

**South Dakota Public Utilities Commission**  
**Frequently Asked Questions about Solar Energy**

Oct. 10, 2024

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**SOLAR ENERGY**

The PUC's role in solar development involves education and regulation. For utilities within the PUC's jurisdiction, the PUC regulates small generator interconnection practices and the price that solar generators get paid for excess generation. The PUC also has siting authority for solar farms with a capacity of 100 MWs or more.

**How popular is solar power in the U.S.?**

The National Renewable Energy Laboratory (NREL) reports<sup>1</sup> that solar energy provided for about 5.6% of total U.S. electricity generation in 2023 and made up approximately 54% of new U.S. electric generation capacity additions during the year. Based on generator interconnection requests to the transmission system, solar energy is forecasted to make up a considerable portion of future generation connected to the electric grid.

**How much solar generation is in South Dakota?**

Relative to other states, South Dakota doesn't have a large amount of solar generation, although it is increasing. In 2023, the state's total generation was 17,905,904 MWh. Solar power accounted for 47,337 MWh, which makes up approximately 0.26% of South Dakota's generation. Existing utility scale solar in South Dakota is a 1 MW facility near Pierre, the 80 MW Fall River Solar Project near Oelrichs, and the 128 MW Wild Springs Solar Project near New Underwood.

In addition to the operating solar projects listed above, the PUC has issued a permit for the construction of the Lookout Solar Project in February 2020 to construct a facility in Oglala Lakota County capable of generating up to 110 MW of energy.

**What are the main types of solar energy systems and what's the difference?**

There are four main types of solar installations: residential, commercial, community solar farms and utility-scale solar farms. Residential refers to systems that serve single-family residences and may also include multi-family housing. Commercial includes non-residential roof-mounted systems regardless of size, and non-residential ground-mounted systems up to 5 MW.

Community solar farms are shared renewable energy arrangements that allow several energy customers to share the benefit of one local renewable energy power plant.

Utility-scale solar is distinguished from other installations by project size – utility-scale projects are generally large – and the fact that the projects are either owned by electric utilities to serve their customers or the electricity is sold to wholesale utility buyers, not end-use consumers.

**What are the benefits of solar energy?**

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<sup>1</sup> NREL Solar Industry Update. Located at: <https://www.energy.gov/eere/solar/quarterly-solar-industry-update>. Accessed on September 24, 2024.

From an environmental perspective, solar energy systems have less of an impact on the environment when compared to other electricity generating resource types. While community and utility scale solar farms can go on for miles, residential and commercial solar energy systems can be placed on existing buildings and do not require major land allocations or infrastructure development. Further, solar energy uses the sun to produce electricity and thus, there are no adverse environmental emissions by solar energy systems. Finally, solar energy systems are not as loud as other resource types.

From a technical perspective, generation from solar energy systems aligns better with the typical daily pattern of electricity consumption than wind energy. This results in solar energy being able to generate more electricity during periods of higher electrical consumption than wind energy. However, as the amount of solar energy on the electric grid becomes saturated, the benefits realized from solar energy production matching the daily load pattern decreases.

### **What challenges does solar energy face?**

Many of the challenges solar energy faces are related to cost. While solar energy has become much more affordable in recent years, the low cost of other energy sources like natural gas have made solar energy less competitive. The uncertainty of incentives such as solar tax credits also present a challenge.

One of the biggest hurdles to solar is the intermittency of solar energy and the challenges it creates in terms of generation and integration. What does that mean? Intermittency refers to the variability of solar energy and it can be problematic because our grid is expected to be reliable *every second of the day*. Grid operators must plan ahead to ensure the right amount of electricity is produced at the right time to continuously meet electric demand. However, solar energy is less predictable than more traditional fossil-fueled or nuclear energy sources, making this task more difficult.

Solar energy generates electricity only when the sun shines and energy production varies day to day and hour to hour depending on other factors like time of day, season, and local weather conditions. Because solar energy can't be depended on alone, grid operators must ensure they have a contingency plan if expected solar production falls short. There are numerous possible solutions to this intermittency problem, like diversifying energy sources, establishing redundancies and building energy storage capabilities, but all come with an added cost.

Transmission capacity is also an obstacle for utility-scale solar development. When it comes to renewable energy in the U.S., the areas most ideal for renewable energy development are located far from the demand centers in need of that energy. As a result, project developers know that generated electricity will need to be transported long distances to reach customers. While these project developers typically pay for the interconnection lines needed to get their power to the grid, current long-distance, high-voltage interstate power lines are too congested to serve new projects. In order to continue developing renewable energy projects, significant investment in new interstate transmission lines will be needed.

### **What does solar energy cost?**

Technology development, commercialization, and manufacturing scaling have contributed significantly to rapid reductions in the installed cost of a PV solar system.

The installed costs of PV solar panels vary between residential and utility-scale solar farms, with the latter benefiting from economies of scale. In 2023, the median installed price for residential systems was approximately \$2.80 per watt direct current<sup>2</sup> or DC and the median installed price for utility scale systems

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<sup>2</sup> NREL Solar Industry Update. Located at: <https://www.energy.gov/eere/solar/quarterly-solar-industry-update>. Accessed on September 24, 2024.

was \$1.27 per watt DC<sup>3</sup>. Based on the median residential PV system price, it would cost a homeowner approximately \$28,000 to install a 10 kW PV system.

## SOLAR POWER FOR YOUR HOME

### Steps to Going Solar

1. Get a home energy audit.
2. Complete cost-effective energy efficient home improvements.
3. Evaluate your home's suitability for a solar system.
4. Understand your utility bills, local incentives (tax credits, rebates, etc.) and rules.
5. Reach out to your electric utility to learn about the interconnection process, interconnection cost, and the amount the utility will compensate you for any excess generation.
6. Research local building codes and permitting requirements.
7. Explore solar system types and your available solar access.
8. Get proposals from several reputable, established solar system providers.
9. Analyze costs, projected savings and contracts to make the best choice for you and your home.
10. Consider warranties, insurance, rebates and maintenance.

### What do I need to know when considering or installing a solar energy system?

Going solar is a significant decision. You should understand the basics of solar energy, your options to go solar, and what questions to ask solar professionals.

#### *Is my home suitable for solar panels?*

Solar panels are built to work in all climates, but in some cases, rooftops may not be suitable for solar systems due to age or tree cover. If there are trees near your home that create excessive shade on your roof, rooftop panels may not be the most ideal option. The size, shape, and slope of your roof are also important factors to consider. Typically, solar panels perform best on south-facing roofs with a slope between 15 and 40 degrees, though other roofs may be suitable too. Consider the age of your roof and how long until it will need replacement.

#### *How do residential solar systems work?*

Most residential solar systems are PV systems. These generate electricity through two main components: panels (or modules) made up of PV cells that convert sunlight to electricity and inverters that convert DC to alternating current or AC for use in your home.

#### *What are the components of a PV system?*

Solar PV modules or solar panels are where electricity gets generated but are only one of the many parts in a complete PV system. A number of other technologies must be in place for the generated electricity to be useful in a home or business. PV arrays must be mounted on a stable, durable structure that can support the array and withstand wind, rain, hail, and corrosion over decades. These structures tilt the PV array at a fixed angle determined by the local latitude, orientation of the structure, and electrical load requirements.

Inverters are used to convert the DC electricity generated by solar PV modules into AC electricity, which is used for local transmission of electricity, as well as most appliances in our homes. PV systems either have one inverter that converts the electricity generated by all of the modules, or microinverters that are

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<sup>3</sup> Ibid.

attached to each individual module. It is expected that inverters will need to be replaced at least once in the 25-year lifetime of a PV array.

Finally, batteries allow for the storage of solar PV energy, so it can provide power at night or when weather elements keep sunlight from reaching PV panels.

#### *How much electricity can you generate with solar?*

The National Renewable Energy Laboratory developed a tool called PVWatts<sup>4</sup> for this purpose. It estimates the energy production and cost of energy of grid-connected PV energy systems for any address in the world. It allows homeowners, small building owners, installers, and manufacturers to easily develop estimates of the performance of potential PV installations, and can even compare solar's cost to utility bills. These tools are great for getting started, but make sure to work with a solar installer for a custom estimate of how much power your solar energy system is likely to generate.

#### *What are my ownership options?*

If you can afford it, buying your solar panels outright will bring you the biggest return on your investment. If that is not an option, you could look into getting a solar loan.

#### *How can I decide if a solar energy system is right for me?*

Every situation is different so it's important to do your homework and be an active participant in the process. Knowing your electricity usage and whether or not your roof is appropriate for solar are good first steps. Know your finances. Sunlight may be free, but solar energy systems are not. Research your solar company and get the best deal. Before entering into any agreement, thoroughly vet the company. Asking for references and proof of licensure and checking with [South Dakota's Secretary of State](#) office to ensure the company is in good standing should all be a part of the process of selecting a reputable company. Getting multiple bids for your solar energy system should also be a part of your research process. The market can be competitive and having multiple solar companies competing for your business can save you money. Finally, when looking for deals, don't forget about tax credits and incentives. These can save you money as well, but make sure you fully understand any potential tax implications of these money savers.

#### *What incentives are currently offered for solar in South Dakota?*

Federal Tax Credit: There are two types of federal tax credits available for solar energy, an investment tax credit (ITC) or a production tax credit (PTC). Residential solar systems are only eligible for an ITC,<sup>5</sup> whereas businesses installing solar can claim either an ITC or a PTC.<sup>6</sup> The ITC, created by the Energy Policy Act of 2005, established a 30% tax credit for both residential and commercial solar projects. In 2020, the ITC incentive amount began a stepdown schedule to lower the tax credit percentage and declined to the rate of 26%. In August of 2022, Congress passed legislation to extend the residential solar system ITC at a rate of 30% for installations that occur between 2022 and 2032. The [REDACTED] residential system ITC rate then decreases to 26% in 2033 and to 22% in 2034, with the ITC set to expire in 2035 unless Congress renews it. The ITC and PTC for businesses installing solar have slightly different tax credit amounts, but are on a similar

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<sup>4</sup> National Renewable Energy Laboratory (NREL). PVWatts Calculator. Located at: <https://pvwatts.nrel.gov/>.

<sup>5</sup> U.S. Department of Energy. Homeowner's Guide to the Federal Tax Credit for Solar Photovoltaics. Located at: <https://www.energy.gov/eere/solar/homeowners-guide-federal-tax-credit-solar-photovoltaics>. Accessed on: 9/25/2024.

<sup>6</sup> U.S. Department of Energy. Federal Solar Tax Credits for Businesses. Located at: <https://www.energy.gov/eere/solar/federal-solar-tax-credits-businesses>. Accessed on: 9/25/2024.

timeline for phasing out. More information on the ITC and PTC for businesses can be found on the U.S. Department of Energy's website.

- South Dakota property tax credit: The first \$50,000 or 70% of the assessed value of solar energy systems (less than 5 MWs), whichever is greater, is exempt from the real property tax. See [SDCL §§ 10-4-42 to 10-4-45](#).

#### *What will I get paid for my excess generation?*

All electric utilities regulated by the PUC are obligated to interconnect with and purchase power from small solar facilities if the generator desires and agrees to the terms. The minimum rate paid is referred to as the avoided cost which is the incremental costs to an electric utility of electric energy or capacity or both which, but for the purchase from the solar facility, such utility would generate itself or purchase from another source. For solar facilities with a capacity less than 100 kW, the rates utilities pay for the power must be filed with the PUC. These rates must also be approved by the PUC for the regulated investor-owned utilities. This transparency allows producers to compare rates and make informed decisions regarding the economics of a small renewable power facility. These filed rates can be accessed here, <https://puc.sd.gov/energy/rrrates.aspx>.

South Dakota does not compensate solar generation at a net metered rate. Please see the PUC's [Compensation page](#) for an explanation as to why that policy has not been adopted.

#### **SOLAR LEASE**

**I am looking to install a solar energy system for my home by entering into a lease agreement with a solar installation and maintenance company. What do I need to know about South Dakota laws to do so?**

The most important consideration is a solar lease agreement must state that you, the lessee, hold all rights and abilities to operate, maintain and control the facility. If you as the lessee do not have those three elements, you are not in compliance with South Dakota law. Therefore, the company from which you lease or purchase your system, or the company you have operate and maintain your system, must agree to forfeit all rights to the system so they are not operating as an electric utility.

#### **Can I generate or provide my own electricity for my own consumption in my home or business?**

Yes, you can as long as you are using the electricity yourself and not selling it to any entity other than via a wholesale agreement with a public utility assigned to your electric service territory. If you are selling it via retail, then you are operating as a public utility and that is not allowed by law. You may have a wholesale agreement with your electric provider to purchase your excess generation. Every location in South Dakota is part of an existing electric service territory assigned to one electric service provider.

Here is a link to the applicable South Dakota law, [SDCL 49-34A-42](#), and excerpts:  
*Each electric utility has the exclusive right to provide electric service at retail at each and every location where it is serving a customer... No electric utility shall render or extend electric service at retail within the assigned service area of another electric utility...*

#### **What other resources are available?**

[U.S. Department of Energy](#)

[U.S. Department of Energy's Homeowner's Guide to Going Solar](#)

National Renewable Energy Laboratory

Estimate Energy Production and Cost of PV Systems (NREL)

Solar Energy Industries Association