

Bright Thoughts on Oklahoma Energy

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Oklahoma has so much untapped, solar energy availability. Ranked number six out of the fifty states for average peak sunlight hours in the United States, our state has somehow achieved the number forty-nine when it comes to solar energy production, according to the Oklahoma Sierra Club (Davis *et al.* 2018). As a scientist who has devoted her life to finding more environmentally friendly ways to produce energy, the lack of widespread dependence on solar energy in our state does not make sense to me. Solar energy is a promising renewable resource we should be taking advantage of as soon as possible. Its benefits outweigh the draw backs of its use and there are feasible ways for us to incentivize its widespread development in the near future.

Benefits of Solar Energy in Oklahoma

There are many benefits of implementing solar energy in Oklahoma. The reduced greenhouse gas output, refurbishing of otherwise abandoned land for solar farms, improved community energy autonomy and security, and a general increase in the economic health of our state are just a few of the many ways transitioning to solar panels will benefit our state.

The reduction of our state's carbon footprint with the mass production and use of solar panels is one of the primary reasons for moving away from our current dependence on fossil fuels. According to a study done in Australia in 2009, it would take solar cells less than 1/12 of their lifetime to payback the amount of emissions from their manufacturing process (Sendy 2019).

Solar farms would be a cost effective way to refurbishing lands unused due to toxicity levels. In 1994, the United States has tried to incentivize the cleanup and reuse of lands contaminated by hazardous chemicals, such as retired landfills, through the Brownfield programs. A major setback of this program has been that the general public does not want to risk

building businesses or residences on land that is perceived to be hazardous. Although the program was success in creating public parks and private golf courses on cleaned land, there are still hundreds of thousands of acres available for development (Wikipedia 2018). Much of this unused land is in Oklahoma. In recent years, Brownfield projects have turned to converting harzardous land for solar farms. Since solar farms require relatively low maintenance and human presence, it has been found to be the most optimal way to profit from hazardous land without harming people (Gerlat 2013).

The energy autonomy and stability of communities across the stated would be improved by the presence of local solar farms. Since hospitals and emergency services heavily rely on electricity to save lives, many people are vulnerable to unnecessary suffering and/or death should a tornado or earthquake destroy one of the many miles of connecting power lines. However, solar farms close by or on site would have less equipment to get damaged by natural disasters, creating a more stable electricity source. Also, energy autonomy for those in rual areas would be increased in they will no longer have to rely on as many power lines for electricity when they can set up solar farms on site. Oklahoma schools would also be able to open in earlier days of August due to decreased air conditioning costs from peak amounts of sunlight, if solar panels were installed on their roofs.

Increasing the number of solar panels in Oklahoma would increase the economic wellbeing of our state. Examples of this can be seen from the economic growth of Missouri and Massachusetts after they each implemented their own programs to incentivize solar panels. After adopting tax incentives for large scale and residential scale solar farms in 2014, Missouri fostered the growth of a \$500 million solar industry in their state. This brought over 2,600 new jobs and is expected to save the state's homeowners a total of at least \$2.5 million by 2040.

Massachusetts has been able to reduce the cost of electricity for their homeowners by providing loans to incentivize the installation of solar panels for energy grid buy-back programs. This has led to the creation of over 11,000 new jobs in the solar industry for their state (Davis *et al.* 2018). If Oklahoma could adopt incentives for solar power, our state could also save on utilities and create new jobs. Although there are many more benefits that would come from using solar power as our primary energy source, it is still important for me to acknowledge the possible drawbacks of doing so.

Drawbacks of Solar Energy in Oklahoma

Despite the many benefits of solar power, there are a few drawbacks to their mass implementation, such as high initial set up costs, pollution of manufacturing solar panel materials, and the presence of other energy alternatives. However, it is my professional opinion that these drawbacks to widespread dependence on solar panels is greatly offset by the benefits they would provide.

The upfront costs of installing solar panels on one's home can easily reach over \$15,000, which would take about 10 years to pay itself off in saved utility bills. Over the lifespan of the solar panels though, homeowners in California saved an average of \$28,000 according to a 20-year study. The long term savings available by switching to solar has led to some states to have low interest loan programs for the purpose of installing solar panels, reducing the upfront cost to that of a monthly utility bill for the first half of the solar panels' lifespan. Programs such as California's loan incentives, if implemented in Oklahoma, would get rid of the upfront costs for the consumers and save them and our government money long term (Sentry 2019).

Although the act of harnessing solar energy results in zero pollution emissions, the materials creation and transportation costs do pollute the environment. For example, the trucks that deliver

solar panels across the continental US run on fossil fuels and as do the factories that create them. Also, pollution in manufacturing processes from gas waste, such as nitrogen trifluoride, can be even more harmful than carbon dioxide when it comes to the greenhouse effect. However, the Australian government conducted a study in 2009 on the reductions in carbon emissions brought by solar panels over their lifetime. They found that it took less than 2 years for the solar panels in their study to reduce greenhouse gas emissions by the amount it took to manufacture and transport them. Since the lifespan of the solar cells used in the study was over 25 years, they left at least 23 years of little to no emissions (Sendy 2019).

Given that Oklahoma happens to be in the heart of tornado alley, many would argue that the high amounts of wind our state receives as well as the availability of wind power at night would make wind energy the most reliable source of alternative energy. However, the lifespan of windmills is less than 10 years whereas crystalline solar panels have a lifespan of at least 25 years. Due to their large size and large amounts of moving parts, wind mills also require more expensive equipment and a higher learning curve to maintain than solar panels. Also, windmills are extremely noisy and cannot be kept near residential areas, greatly increasing the costs of transporting energy to populated areas. Although wind energy is available at night whereas solar energy is not, advancements in battery storing technology by the company Tesla has cut the price of storing energy by at least a half over the past five years. This advancement in affordable battery technology makes solar energy more accessible. Even though Oklahoma has a high amount of wind on a daily basis, the location flexibility of solar panels as well as their lower costs makes them the better choice (Sendy 2018).

How We Can Foster Solar Energy Development in Oklahoma

We can make this a reality for us in Oklahoma if we move forward in our legislative support for solar panel technologies through grid buyback programs and promoting third party development of solar farms. If we pushed for policies that would require energy companies to buy excess the excess energy placed into the grid, this would greatly reduce the costs of maintaining rooftop solar arrays for consumers. By allowing single family homes to earn utility credit for excess energy produced by their solar rooftop solar, the time to pay off the initial investment would decrease. This would also decrease costs for utility companies long term because the costs of equipment maintenance and installation would be on the individual families. A mandatory buyback policy implemented in 2013 in Georgia accomplished lower costs for both consumers and utility companies, as well as leading to over a 1000% increase in installed solar systems over a five-year period (Davis *et al.* 2018). The other main way we can foster solar development through is by providing tax incentives for third parties to develop solar farms in Oklahoma. Just a few million dollars in tax incentives provided by the government of Missouri for solar farms in their state allowed for the create of a \$500 billion solar industry that brought over 2,600 new jobs to their state and is expected to save their homeowners over \$2.5 million in utility bills by 2040 (Davis *et al.* 2018). Given that Oklahoma has a high amount of peak sunlight levels throughout the year, time and money spent on fostering solar technology would quickly pay itself off.

Conclusion

Given the large amount of benefits, relatively few drawbacks, and feasibility of enacting supportive policies, it is realistic for us in Oklahoma to adopt solar panels as our primary source of renewable energy. Since we are one of the sunniest states in the US, why not embrace a bright alternative to power our future?

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