



Utility-Scale Solar in Ohio





What is Utility Scale Solar?

- Utility scale solar power projects are generally thought of as projects 20 MW or greater in size, and are often 100 to 500 MW in size. They are ground mounted, interconnected to the power grid (rather than behind-the-meter), and generally have offtake with a utility. We are not talking about rooftop solar.
- Utility scale solar projects can be built in nearly any size. The projects have less lead time to develop and construct than a traditional power project.
- Since the solar panels are mounted on the ground they can be placed on trackers that allow the solar panels to follow the sun all day long. This increases the output of the each solar panel every day.
- Utility scale projects are built with reliable equipment that has a proven track record.
- There are economies of scale – the larger the project, the lower the price. The cost of utility-scale solar is significantly lower than the cost of commercial or residential installations.



Pricing Considerations

- Because of technological advances, efficiencies in installation and construction, and optimized design, prices for electricity from utility scale solar have dropped dramatically—over 60% in past 7 years or so.
- Utility scale solar power is now fully competitive with other major sources of generation. According to AEP Ohio, Hecate Energy’s proposed 300 MW solar array in Highland County when run through 1,000 different simulations led to lower prices to the customer 100% of the time over the life of the project.¹
- When utility scale solar takes its seat alongside other major power sources, the diversity of available generation options is enhanced and the price volatility that can result from excessive reliance on any single source of electricity is reduced.
- Price is knowable for the life of the project—it will never change due to fuel pricing or transportation costs or environmental regulations. Budgeting and planning is greatly simplified.
- Ohio solar power projects help reverse the trend that has seen Ohio become a net importer of energy² and, thus, a price-taker for out-of-state generation supply.

1. Source: AEP Ohio testimony to Ohio Public Utilities Commission

2. Source: U.S. Energy Information Administration



Grid Reliability

- Utility scale solar plays an integral role in promoting a reliable and cost effective grid.
- Solar power plants meet peak demand with maximum output.
- Integration with emerging battery storage solutions will minimize intermittency issues, and grid reliability and regulation will be enhanced due improved flexibility.
- Utility scale solar when optimally located can help reduce congestion costs.
- Utility scale solar leads to better reliability since power plants have an availability factor near 100%.



Customers Have Expressed Demand for Solar

- Solar power results in a cleaner energy mix that is overwhelmingly desired by both business and residential customers.
- Nearly half of all business respondents to a recent Navigant Consulting survey of Ohio-based businesses said they had explicit goals around carbon emission reductions and/or renewable energy procurement.¹
- States in many instances are “competing” with each other for commercial and industrial customers, and access to renewable power is becoming an increasingly important factor in many of these decisions.
- When tied to a utility offtaker, utility scale solar permits a broader set of customers to benefit from the energy mix that they want; all AEP customers benefit – not just higher-income households and huge companies.
- Solar power adds a source of generation that is typically still only a small percent of the electricity generation mix. When 400 MW of solar generation is added, the renewables share of AEP Ohio electricity mix increases from 1.3% to less than 4%.¹
- Public hearings that were held as part of the PUCO and OPSB approval process demonstrated overwhelming public support for the project. On December 3, 2018, 55 of the 55 persons who testified, testified in favor at a Columbus PUCO hearing. Last week, at the Highland County OPSB public hearing, of 31 persons who spoke, 24 persons spoke in favor of the project.

1. Source: AEP Ohio testimony to Ohio Public Utilities Commission



Economic Development Considerations

- The solar project has committed to use local equipment and services to an extent that will create 150 direct permanent jobs in Appalachian Ohio. These jobs will all be in the solar energy supply chain – a growth industry with increasing demand.
- The solar project will create hundreds of construction jobs for the approximate 12 month construction period. ¹
- The solar supply chain has connections to traditional Ohio-based businesses, such as steel galvanizing, battery storage, and glass making. Economists have estimated that the 400 MW solar project creates or sustains nearly 3,900 fulltime and part-time direct and indirect jobs in addition to the 150 direct supply chain jobs. ²
- The project provides a chance for revitalization of rural counties, and new revenues for hard-pressed school districts. The solar project will pay a substantial multiple on the current tax revenue that the land generates.
- The project provides opportunities for research and development related to solar technology at Ohio's universities.

1. Source: Highland Solar Ohio Power Siting Board Application, Exhibit C

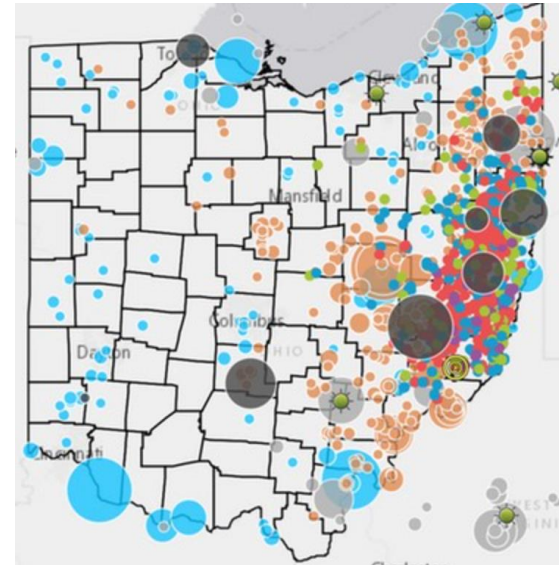
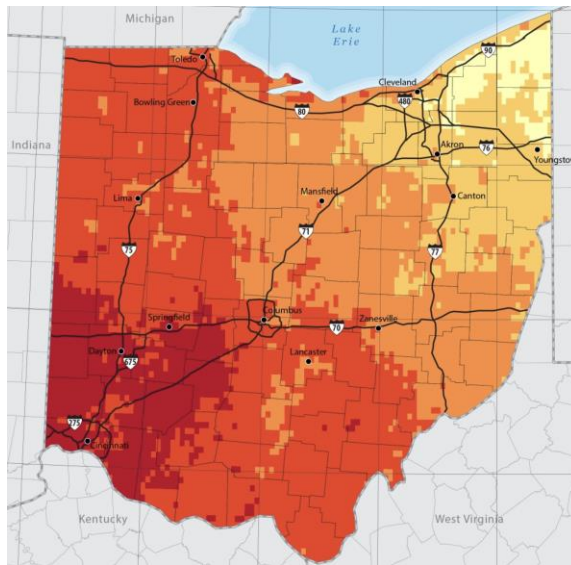
2. Source: Bill LaFayette, Ph.D., owner of Regionomics LCC ; Stephen Buser, Ph.D, Professor Emeritus at the Fisher College of Business, the Ohio State University



Solar Power Supplements Current Energy Activity

Solar power generation adds economic and geographic diversity to Ohio's energy economy.

- The image on the left represents solar resource. The darker the orange, the higher the solar resource. ¹
- The image on the right represents existing oil and gas activity. The blue and gray circles show location and relative size of current electricity generation facilities. The other circles represent oil and gas activity. ²



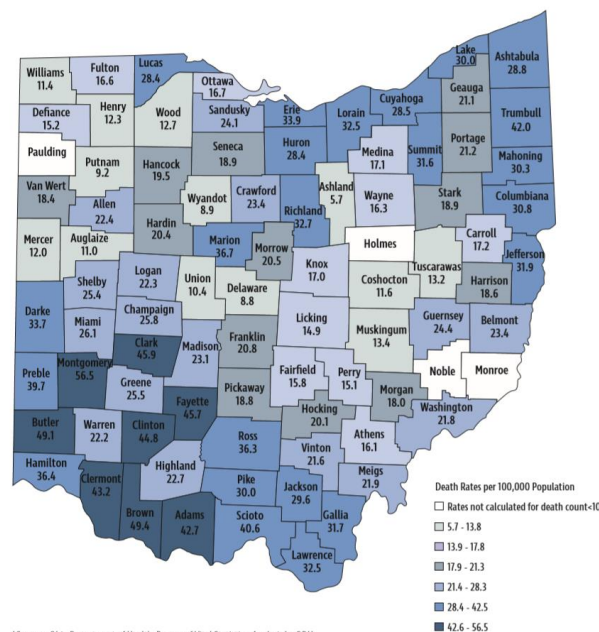
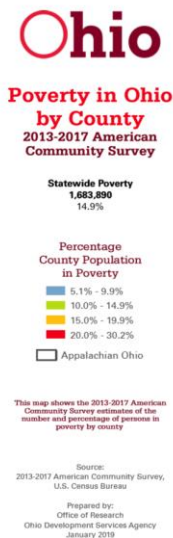
1. Source: National Renewable Energy Laboratory
2. Source: Fractracker Alliance



The Appalachian Region Can Benefit from Job Creation and Economic Diversification

The Appalachian Region has relatively high unemployment, and is disproportionately feeling the impact of the opioid crisis.

- The image on the left represents the percentage of the population by county living in poverty.
- The image on the right shows the rate of unintentional drug overdose death rate by county from 2012-2017.



¹ Sources: Ohio Department of Health, Bureau of Vital Statistics; Analysis by ODH Injury Prevention Program; U.S. Census Bureau (Vintage 2016 population estimates).
² Includes Ohio residents who died due to unintentional drug poisoning (underlying cause of death ICD-10 codes X40-X44).
 Rates suppressed if < 10 total deaths for 2012-2017.





Why Utility Scale Solar, Why Now

- **Jobs Now & In The Future-**
 - Nationwide, by 2017, just under 374,000 individuals work, in whole or in part, for solar firms, with construction/installation representing almost 4 in 10 of those workers. ¹
 - In 2016, Solar Photovoltaic Installers was the fastest growing occupation and is forecasted to continue as the fast growing occupation through 2026. ²
- **Secure, Reliable, and Affordable Electricity-**
 - The price you pay today is the same price you pay through the life of the contract.
 - Utility scale solar adds to the diversity of Ohio's energy supply helping ensure the security of the State's energy future now and for years to come.
- **Ohio, a place for business-**
 - An increasing number of companies want to power their businesses with renewable energy and they want to locate operations in states where they can procure and be a part of the growth in renewable energy.

1. Source: Department of Energy- U.S. Energy and Employment Report, January 2017

2. Source: Bureau of Labor Statistics- Table 1.3 Fastest Growing Occupations, 2016 and projected 2026

THANK YOU