Program helps pick site for renewable energy generation

Sunshine and wind are two things we know well in the Tri-Cities and beyond. My own back yard is a perpetual vortex of breezy fun to the point that it almost seems silly not to harness it for something useful. But I recently learned that when we are talking about building renewable energy generation capacity, it is not quite as simple as, "If you build it, they will come."

In fact, according to renewable energy expert and Pacific Northwest National Laboratory researcher John DeSteese, there are several criteria that make a piece of property suitable for this kind of development. DeSteese and his team recently completed an assessment regarding the use of specific land for renewable power generation through PNNL's Technology Assistance Program.

The program provides small businesses with up to a week of researcher time for free help with specific technical questions or challenges. This particular project focused on wind and solar power generation.

So how would one determine whether a particular site would actually work for generation purposes?

To be considered suitable as a wind energy resource, a site must first and foremost have transmission availability and capacity, meaning it should ideally be located within a mile of existing transmission lines to eliminate the need to construct new ones, typically an expensive endeavor. It should also have utility interconnection to avoid incurring the cost of building a substation.

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Economic Diversity

Next, the wind power density at 50 meters or 164 feet altitude (measured in watts per square meter) must be at acceptable levels and wind speed must be at least 14 mph for commercial-scale projects.

Terrain accessibility and property size are also important, as land requirements for a single utility-scale wind turbine are about three acres. Multiple units would require enough land to space them properly for optimizing the wind resource.

"Once you've determined the project to be feasible against these technical criteria, there are other important factors to consider," DeSteese says. "These include whether there is interest from established wind developers who are familiar with turbine design, wind farm configuration, and federal and local incentives, as well as your own analysis of the economics and local and state permitting requirements."

And what about harnessing our "300 days of sunshine" per year? To assess a site's suitability as a solar energy resource, the first task is to verify the property's energy density via assessment of solar insolation, typically represented in kilowatt hours per square meter per day. Commercial-scale projects usually require energy density exceeding 4.5, although photovoltaic panels producing energy at lower insolation levels might still be feasible as their price decreases.

"The rest of the geographic criteria and process for determining suitability for solar power generation is similar to that of wind," DeSteese says. "Property size, proximity to transmission lines, utility interconnection, developer interest, economic analysis, and permitting requirements are all key pieces to the puzzle."

Is it possible to have both systems on one piece of property? DeSteese says it is possible, but the two system types should not be installed in extremely close proximity.

"Solar and wind power generation are becoming more and more important as we expand our incorporation of renewable power into the grid," notes DeSteese. "Proper site selection is paramount to maximizing these wonderful natural resources in a way that is both technically and economically feasible."

There are opportunities for energy development in the Tri-Cities and surrounding areas. But it's important as we look at growing our economy that we, both literally and figuratively, put our energy in the right places.

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