

WINTER STORM ELLIOTT: EXPLAINED

What was Winter Storm Elliott?

Winter Storm Elliott was a relatively short-duration extreme weather event which descended upon the Northeast United States from December 23 – December 25, 2022. In what the National Oceanic and Atmospheric Administration has dubbed a “historic arctic outbreak”, temperatures dropped 29 degrees Fahrenheit over a 12-hour period – the largest temperature plunge in recorded history.

This event triggered historic demand upon PJM, our region’s electric grid, as residents headed into both a weekend and extended holiday.

What is PJM and how is it beneficial to consumers?

PJM oversees the electric markets of all or parts of 13 states and the District of Columbia and stretches from New Jersey to Illinois.

PJM operates a capacity market which ensures the long-term reliability of the electric grid by providing for the sale of electric capacity several years into the future, based on anticipated consumer demand. As a result, consumers are assured of an affordable and reliable supply of electricity, while electric power generators that successfully compete in an annual capacity auction are assured of guaranteed revenue. Importantly, PJM maintains a capacity margin as well to make sure that more electricity than forecast is available to account for unanticipated outages or peak demand during extreme weather events.



PJM also evaluates proposed electric transmission infrastructure projects so that sufficient capacity is in place to move electricity throughout the market and meet anticipated demand.

What went wrong during Winter Storm Elliott?

The historic temperature plunge impacted fuel supplies, fuel deliveries and equipment which resulted in some base-load generation facilities not performing when called upon. Despite these challenges, there was still sufficient electricity generation within PJM to avoid any service disruptions to Pennsylvania residents. Both the lights and the heat stayed on.

Meeting our daily energy needs involves complex market dynamics that predict day-ahead demand and seek to match this demand with available generation. One of the biggest contributing factors to the ‘near-miss’ of Winter Storm Elliott was PJM’s underestimation of the weekend’s load demand by at least 10,000 megawatts. Failure to accurately predict load demand sends a signal to some power generators whether or not their facilities are needed to operate in the coming 24 – 48 hours. For comparison, 10,000 megawatts is enough electricity to power nearly 10 million homes.

Did any Pennsylvania residents lose power during Winter Storm Elliott due to grid outages?

No. Despite the inability of certain plants across a range of fuel sources to perform due to the extreme temperature plunge, there was still sufficient electricity to meet the needs of Pennsylvania consumers. Unlike other regions of the country which have experienced rolling blackouts during times of peak demand because of their reliance on intermittent energy sources, Pennsylvania's diverse base-load energy mix of natural gas, coal and nuclear energy – combined with emergency fuel oil – provided over 90% of the electricity during Winter Storm Elliott's peak demand. To meet demand during these critical weather events, electricity must be able to be produced on scale and be dispatchable (generated to meet real time demand). Currently, only natural gas, coal and nuclear energy can meet these base-load generation requirements.

It is notable that during Winter Storm Elliott, PJM was still able to export more than 10,000 megawatts of electricity to neighboring grids, including over 5,000 megawatts to the Tennessee Valley Authority, to help those grids address their electric generation challenges. And billions of cubic feet of natural gas were exported to neighboring states to heat homes, businesses, hospitals and other critical care facilities.

What about home heating?

While some states have sought to prohibit new natural gas hookups and strain their power grids by forcing homeowners and businesses to use all-electric heat, more than 7.3 million Pennsylvanians (57%) continue to heat their homes with natural gas or propane. With less than a quarter of homes using electric as a primary heating source, it is the diversity in the Commonwealth's home heating portfolio which helped spare the PJM grid of further strain, thereby reducing the potential for rolling blackouts during the extreme cold weather. During Winter Storm Elliott, no Pennsylvanians were impacted due to natural gas supply disruptions.

How are Pennsylvania consumers benefitting from Marcellus Shale?

In 2008, Pennsylvania produced only 25% of its own natural gas demand. As a result, consumers were dependent upon imports of natural gas from producers in Texas and along the Gulf Coast. Today, Pennsylvania produces 20% of the nation's natural gas and has vastly diversified its electricity generation portfolio.

By being able to rely upon Pennsylvania-produced natural gas, health care facilities, homes, businesses, and other consumers benefitted from having enough natural gas to meet both the state's heating and electricity generation needs.

Where can I learn more?

For more information about what transpired in December 2022, visit the Marcellus Shale Coalition (MSC) website to read [A Closer Look at Winter Storm Elliott: Gas Delivered Amid "Unprecedented Demand"](#). To learn more about Pennsylvania's competitive electricity market and its benefits to consumers, please read the MSC's [Electricity Market Fact Sheet](#).