SOLAR POWER COULD BE USEFUL ALTERNATIVE TO NATURAL GAS HEDGING

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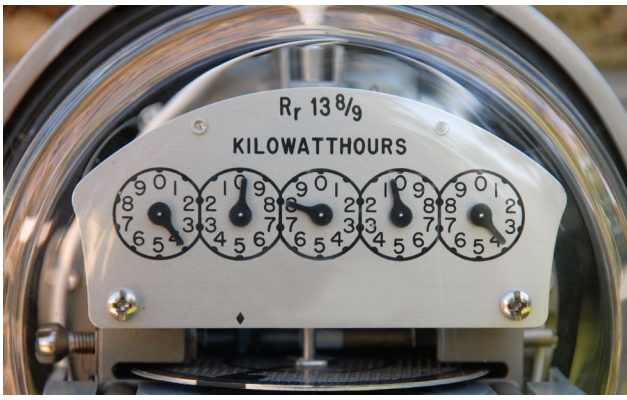

Among all of the uncertainties in the energy sector, one notion should be clear to anyone seriously paying attention: the U.S is headed quickly toward a carbon-restrained future. Federal regulations such as the Clean Power Plan, which places aggressive limits on the emission of carbon dioxide and other greenhouse gases, are creating a chokehold on traditional coal-fired electricity production.

Many utilities have already chosen to transition some coal-fired facilities to natural gas.

In addition, the diminished price of solar panels and government rules that favor - or even mandate - renewable power are leading to greater penetration of non-fossil resources. This, too, helps create more demand for natural gas power generation, since the intermittency of renewable resources is best resolved by quick-start natural gas turbines.

On top of both of those factors, the abundant supply of and low price for natural gas has made the natural gas solution an obvious choice for utilities.

For their part, utility regulators have had little trouble green-lighting more natural gas for regulated utilities. In the immediate future, such approvals will save customers money and help to speed compliance with environmental regulations. However, placing more and more 'eggs' in the natural gas basket doesn't come without some risk.

Historically, the price of natural gas has been somewhat volatile. Just because the price of natural gas is at a 14-year low this week (about $1.88 per million BTU) doesn't mean it will be that low in a year, three years, or five years.

That's why it is critical that estimates about the future price of natural gas are accurate. That's also why natural gas price hedging remains a tool embraced by both utilities and regulators.

As the Wall Street Journal pointed out recently, hedging allows utilities to navigate the volatility of weather without creating constant sticker shock for their customers. This December, for example, is one of the mildest on record, driving down the price of natural gas. That, of course, is good for electricity customers.

Next December could be the exact opposite, though. Customers must be protected, and natural gas hedging provides a built-in safety net to do just that. Especially for utilities in regions with wild temperature swings, such as the Southeast, hedging is an indispensable tool.

Fortunately, public service commissions in a number of service territories continue to assert the value of hedging. For example, in Georgia, a debate about hedging strategies revealed that a $1 increase in the price of natural gas would have cost Georgia Power customers about $100 million in 2007, but $300 million today, based on increased use. In that scenario, hedging was a crucial tool.

Recently, too, when some customers in Florida argued to discontinue natural gas price hedging in that state, the Florida Public Service Commission unanimously voted to uphold the practice.

Lisa Edgar, Chairman of the Florida Public Service Commission, said that hedging "is a tool that in many years [has] proven to benefit the customers as it was intended to do."

THE ROLE OF SOLAR IN THE FUTURE

While price hedging will likely continue to be a staple of utility operations, other processes seem poised for change.

For example, utilities have traditionally used economic factors to determine which electricity generation resources to dispatch when customers require additional power. At peak periods, when additional electricity is needed, this could mean ramping up a low-cost coal-fired unit or using inexpensive hydropower resources, as opposed to costlier options.

However, under the EPA's Clean Power Plan, dispatch decisions in the future could depend more on environmental factors than economic ones. In other words, a more expensive natural gas-fired combustion turbine might be dispatched rather than a cheaper option such as coal or hydro due to restrictive federal rules.

In this future, solar will play an increased role. EPA rule making and administration policy clearly favors solar as an energy resource. The market price of solar, as well as the economic viability of utility-scale solar projects, also bodes well for solar being an important part of the grid in the coming years.

In fact, an October piece by Michael Kanellos in Forbes suggests that solar power could soon be a cheaper alternative than natural gas-fired generation. Kanellos cites a new report from Lawrence Berkeley National Laboratory that says between 2017 and 2040, the average leveled cost of power from solar plants will be $42 per megawatt hour, compared to $48 for the fuel cost of gas alone.

Read the Berkeley Report Here

The report from Lawrence Berkeley National Laboratory, of course, comes with a number of caveats. First, a substantial portion of the solar power plants studied are located in the Southwest. Some of them haven't fully come online either. Second, natural gas prices, as we've noted, are also difficult to predict with any certainty. Third, it is still unclear how the solar industry will bear the economic impacts of federal tax credits eventually disappearing. Despite those caveats, the projected pricing for the solar projects cited by Kanellos are for real solar contracts, and are compared to just the fuel for natural gas plants, not their capital costs.

The reality is that while the vast majority of megawatts from utility-scale solar projects will come from the sun-rich and largely cloudless Southwest, other regions - including the Southeast - are also likely to see to significant solar projects come online in the near future.

In May, PACE wrote encouragingly about a solar project undertaken in New Orleans by Entergy. More recently, in July, we joined others in applauding an announcement by Alabama's largest utility, Alabama Power, to invest in up to five hundred megawatts of renewables, much of which will come from utility-scale solar. These projects and others like them deploy solar power in a way that both helps the grid and avoids unfair cost shifting between customer groups.

In addition to creating more opportunities for utility-scale solar projects, the diminished cost of solar power is also leading to more 'avoided cost' contracts for utilities. These contracts typically involve a utility in one state buying electricity from a utility in another, where either the time of day or weather conditions allows for selling of cheap excess power.

In the past, such power was usually generated from coal, natural gas, or nuclear power. These days, solar generation has become an option for 'avoided cost' contracts, particularly during peak hours when solar works best.

In Utah, two 80-megawatt plants will start selling power to PacificCorp under avoided costs contracts. Idaho Power signed a similar contract for 461 megawatts.

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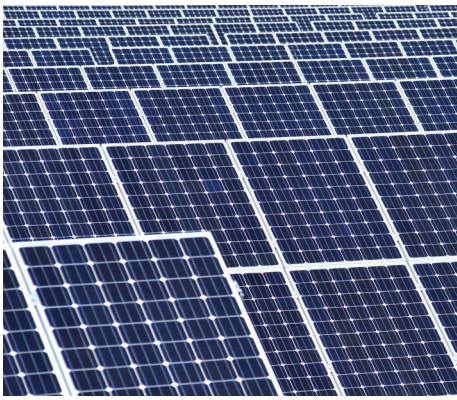


LIMITATIONS AND CONSIDERATIONS

Utility regulators must also bear in mind the practical aspects of incorporating more solar power into the grid. After all, despite claims by some to the contrary, solar power is not a capacity resource. Without battery storage, solar remains a resource that works only when the sun is available.

The difficulty of integrating more solar stems from the fact that most power plants currently on the grid were not designed to cycle up and down frequently to balance large amounts of intermittent power generation from renewables.

For the most part, coal-fired plants and nuclear units are designed to be turned on and left on. That means pairing them with variable resources like solar power might not be the best idea for a grid that requires a high degree of stability and pinpoint matching of supply to demand.

"Together, the need for gas-fired generation and the lack of dispatchable renewable generation increases the likelihood of price volatility and possible over- and under-generation conditions," FERC stated recently at a monthly meeting in Washington, DC.

The agency explained that the demand curve "is a particular challenge in the winter when the sun sets well before the evening peak load."

In other words, as more solar power comes online, utilities will need to solve how to deal with conditions where solar doesn't contribute much to the grid.

For now, fast-acting natural gas turbines are typically the cheapest way to balance grid demand and avoid cycling slower-starting units that use coal or nuclear power.

"Today we're designing gas turbines that in 10 minutes get to simple cycle operation and in 30 minutes get to combined cycle operation," Joe Mastrangelo, CEO of GE Power Generation Products, stated recently. "So, how quickly can you bring a gas turbine online and how can you provide tools to allow it to sync to the grid faster so you can balance the intermittency that occurs with renewables [is the key question]."

The bottom line is that cycling generation units on and off compromises their efficiency and is usually very costly. Variable energy sources such as solar, despite their environmental and regulatory benefits, might also end up making traditional sources more expensive, because they lead to higher cycling costs.

At present, much of the growth in power plant cycling is coming from solar.

"Some say that renewables are starting to stress the operations of conventional power plants because they are the force behind increased cycling,"said James Schetter, president of the energy research firm Renewable Impacts.

"Cycling cost impacts seem low now, but as renewables penetrations increase, they may increase as well."

California is already seeing some of the early effects of significant solar integration. According to a recent article by Bloomberg, on Tuesday, October 20th, for example, solar generation accounted for 19 percent of California's electric supply. This massive deployment of solar power into the everyday operation of the California grid has had real-life impacts for the utilities in that state.

For example, the gas-fired generation needed to back up solar generation on the California system surged to more than nine thousand megawatts last winter, up 46 percent from three years earlier, according to FERC data.

The California Independent System Operator (CAISO) expects it will need to rise further to thirteen thousand megawatts in 2020.

The shifting landscape in California is not lost on its grid planners, who recognize that the increased integration of solar means that energy policy has painted California into a corner where more natural gas generation offers only the only available solution.

"Capacity will no longer be the coin of the realm," CAISO CEO Steve Berberich was quoted recently in a report by Utility Dive. "Capability will be the coin of the realm."

Berberich and others point out correctly that utilities now live in a world where choosing the least cost option might not be possible. This affects not only their planning and their operations, of course, but the costs they pass along to customers.

Regulators must determine the best way to deal with the cost impacts of a world where capability outweighs capacity. They must also grapple with the costs of integrating more solar into grid operations, especially since that is likely to mean increasing the operational costs of existing power plants.

UTILITY-SCALE SOLAR AS A POTENTIAL HEDGING TOOL

The energy future we are entering creates a clear pattern. More solar means more natural gas. More natural gas means more need for natural gas price hedging. Otherwise, customers grow only more susceptible to upward changes in the price of natural gas.

But integrating more solar doesn't just have to be an obstacle for utilities. It can also be a solution. Despite its limitations, solar power generally performs well when the sun is available during the day.

This generation window for solar power might not match perfectly with the peak demand of a utility, which typically arrives later in the day when the sun is setting, but it does match portions of the day when electricity demand is high. This is especially true on sunny days when both temperatures and solar performance are likely to be high.

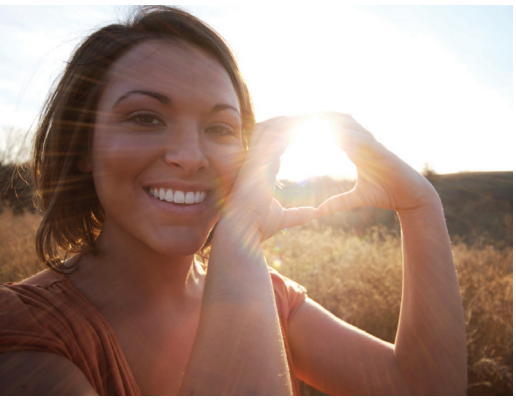
While there are challenges for utilities associated with the intermittency of variable energy resources, there's no debate that each kilowatt-hour produced is one less kilowatt-hour that would have otherwise been generated by a fossil resource—likely gas-fired.

That gas-fired generation may come at a price of 2 cents per kilowatt-hour in years when gas prices are historically low, but can rapidly climb to 18 cents per kilowatt-hour when prices spike due to historic highs caused by higher demand.

"Locking in" energy from a solar plant at a fixed cost could be viewed synonymously with the current utility practice of "locking in" on fuel price hedges. In this way, utility-scale solar could act as a physical hedge against natural gas prices.

There can be no doubt that traditional hedging practices will continue to have a place in utility planning and regulatory action, but utility-scale solar could be an alternative worth exploring further in the domain of hedging strategies. Utilities, as well as their regulators, should consider pricing solar against their traditional natural gas fuel hedging programs.

If the financed annual cost of utility-scale solar construction is less expensive than natural gas hedging, perhaps it could be alternative that works to the benefit of both utility and customer.



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