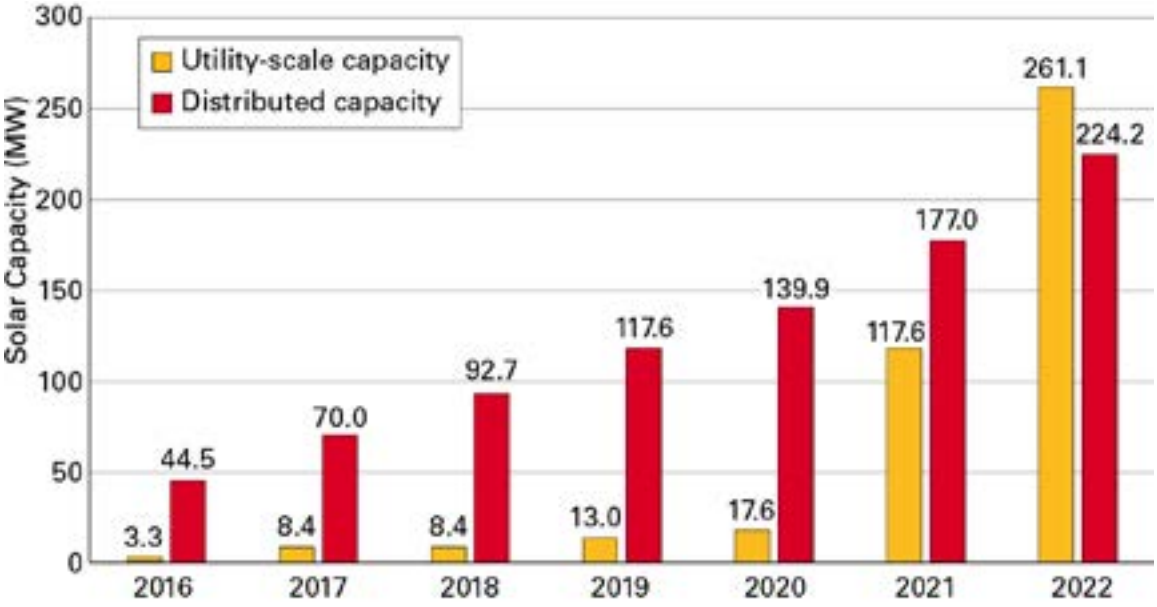
Utility-Scale

Iowa is a particular state for solar development where the majority of the state is regulated by Midcontinent Independent System Operator (MISO). Although, small portion of the northwestern region of the state is regulated by Southwest Power Pool (SPP) there aren't any projects in the SPP queue for Iowa currently.

Projects Queued for Development in Iowa

ISO	Number of Solar Farms	Capacity (MWac)
MISO	91	15,615

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 Iowa is **44 months.** As per the projected in-service dates for the current projects in queue, Iowa will most likely add **1.7 GW** of Utility Scale farms by the end of 2025, which is a fairly strong increase in operational capacity.



Iowa has seen a noteworthy increase in utility scale solar development. While the state is currently ranked 33rd in terms of nation-wide solar development, that ranking is projected to rise to 24th within the next 5 years. Additionally, the promise of more utility scale projects offers local communities the opportunity for more job creation and additional tax exemptions and revenue that trickle from the construction of these facilities.

Alliant Energy, one of Iowa's largest energy utility companies, is committed to achieving net-zero CO2 emissions from its electricity generation by 2050 as part of its Clean Energy Blueprint. To support this goal, the company plans to add 400 megawatts (MW) of solar generation in Iowa by the end of 2024, in addition to its existing 1,300 MW of wind generation in the state. Alliant Energy is actively collaborating with the agriculture industry, labor groups, and landowners to ensure that the benefits of solar energy are well understood.

Select Alliant Energy Solar Projects

Duane Arnold Solar Project	In November 2021, Alliant unveiled plans to secure 200 megawatts of solar power generated by this project, currently under development by NextEra Energy Resources in Linn County. This initiative involves the transformation of part of the land and infrastructure previously associated with the former Duane Arnold nuclear energy facility, effectively turning it into Iowa's largest solar and battery storage facility.
Dubuque Solar Project	The Dubuque Solar project includes two sites, the West Dubuque Solar Garden and the Downtown Dubuque Solar Garden. The West Dubuque Solar Garden, generating 3.9 megawatts of power with 15,000 panels, equals the annual energy consumption of 727 Iowa homes, while the Downtown Dubuque Solar Garden, a 901-kilowatt AC solar garden on a former industrial site, matches the annual energy usage of around 126 average Iowa homes.
Indian Creek Nature Center Solar Project	The Alliant Energy-owned solar array on-site generates enough energy to match the building's annual consumption, marking it as Iowa's inaugural commercial building actively pursuing Net Zero Energy certification while utilizing 420 solar panels to monitor real-time energy production data for climate-specific efficiency.
Marshalltown Solar Project	The Marshalltown Solar Project, operational since early 2020, features a 2.5-megawatt solar system that enhances sustainability by providing clean energy to the community, offsetting local electric demand, and complementing the efficiency of a 706-megawatt natural gas generating station launched in spring 2017 in Marshalltown, Iowa.

MidAmerican Energy, another prominent Iowa-based utility company, has integrated utility-scale solar energy as a vital component in their mission to produce carbon-neutral energy for its customers. They have successfully finalized multiple solar projects in 2022, expanding the company's renewable capacity by 141 megawatts to complement the existing 7,300 megawatts of wind capacity.

Select MidAmerican Energy Solar Projects

MidAmerican Energy employs single-axis tracking to ensure the solar panels pivot from east to west throughout the day, optimizing electricity generation. Furthermore, certain projects are directly linked to the local distribution system, ensuring that the energy generated benefits the surrounding areas. For instance, the Waterloo solar project alone can power approximately 650 average Iowa homes, and collectively, the solar projects will incorporate nearly 400,000 solar modules.

Waterloo solar project in Waterloo	3MW
Hills solar project near Iowa City	3MW
Neal solar project near Sioux City	4MW
Franklin solar project near Hampton	7MW
Arbor Hill solar project in Adair County	24MW
Holiday Creek solar project in Webster County	100MW

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 8 project leases with an estimated capacity of 172 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

Projects under development in Iowa

Iowa is a state primarily regulated by Alliant Energy and Ames Municipal Utilities for small-scale community solar farms.

Iowa has seen considerable growth in Community and Distributed generation. There are currently around 5 community solar farms in construction and 5 site control community solar farms that are less than 10 MW in Iowa. The state is currently building out a pipeline for small scale solar project development and there has been much discourse on the implementation of community solar programs. Iowa 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.

Select Iowa Community Solar Projects

Cedar Falls Utilities	Simple Solar	Stands as Iowa's most extensive community solar venture, with a total capacity of 1.5 MW. Energy generation at this location commenced on April 1, 2016, and the project occupies eight acres close to Prairie Lakes Park in Cedar Falls.
City of Ames	SunSmart	SunSmart is a community solar facility with a 2MW capacity, situated between Airport Road and Highway 30. This endeavor aims to increase the availability of clean solar energy to individuals who may have shaded roofs or reside in rented apartment complexes.
Alliant Energy	Cedar Rapids CSG	The Cedar Rapids-based garden, part of the Alliant Energy Community Solar program, includes 18,000 solar blocks, each generating around 541 kilowatt-hours annually. When operating at full capacity, this 4.5-megawatt project has the potential to supply power to 3,600 homes, located north of the 1100 block of 33rd Avenue SW on company-owned property.

Iowa
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.

Iowa saw the average LMP price increase by 33.6% in the past 3 years with an average price of $30.27 $/MWh in 2023. This price is expected to increase by 6.3% in 2024 and 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 Iowa. The current commercial electricity rate is 8.01 ¢/kWh which is a 35.5% increase compared to the commercial electricity rate of 5.91 ¢/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.

Iowa

LMP Scorecard

Merchant Energy Pricing: **Market: MISO & SPP** **Hub: Iowa.Hub**	
Number of price nodes active:	**31**
Average LMP price as of 07/01/23:	**$30.27**
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)	**8.01¢/kWh** Current commercial electricity rate **5.91¢/kWh** Rate in January 2020, +35.5% incr.
Percentage change in average LMP in the past 3 years	**+33.6%**
Forecasted percentage change in average LMP Price for 2024:	**+6.3%**

Average LMP Prices: Historical & Forecasts

Year	Avg LMP Price ($/MWh)
2018	$28.36
2019	$22.61
2020	$19.62
2021	$23.95
2022	$40.43
2023	$28.73
2024 (est.)	$32.06
2025 (est.)	$35.77

Based on the LMP and ISOs data in Iowa, the 2024 average LMP is estimated to be $32.06/MWh, increasing by 6.3% compared to 2023.

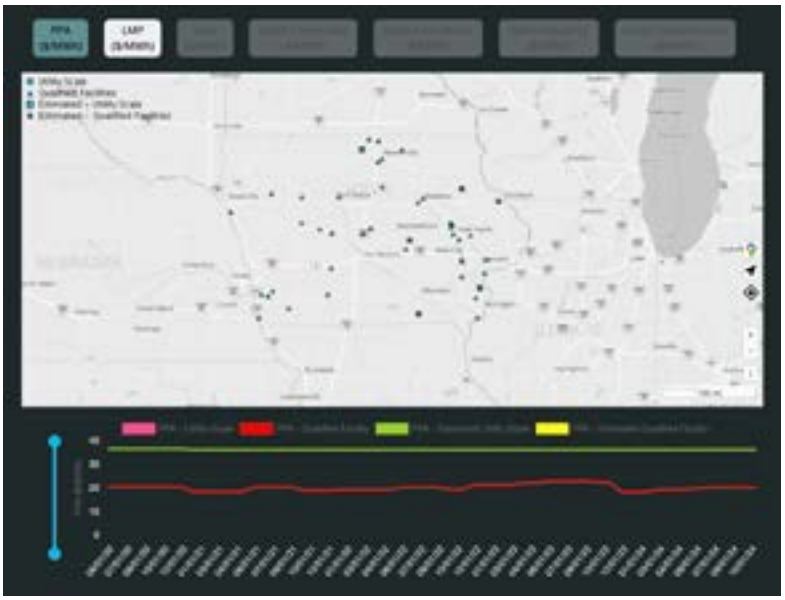
Iowa

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 Iowa is $19.85 $/MWh and the average Estimated Utility-Scale PPA price is $36.38/MWh. This price has increased by 9.32% 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 Iowa.

Iowa
PPA Scorecard



Average PPA price 2023:	**$19.85**
Average PPA price change in the last 3 years	**+9.32%**
Largest PPA buyers:	**Meta, Greenbacker Renewable Energy**

Average PPA Prices:

Year	Price ($/MWh)
2020	$19.48
2021	$18.91
2022	$20.36
2023	$19.85
2024	$19.22

Federal & Iowa State

Tax Incentives for Solar Developers

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

IA Solar Development Incentive	Type	About
Iowa Solar Energy Tax Incentive	State	The solar tax incentive currently offsets up to 15% of the cost of a solar project. Combined with the federal investment tax credit, the two credits can offset up to 45% of the cost of a solar system. The credit caps of $5,000 (residential) and $20,000 (business) encourage many smaller projects across the state.
Net Metering	State	Net metering enables homeowners who generate surplus energy to apply it as a credit toward their upcoming electricity bill. In Iowa, the net metering program is robust, granting individuals the full retail electricity rates for the excess energy they accumulate.
Federal Solar Tax Credit (ITC)	Federal	Developers can claim 30% of the installation cost as a credit on their federal income taxes.

Renewable Portfolio Standard (RPS)

In 1983, Iowa made history as the first state in the United States to implement a renewable portfolio standard (RPS) through the enactment of the Alternative Energy Production law. The Iowa RPS mandates that the state's two investor-owned utilities, MidAmerican Energy and Alliant Energy Interstate Power and Light, collectively secure 105 megawatts (MW) of renewable generating capacity and associated energy production. By 2011, Iowa was 100% compliant and this mandate had already been achieved and there have been no further changes to the policy or its minimum requirements.

The Iowa Utilities Board (IUB) distributed the 105 MW requirement between the utilities, aligning with each utility's proportionate share of combined estimated Iowa retail peak demand in 1990: MidAmerican Energy: 55.2 MW (52.57% of demand) Alliant Energy Interstate Power and Light (IPL): 49.8 MW (47.43% of demand).

Utilities are obligated to fulfill their RPS responsibilities by either owning renewable energy production facilities within Iowa or by establishing long-term contracts to purchase or transmit electricity from renewable energy facilities within their service area.

Federal Solar Solar 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 Iowa, 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.

Iowa Solar Energy Tax Incentive

Iowa created an upfront solar tax incentive in 2012 with bipartisan support and has passed program expansions and improvements on a bipartisan basis three times since then. The solar tax incentive currently offsets up to 15% of the cost of a solar project. Combined with the federal investment tax credit, the two credits can offset up to 45% of the cost of a solar system. The credit caps of $5,000 (residential) and $20,000 (business) encourage many smaller projects across the state.

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