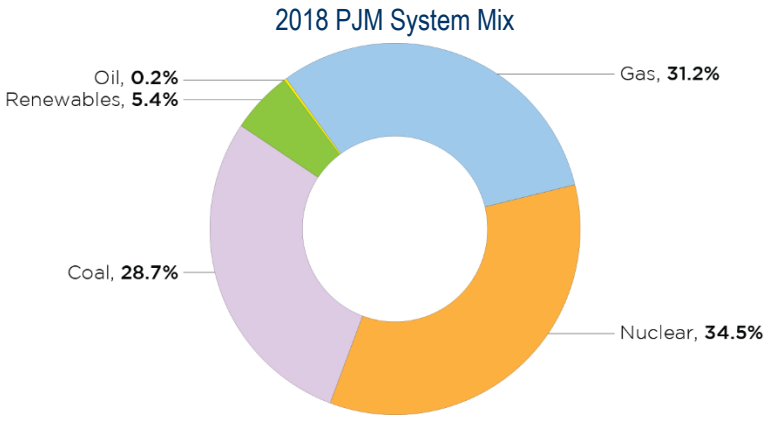
The Value of Markets

Organized wholesale electricity markets were created to address ever-increasing electricity costs and to encourage innovation through free-enterprise competition. PJM's markets have done just that. Competition has helped to ensure less expensive, more reliable and cleaner electricity supply. And competitive markets can adapt to support changes in public policy and consumer needs.

The PJM electric grid, serving 65 million people in 13 states and the District of Columbia, ensures that reliable power gets to consumers whenever they need it. The electricity markets run by PJM encourage competition and significant private investment in new technology and have resulted in decreasing emissions and stable wholesale electricity prices.

PJM's grid has strong electricity reserve margins to serve in times of need, and the generation mix is significantly more diverse than it was 10 and 20 years ago. The PJM markets have facilitated an unprecedented technology switch from older, less efficient generation resources to new, lower-emission and increasingly efficient resources, while encouraging and integrating renewables. The PJM markets can continue to help shape the future. They can adapt to changing public policies and consumer needs doing more than their historic role of supporting reliability at the lowest cost.



The History of Markets

In the 1990s, federal lawmakers introduced wholesale electricity markets following a period of poor generator performance and escalating costs, coupled with rate shocks, as high-cost, new generating plants came online. PJM established the first wholesale electricity market in the U.S. in 1997.

The wholesale markets were designed to meet short-term and future requirements of operating the electric power system reliably and at the lowest cost. Federal policymakers saw competition among electricity suppliers as a means to control prices by attracting new sources of private investment in newer, less expensive technologies. The wholesale markets manage prices by allowing the lowest-cost power source, wherever it is located, to provide electricity to wherever it is needed, over a wide region.

The movement to wholesale markets created the foundation for states to reform their retail electricity markets by opening access to this new supply of electricity at more competitive, and therefore lower, prices. Large regional markets such as PJM have served as a dynamic mechanism to encourage the building of new, less costly power sources while indicating which resources are no longer viable. Even fully regulated states benefit from the organized wholesale markets. Utilities located in those states can buy and sell electricity in the markets when they need to, or when it makes economic sense. Regulated utilities and states also benefit from the transparency of wholesale market prices – using them as a comparison when making electricity supply investment decisions.

Markets Cost-Effectively Promote Reliable Systems

Energy market prices signal to generators how much energy to produce and where, at any given time, to ensure the reliable flow of electricity. The pricing system facilitates use of the lowest-cost generation options. The energy market encourages suppliers and consumers of electricity to buy and sell electricity at prices that are as low as possible while still ensuring reliability.

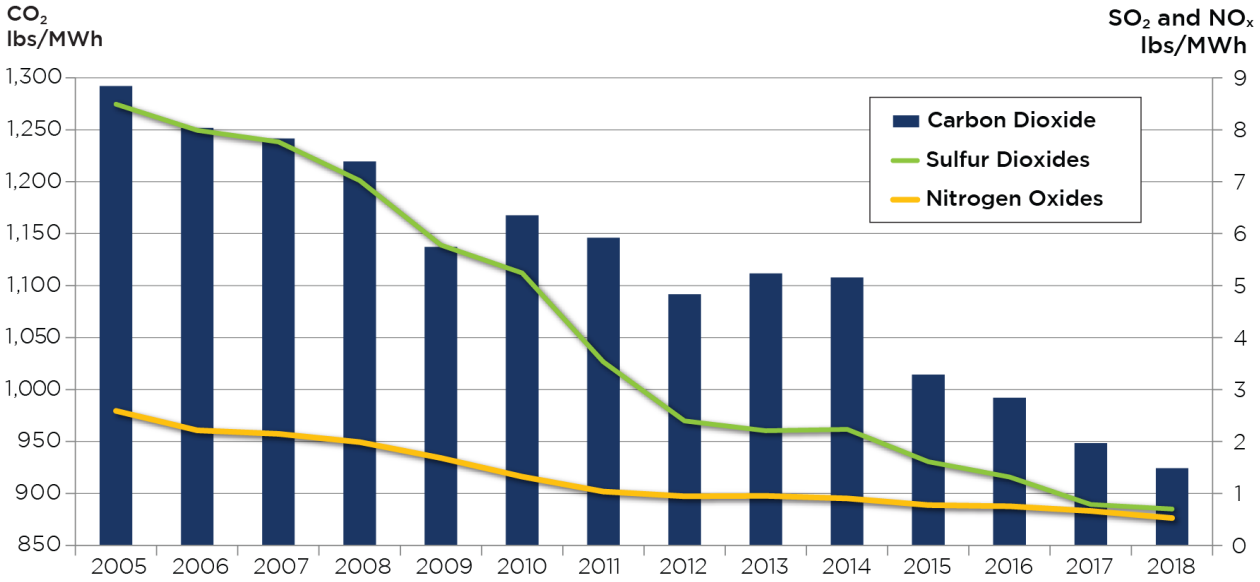
Markets also ensure reliability for the future. The PJM capacity market secures electricity in order to meet consumers' needs up to three years in advance.

The PJM markets help save consumers at least $3.2 billion a year by integrating more efficient resources, ensuring the lowest production costs, and reducing the need for reserves by drawing from a wide pool. Costs impacted by the markets have not gone up for 20 years. The chart below shows that wholesale, market-related electricity prices, adjusted for inflation, have remained essentially flat since the advent of the markets in 1999. The wholesale markets have allowed customers to benefit from both falling natural gas prices and competition among generators vying for new entry.

Markets Help Transition to a Cleaner Grid

New technologies tend to improve efficiency, and PJM's current generation mix is about 30 percent less carbon-intensive than 10 years ago. This reduction has come at zero additional cost to consumers. Emissions reductions are largely the result of competitive markets encouraging the free entry of new, more efficient technologies.

2005–2018 PJM Average Emissions



Markets Drive Investment Without Consumer Risk

Markets are the most powerful tool for attracting investment for new generation and new technology at the lowest cost.

For more than a decade, PJM has been in the midst of a drastic technology shift. More than 27,000 MW of PJM's oldest generators, averaging 46 years, retired from the system. They were replaced by more than 32,000 MW of new, more efficient, lower-emission generation such as gas turbines, wind and solar.

Such a significant technology transition during a short period of time poses the risk of energy shortfalls or sharp price increases. Markets drove an orderly changeover, keeping an ample supply at low prices with no effect on reliability. This influx of new generation has been largely paid for by private investment, rather than consumers. These investors, not ratepayers, bear the financial risk of this technology transition.

Markets Improve Generator Performance

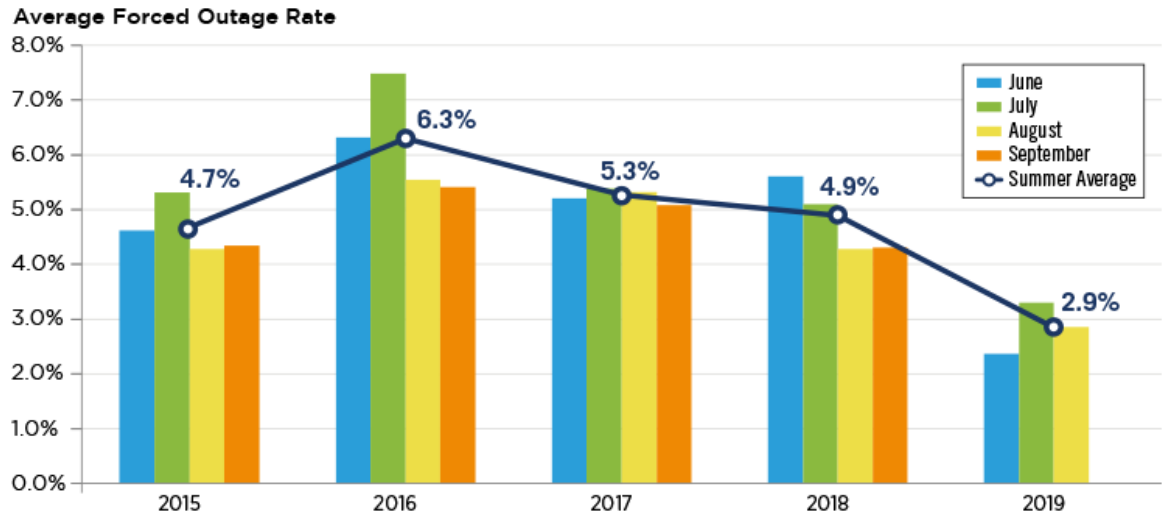
In addition to driving a more cost-effective fleet of generators through new investment, markets also encourage existing generators to operate more efficiently. Generators are paid when they produce electricity; therefore, they are incentivized to operate to the limits of their capabilities. If they cannot operate at that level, they lose opportunities to earn revenue. Since the introduction of wholesale markets, generator performance has improved substantially, lowering costs and improving reliability for consumers.

As an example, it is in the era of competitive markets that nuclear power has built its reputation as a reliable source of available power. Across the present-day PJM fleet, nuclear units increased their annual operational availability by nearly 20 percent. In a state like Pennsylvania, this improvement to the state's fleet alone is the equivalent of adding one new nuclear reactor.

The system overall is becoming more reliable as the capacity market incentivizes and phases in better-performing resources and capacity performance requirements, which reward resources that perform during times of system stress and penalize those that fail to perform. This is part of a larger trend of decreasing outage rates, which is driving down the required reserve requirement in PJM, reducing wholesale costs to customers.

For example, average forced outage rates during the peak summer months, when the system is most stressed, fell from nearly 5 percent in 2018 to less than 3 percent in the summer of 2019, which was the lowest rate in five years. And that trend should continue; from 2019 to 2023, about 8,600 MW of generation with an average forced outage rate of 12.3 percent is expected to retire, while about 15,000 MW of generation with a projected outage rate of 4.1 percent is planned to come online.

Average Forced Outage Rates



Markets Support the Economy

The geographic area served by PJM accounts for more than 21 percent of the U.S. gross domestic product. That means that affordable wholesale electricity prices have an outsized impact on the economic productivity of our region and the nation.

States that have elected to rely on market forces to stimulate the entry and exit of power generators have cultivated some of the most attractive environments for new resource development and investment in the U.S. For example, three of the top-four states in PJM with generation projects under consideration are Ohio (20,961 MW), the PJM portion of northern Illinois (19,728 MW) and Pennsylvania (18,000+ MW). This is no accident. Policies have enabled these states to nurture a vibrant market for generator development that attracts billions of dollars of private investment – more than $20 billion in these states alone.

Markets Can Adapt to Support Changing Needs

As the energy industry continues to evolve, competitive markets help cost-effectively maintain a reliable grid. But markets can do more than that. In the 2014 Polar Vortex, 22 percent of generators failed to perform. PJM responded with financial incentives to improve reliability during the vulnerable heart of winter. PJM can explore market design changes that would give financial incentives for outcomes that go beyond reliability and are based on changing consumer needs and public policy decisions.