South Dakota Public Utilities Commission
Frequently Asked Questions about Solar Energy

April 20, 2021 **Printer Friendly Version**

The South Dakota Public Utilities Commission's role in solar development involves education and regulation. For utilities within the PUC's jurisdiction, the PUC regulates 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.?

According to the U.S. Energy Information Administration (EIA), solar energy provided for about 3% of total U.S. electricity generation in 2020 with all renewable energy sources accounting for 20% overall.

How much solar generation is in South Dakota?

Relative to other states, South Dakota doesn't have a large amount of solar generation though it is increasing. In 2020, the state's total generation was 17,038,876 MWh. Solar power accounted for 1,933 MWh, which makes up approximately 0.01% of South Dakota's generation. Existing utility scale solar in South Dakota is a 1 MW facility near Pierre.

Even though solar generation in South Dakota has yet to take off, the PUC has issued permits for the construction of two large-scale solar facilities in South Dakota. The Lookout Solar Project was granted a permit in February 2020 to construct a facility in Oglala Lakota County capable of generating up to 110 MW of energy. Wild Springs Solar Project was granted a permit in November 2020 to build a facility in Pennington County capable of generating up to 128 MW.

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. This kind of installation pools investments from multiple members of the community and provides power and/or financial benefit in return. Shared renewable projects are often located on public or jointly-owned property and provide an option for those who can't install solar on their property, like renters and condominium owners or homeowners with roofs that are improper for solar installation.

Utility-scale solar is distinguished from other installations by project size, utility-scale projects are generally large, and the fact that the electricity is sold to wholesale utility buyers, not end-use consumers.

What are the benefits of solar energy?

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 don't require major land allocations or infrastructure development. Further, solar energy uses the sun to produce electricity and, thus, there are no combustion by-products emitted 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.

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 the Solar Investment Tax Credit (ITC) also presents a challenge. 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 current rate of 26%. Congress passed legislation to continue this rate through 2022 with the rate scheduled to decline again to 22% in 2023 and 10% (utility/commercial) or 0% (residential) in 2024.

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. Grid operators do their best to plan ahead and 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 is a non-dispatchable energy source, meaning it's not under the control of the operator. 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 powers 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?

According to the U.S. Department of Energy, the amount of solar energy connected to the electric grid has increased more than 20-fold since 2008. Technology development, commercialization, and manufacturing scaling have contributed significantly to rapid reductions in solar hardware costs. However, the non-hardware costs, often referred to as soft costs that include financing, customer acquisition, permitting, installation, labor, inspection and more, have not declined as rapidly. In 2019, soft costs account for 66% of the total installed price.

The installed costs of PV solar panels vary between residential and utility scale solar farms, with the latter benefiting from economies of scale. In 2019, the median installed price for residential systems was approximately $2.89 per watt DC and the median installed price for utility scale systems was $1.34 per watt DC. Based on the median residential PV system price, it would cost a homeowner approximately $28,900 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 photovoltaic (PV) systems. PV systems generate electricity through two main components: panels (or modules) made up of PV cells that convert sunlight to electricity and inverters that convert direct current (DC) to alternating current (AC) for use in your home.

What are the components of a photovoltaic (PV) systems?

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 photovoltaic 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 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 photovoltaic 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 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's not an option, then you could look into getting a solar loan.

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

Everyone's 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 systems are not. Research your solar company and get the best deal. Before entering into any agreement with a solar company, thoroughly vet the company. Asking for references and proof of licensure and checking with the secretary of state to ensure the company is in good standing should all be a part of the process of selecting a reputable company to work with. Getting multiple bids for your solar system should also be a part of the buying process. The market can be quite competitive and having multiple solar companies

competing for your business can save you a few bucks. 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: A taxpayer may claim a credit of 26 percent of qualifying upfront capital costs for a solar energy system.
    - This incentive applies to the installation of both solar water heaters and solar panels.
- South Dakota property tax credit: The first $50,000 or 70 percent of the assessed value of solar energy systems (less than 5 MWs), whichever is greater, is exempt from the real property tax (SDCL §§ 10-4-42 to 10-4-45).

Why doesn't South Dakota have net metering? What will I get paid from my utility for my excess generation?

Net metering is a policy in which a utility must purchase power generated by its customers at the same retail price it sells electricity to the customer. Typically used as an incentive for customers who install renewable energy systems like solar, net metering was first considered as a result of the Public Utility Regulatory Policies Act of 1978. At the time, South Dakota policymakers debated and chose not to implement it. Having considered this on numerous occasions, since then, the state legislature concluded mandatory net metering is not of the public interest.

Net metering hasn't been adopted for several reasons. First, the utility would be forced to pay the generator an above market cost of generation. Further, the utility would not be able to schedule the generation of electricity and it would be worth less than electricity they are already buying for a lower price.

Second, retail electricity rates are based on the variable cost of energy generation and a portion of the fixed costs of generation, distribution and transmission facilities. If utilities must pay above market rates for substandard power, rates will eventually have to rise to cover increased expenses. In addition, net metered customers don't pay their fair share of the utility's fixed costs and those costs are shifted to the utility's other customers causing their rates to increase. Increased rates will have the largest effect on low income customers, who couldn't afford the upfront costs of renewable energy systems in the first place.

Small generators have the opportunity to sell power to a utility without net metering. The purchase price the utility pays must reflect the value of generation and be similar to the utility's wholesale cost of power. It doesn't include costs of transmission, distribution and overhead, as well as other costs of providing electrical service that are included in net-metered rates.

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. For solar facilities with a capacity less than 100 kW, the rates utilities pay for the power must be filed with and approved by the PUC. This transparency allows producers to compare rates and make informed decisions regarding the economics of a small renewable power facility.

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