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Learning From Kansas: Why Utilities Are Embracing Wind Energy

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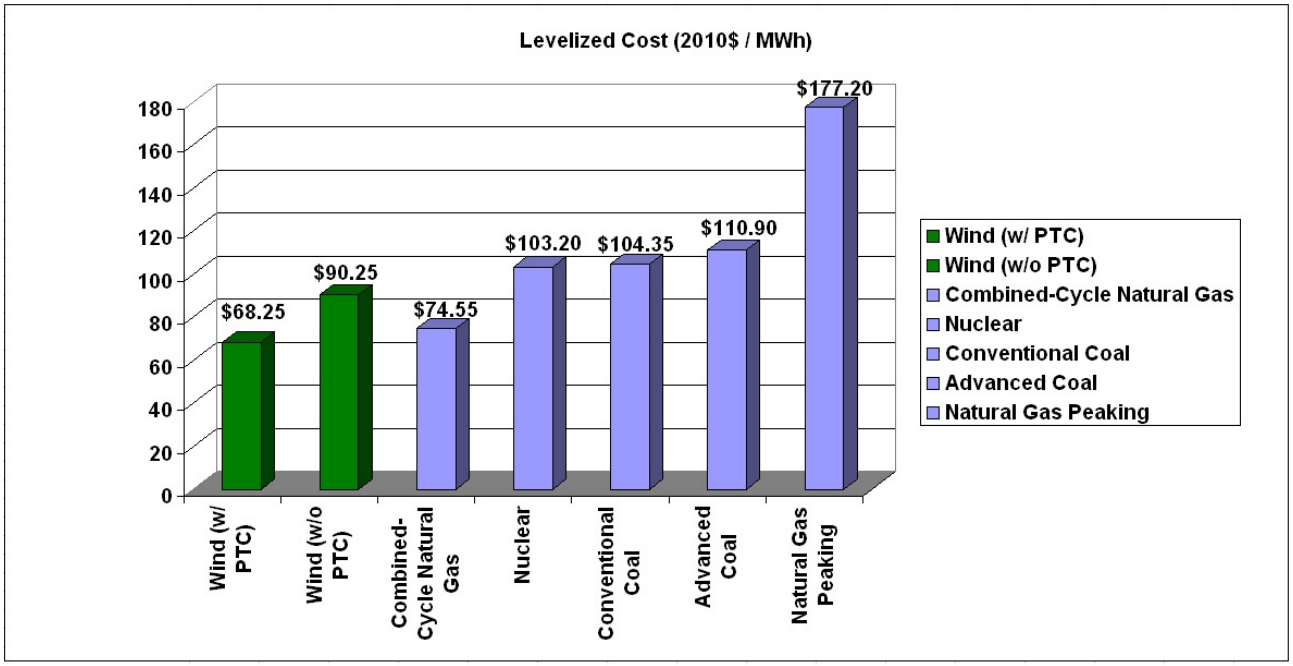
In Kansas, wind energy generation is at least equivalent in cost - and often cheaper - than traditional sources of energy, according to academic studies that analyzed the costs of various types of generation in the state.

The best standard for this type of analysis is known as a levelized cost of energy (LCOE) comparison, which takes into account the following cost components for each type of generation source: investment and installation costs; operations and maintenance costs; fuel costs; life of the generating unit; and energy generated by the unit.

Over the past few years, there have been a number of LCOE studies performed by a variety of different governmental and non-governmental entities.

Based on these studies, the average LCOE for wind generation is $68.25/MWh if the federal production tax credit (PTC) is taken into consideration, or $90.25/MWh if the PTC is not included. This compares very favorably to the average LCOE for combined-cycle natural gas, at $74.55/MWh; conventional coal, at $104.35/MWh and natural-gas peaking facilities, at $177.20/MWh.



One of the main reasons that wind energy costs in Kansas are so low is that the state has an excellent wind resource. Therefore, wind projects in the state have capacity factors that far exceed the national average. Projects with high capacity factors see a marked decline in their total levelized costs. Thus, Kansas' excellent wind resource leads to markedly lower wind generation prices than can be found in other areas across the country.

Preparing for the future

One of the benefits that renewable energy sources - such as wind and solar - provide is price certainty. When utilities add renewable energy generation to their portfolios, they can lock in power supply at a known price for up to 20 years.

Two years after Kansas utility Empire District Electric started receiving wind-generated power from the Elk River Wind Farm in Butler County, the company wrote to its shareholders, "[Wind energy power purchase agreements] decrease our exposure to natural gas, provide a hedge against any future global warming legislation and help us give our customers lower, more stable prices."

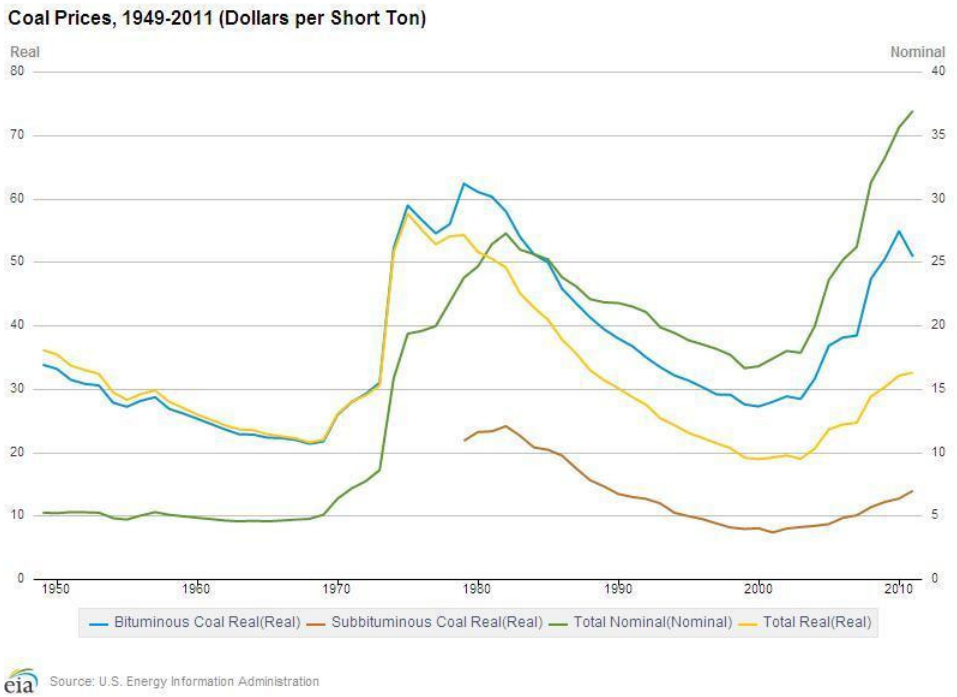
Eighty percent of the overall cost of wind power is incurred up front, due to the procurement of the turbines and the construction of the generation facility. Only about 10% of the levelized cost is incurred during operations and maintenance.

For projects developed by third parties and in which the energy is purchased by a public utility, the utility is able to lock in a price for the electricity for the term of the agreement, regardless of any fluctuations in the ongoing project costs.

The benefit of having the bulk of wind facility costs incurred up front is that because the costs are accrued early in the project's development, it becomes easier to accurately estimate the extent of those costs. Additionally, because the majority of these costs are related to equipment and construction services, the total costs for these projects are likely to decrease over time as technology becomes more widely utilized.

A May 2012 study conducted by the National Renewable Energy Laboratory for the International Energy Agency illustrates this point. For the study, researchers collected LCOE estimates for onshore wind generation from 13 recent analyses, and they found about a 20% to 30% reduction in the LCOE of wind energy generation by the year 2030.

These results are even more impressive because wind as a "fuel" is free, so there is no exposure to volatile fuel prices or fluctuating fuel transportation costs.



Whereas the costs of wind are relatively predictable, the costs of coal and natural-gas generation facilities can fluctuate significantly over time due to the costs associated with fuel prices, as well as increasingly stringent environmental regulations. Furthermore, the U.S. Energy Information Administration reports that coal exports are on a record pace this year, so new demands will compete for current supplies, which will likely drive prices upward.

To put these increases into perspective for Kansas, between 2006 and 2011, utility Westar reported that the weighted average price of coal used in its facilities increased by 39%. These increases in coal prices cause significant increases in residential electricity rates. In Kansas, like elsewhere in the U.S., the price of electricity has been steadily increasing.

Such price volatility is not limited to coal. Despite recent developments in hydraulic fracturing and horizontal drilling, natural-gas prices remain subject to significant fluctuations in price.

The Kansas Corporation Commission (KCC) has recognized the problems caused by volatile fossil-fuel prices and found that the inclusion of wind energy into a public utility's portfolio can provide valuable protection against that price volatility and can

serve an important role in a well-designed electricity portfolio.

"Natural gas, coal and wholesale power prices have all experienced significant volatility and upward trending costs," the KCC stated. "Wind generation provides value as insurance for customers from some of the effects of unexpectedly high and volatile fuel and wholesale energy prices."

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