



Illinois an Example of When the Wind Doesn't Blow

Jonathan A. Lesser

Whether it is promises of thousands of jobs from a new “green” economy, lower emissions, or lower costs (eventually), wind’s availability, and lack thereof, is often forgotten. Of course, it is true that until we can store electricity cheaply, wind-generated electricity will not be available when the wind is not blowing.

When the demand for electricity is highest, it is best to have all of your generating resources available. That is why plant owners do not shut down their facilities for routine maintenance in the summer, when loads are greatest, but instead wait until spring or fall, when loads are low. However, wind generation is not generally “schedulable” like more traditional sources of generation.

If wind generation produces little electricity at peak demand times, then it is an even more expensive proposition, producing relatively low-value electricity and requiring significant fossil-fuel generation backup.

This difference raises an important question: how does wind generation correlate with peak demand? If wind output peaks on hot and humid

Jonathan A. Lesser, PhD, is president of Continental Economics, Inc., an economic and litigation consulting firm, with offices in Washington, DC, and Albuquerque, New Mexico. He can be reached at (202) 446-2062 or at jlesser@continentalecon.com.

summer days, when electricity demand and prices are at their highest, then wind power is a more cost-effective generation alternative than its average cost would indicate. Contrarily, if wind generation produces little electricity at peak demand times, then it is an even more expensive proposition, producing relatively low-value electricity and requiring significant fossil-fuel generation backup to meet peak demand.

ILLINOIS AS AN EXAMPLE

To investigate this issue, I examined data published by PJM for the Commonwealth Edison load zone in Illinois over the two-year period May 1, 2009–April 30, 2011. Illinois has an aggressive renewable portfolio standard (RPS), which creates an economic incentive for wind development, according to data published by the American Wind Energy Association, wind-generating capacity in Illinois is currently 2,286 megawatts, the sixth largest of any state.¹ Moreover, the state has an aggressive construction program ongoing, having added almost 500 megawatts of new wind generation in 2010, and an additional 239 megawatts in the first half of 2011. Another 500 megawatts is currently under construction, and over 16,000 megawatts of wind is in the PJM generation queue. Under Illinois law, the state’s utilities must obtain 25 percent of their electric generation from renewable resources by the year 2025. Thus, knowing when the wind blows in Illinois is important, particularly given how much wind power costs.

First, let us look at how much wind-generating capacity was available (i.e., actual wind generation as a percent of total wind capacity) on the peak

load day for each month during that two-year period. This is shown in **Exhibit 1**.

The data is not particularly encouraging. For example, on August 12, 2010, demand peaked at over 22,000 megawatts. In August 2010, installed wind capacity in the Commonwealth Edison zone was just under 2,000 megawatts, according to PJM data. Yet on August 12, 2010, that 2,000 megawatts of wind generation produced, well, nothing. On June 25, 2009, when demand for that month peaked at over 21,000 megawatts, the 1,000 megawatts of installed wind generation produced all of 113 megawatts.

In fact, the pattern in Exhibit 1 is clear: when electricity demand in the ComEd zone has been highest, wind output has been lowest. Over the entire two-year period, just under 30 percent of the wind capacity was producing on the peak day of each month. And, indeed, in some months, wind availability was quite high. The problem is that wind availability has been highest in shoulder months in spring and fall, when peak demand is lowest.

When electricity demand . . . has been highest, wind output has been lowest.

Exhibit 2 provides another view, this time focused on the 20 highest peak load days over that

Exhibit 1. ComEd Zone Wind Availability at Monthly Peak

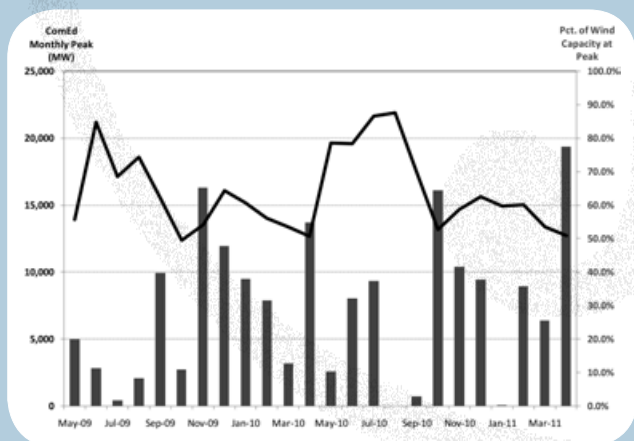
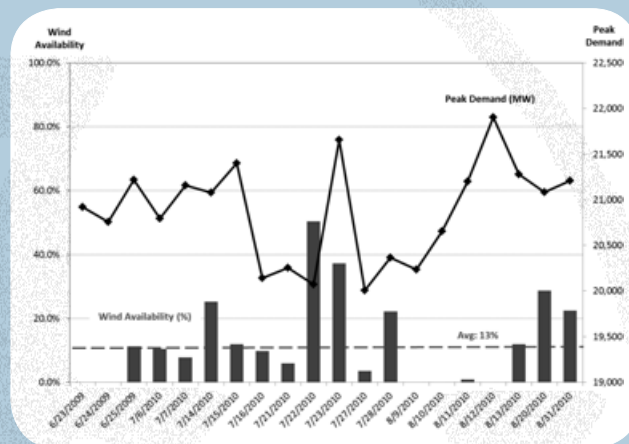


Exhibit 2. Percentage of Wind Capacity Available in ComEd Zone on Top 20 Peak Days



same two-year period. On six of those 20 days, there was essentially no contribution whatsoever from wind, and wind availability averaged only 13 percent over all 20 of the days. The highest availability was just over 50 percent.

Exhibits 1 and 2 show that wind generation tends to be least available when electricity is most valuable, and vice versa. In terms of cost-effectiveness, that pattern of availability is undesirable, to say the least.

Moreover, the problem of lack of wind availability during periods of high peak demand not only leads to higher market prices—less market supply to meet market demand—it also raises costs by forcing additional fossil-fuel backup units to operate, the types of units that have the highest operating costs. Moreover, even if wind generation is available, the uncertainty surrounding that availability creates an operational headache for PJM, which must ensure that sufficient backup generating capacity is available to supplant the lack of wind generation.

As Illinois continues to build more wind generation, the problem of uncertain availability will only increase, leading to higher costs for consumers.

As Illinois continues to build more wind generation, the problem of uncertain availability will

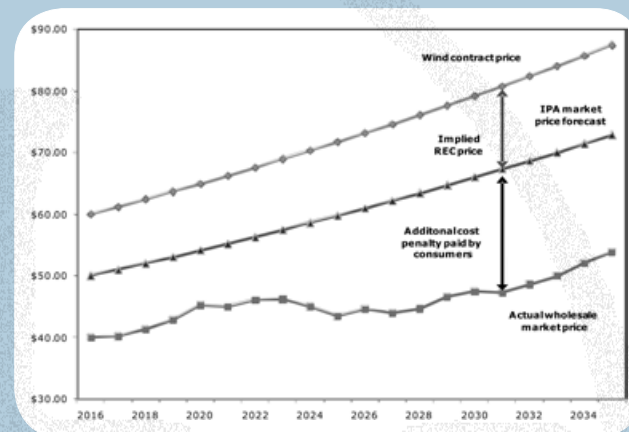
only increase, leading to higher costs for consumers. The 2,200 megawatts of wind generation in the state is least available when it is most needed: on hot summer days when electricity demand peaks. With its RPS driving more megawatts of wind generation being built in the state, more wind turbines will likely sit idle while temperatures sizzle.

The poor performance of wind energy in Illinois is not stopping its politicians, of course. Apparently, having a renewable portfolio standard that will require 25 percent of generation to be met with renewable resources—primarily wind—by the year 2025 is not enough. Proposed legislation this spring tried to incent more wind construction by requiring Illinois utilities to sign 20-year power contracts for much of that renewable generation, reminiscent of the bad old days of Public Utility Regulatory Policy Act (PURPA) contracts that turned out to be much more costly than wholesale market prices.

Recognizing that increased retail electric prices are not the best economic medicine, or perhaps recognizing that such price increases are bad politics, the legislation proposed to extend the existing renewable energy rate cap for residential customers to all customers. But despite the rate cap, given current electric consumption and rates, the increased costs from the proposed long-term contracts would still amount to about a \$200 million additional annual tax on Illinois consumers and businesses.²

Although a \$200 million additional tax would crimp economic growth³ and might even encourage more businesses to flee Illinois for the state's lower-cost neighbors, the potential cost increases could actually be much higher than advertised because the purported rate cap protection is flawed. The reason is that, like the old PURPA contracts, the legislation would require the Illinois Power Agency (IPA) (a power authority that conducts the electricity purchases for utility customers) to prepare 20-year electric price forecasts and calculate the implied prices for renewable energy credits, which utilities need to meet the RPS mandate. The "implied" prices for a renewable energy credit would equal the difference between the IPA's long-term forecast prices of electricity and a renewable developer's contract price.

Exhibit 3. Impact of Above-Market IPA Price Forecast



The problem with this approach is that actual market prices of electricity are never considered. Thus, if actual electric market prices are less than forecast prices, which was the primary problem with PURPA-type price forecasts, consumers and businesses could be required to pay as much as the 2 percent premium, plus the difference between the forecast market price and the actual price, as shown in **Exhibit 3**.

RELENTLESS PUSH FOR RENEWABLES HEEDLESS OF COST

Whether Illinois enacts similar legislation this year or next remains to be seen. But given wind generation's lack of availability in the state when it is most needed, and the economic consequences of higher-cost electricity, perhaps Illinois, and other states, should reconsider the relentless push for renewable energy mandates subsidized by ratepayers. Or if that is too far a leap, use competitive market forces to set renewable energy contract prices, rather than the false promise of clairvoyant 20-year electric price forecasts. ☪

NOTES

1. American Wind Energy Association, *Wind energy facts: Illinois*. Retrieved from <http://www.awea.org/learnabout/publications/upload/1Q-11-Illinois.pdf>.
2. Illinois Commerce Commission, *Comparison of Electric Sales Statistics for 2009 and 2010*. Retrieved from [http://www.icc.illinois.gov/downloads/public/en/10-09 Comparison of Electric Sales StatisticsFINAL.pdf](http://www.icc.illinois.gov/downloads/public/en/10-09%20Comparison%20of%20Electric%20Sales%20StatisticsFINAL.pdf).
3. For a more detailed discussion, see my article Gresham's Law of green energy. (2010–2011, Winter). *Regulation*, 33(4), 12–18. Retrieved from <http://www.cato.org/pubs/regulation/regv33n4/regv33n4-3.pdf>.