



Photo by Mayr

## America's power grid at the limit: The road to electrical blackouts

By Steve Goreham

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Americans take electricity for granted. Electricity powers our lights, our computers, our offices, and our industries. But misguided environmental policies are eroding the reliability of our power system.

Last winter, bitterly cold weather placed massive stress on the US electrical system—and the system almost broke. On January 7 in the midst of the polar vortex, PJM Interconnection, the Regional Transmission Organization serving the heart of America from New Jersey to Illinois, [experienced](#) a new all-time peak winter load of almost 142,000 megawatts.

Eight of the top ten of PJM's all-time winter peaks occurred in January 2014. Heroic efforts by grid operators saved large parts of the nation's heartland from blackouts during record-cold temperature days. Nicholas Akins, CEO of American Electric Power, [stated](#) in Congressional testimony, "This country did not just dodge a bullet—we dodged a cannon ball."

Environmental policies established by Congress and the Environmental Protection Agency (EPA) are moving us toward electrical grid failure. The capacity reserve margin for hot or cold weather events is shrinking in many regions. [According](#) to Philip Moeller, Commissioner of the Federal Energy Regulatory Commission, "...the experience of this past winter indicates that the power grid is now already at the limit."

EPA [policies](#), such as the Mercury and Air Toxics rule and the Section 316 Cooling Water

Rule, are forcing the closure of many coal-fired plants, which [provided](#) 39 percent of US electricity last year. American Electric Power, a provider of about ten percent of the electricity to eastern states, will [close](#) almost one-quarter of the firm's coal-fired generating plants in the next fourteen months. Eighty-nine percent of the power scheduled for closure was needed to meet electricity demand in January. Not all of this capacity has replacement plans.

In addition to shrinking reserve margin, electricity prices are becoming less stable. Natural gas-fired plants are replacing many of the closing coal-fired facilities. Gas [powered](#) 27 percent of US electricity in 2013, up from 18 percent a decade earlier. When natural gas is plentiful, its price is competitive with that of coal fuel.

But natural gas is not stored on plant sites like coal. When electrical and heating demand spiked in January, gas was in short supply. Gas prices [soared](#) by a factor of twenty, from \$5 per million BTU to over \$100 per million BTU. Consumers were subsequently shocked by utility bills several times higher than in previous winters.

On top of existing regulations, the EPA is [pushing](#) for carbon dioxide emissions standards for power plants, as part of the "fight" against human-caused climate change. If enacted, these new regulations will force coal-fired plants to either close or add expensive carbon capture and storage technology. This EPA crusade against global warming continues even though last winter was the [coldest](#) US winter since 1911-1912.

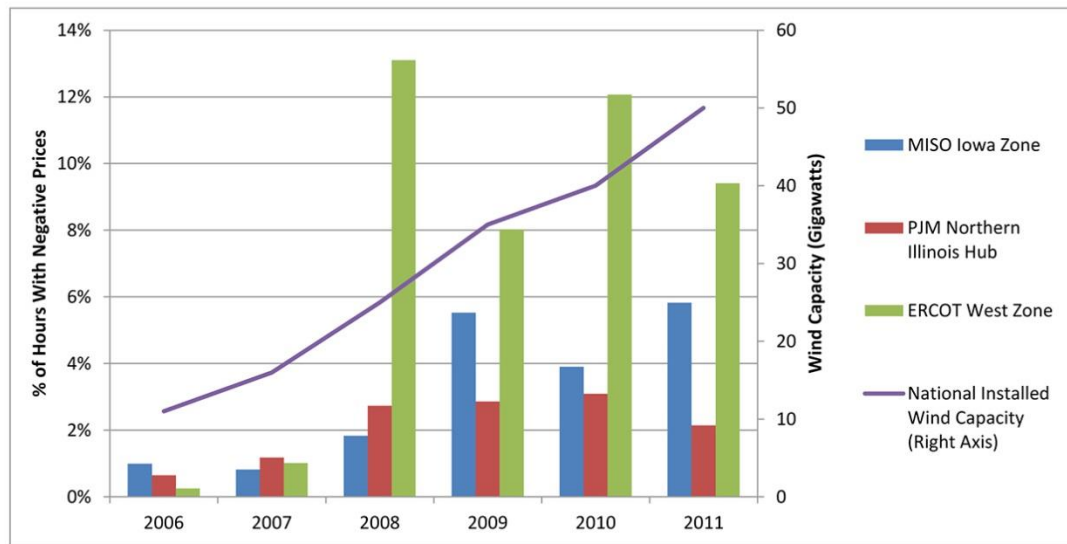
Nuclear generating facilities are also under attack. Many of the 100 nuclear power plants that [provided](#) 20 percent of US electricity for decades can no longer be operated profitably. Exelon's six nuclear power plants in Illinois have [operated](#) at a loss for the last six years and are now candidates for closure.

What industry pays customers to take its product? The answer is the US wind industry. Wind-generated electricity is typically [bid](#) in electrical wholesale markets at negative prices. But how can wind systems operate at negative prices?

The answer is that the vast majority of US wind systems receive a federal production tax credit (PTC) of up to 2.2 cents per kilowatt-hour for produced electricity. Some states add an additional credit, such as Iowa, which [provides](#) a corporate tax credit of 1.5 cents per kw-hr. So wind operators can supply electricity at a pre-tax price of a *negative* 3 or 4 cents per kw-hr and still make an after-tax profit from subsidies, courtesy of the taxpayer.

As wind-generated electricity has grown, the frequency of negative electricity pricing has grown. When demand is low, such as in the morning, wholesale electricity prices sometimes move negative. In the past, negative market prices have provided a signal to generating systems to reduce output.

## Negative Wholesale Electricity Prices and Wind Capacity Growth



The Northbridge Group (2012)

But wind systems ignore the signal and continue to generate electricity to earn the PTC, distorting wholesale electricity markets. Negative pricing by wind operators and low natural gas prices have pushed nuclear plants into operating losses. Yet, Congress is currently [considering](#) whether to again extend the destructive PTC subsidy.

Capacity [shortages](#) are beginning to appear. A reserve margin deficit of two gigawatts is projected for the summer of 2016 for the Midcontinent Independent System Operator (MISO), serving the Northern Plains states. Reserve shortages are also projected for the Electric Reliability Council of Texas (ERCOT) by as early as this summer.

The United States has the finest electricity system in the world, with prices one-half those of Europe. But this system is under attack from foolish energy policies. Coal-fired power plants are closing, unable to meet EPA environmental guidelines. Nuclear plants are aging and beset by mounting losses, driven by negative pricing from subsidized wind systems. Without a return to sensible energy policies, prepare for higher prices and electrical grid failures.

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