The Shape of the Storm

Early lessons for energy and infrastructure LPs from Winter Storm Fern

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A real world climate risk "stress test"

Energy transition investors saved the US economy during the real world climate risk "stress test" of the last week. As system strains mount further in coming years amid high energy demand, LPs need to revisit allocation strategies in light of early lessons from Winter Storm Fern.

Winter storm Fern and its aftermath have not been normal weather. The continent-spanning climate stress test of energy markets has highlighted the value of energy transition infrastructure in new ways important for capital allocators.

Winter storms and even polar vortexes are hardly unprecedented, but the unusual shape of Fern's rolling deep freeze across the country's major energy nodes in succession strained markets.

With load demand spikes over the past week providing a taste of a long-predicted era of "winter peaking" for US energy demand, it was the generation supply that energy transition and climate investors have rushed to market that provided the essential cushion for all-important capacity across fuels and power.

Energy Transition investors kept US energy markets functioning.

Solar, wind and battery additions have dominated power sector additions over the last decade, often combining with swing supply of natural gas peaking capacity in new ways that have challenged traditional financing and merchant risk models.

Without those double-digit additions of solar, wind and battery power – many of them added in response to investor demand for climate risk-aligned assets and energy transition projects – the US energy market's flexibility in the face of Fern would have been much harder to pull off.

PJM, the country's largest organized power and capacity market, experienced generation outages reaching up to 22.4 GW, representing roughly 16% of total capacity, with outages concentrated primarily in Dominion territory. That was overwhelmingly thermal generation going offline, as gas compressors shut in during extreme cold, ultimately spiking the financial returns to high-capacity batteries that can store cheap renewable electrons. The result is widening return spreads for energy transition asset owners.

Over the same period system demand reached approximately 132 GW. Power prices averaged around $3,000/MWh over the weekend, with Tuesday morning averages of approximately $417/MWh.

Looking ahead: Lessons for Allocators

LPs revisiting assumptions about returns to climate risk and energy transition strategies should be counting their future allocation this week as winter storm Fern continues to roil US power and energy markets in an abnormal way.

Continent-spanning freeze-offs accompanied by fierce winter storms that run Southwest to Northeast across the US economic core used to be the stuff of science fiction, but winter storm Fern is just the latest example that the future is here.

Limited partner capital allocators have been given a real-time demonstration of the shape of a new risk-reward matrix by the storm's inability to break US energy markets.

Noreva's capacity and power demand modeling increasingly show the clustering effect of battery deployment have outsized financial results when effectively paired with cheap renewable electrons.

For a demonstration of the ways Noreva can help you navigate this new energy return matrix, contact sales@noreva to learn more about our AI-enhanced and trade-aligned forecasts.

Winter Storm Fern Energy Markets Timeline

Weather-Driven Demand Shock

A severe winter storm drove a sharp increase in natural gas demand, primarily from heating load and increased gas-fired power generation (heat input).

Leading into the event, the market had been positioned bearishly due to warmer-than-expected December and early January temperatures, strong production levels, low storage withdrawals, and relatively weak power generation demand.

Natural Gas Demand Metrics

December heating demand averaged approximately 38.7 Bcf/day. During the cold event, heating demand was expected to peak near 66 Bcf/day, with an average level around 59 Bcf/day.

Power Market Impacts — PJM

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Oil and Gas Production Impacts

Oil producers lost up to 2 million barrels per day of production, or roughly 15%, over the weekend.

These losses were driven by shutdowns of gas compressors caused by extreme cold weather, which constrained both gas and oil production.

Natural Gas Spot Prices

Spot natural gas prices at certain trading hubs surged to approximately $150/MMBtu during the event.

LNG Feed-Gas Dynamics

LNG feed-gas volumes — natural gas liquefied for export — declined by approximately 30%. This drop occurred as domestic U.S. gas prices rose above international prices, rendering LNG exports uneconomic .

Futures & Financial Market Activity

The CME reported a single-day record in natural gas futures and options trading volume, with approximately 2.5 million contracts changing hands.

Market Positioning and Price Action

Many speculative market participants were positioned for prices to fall. As fundamentals tightened, this positioning resulted in a short squeeze, driving a rapid price rally.

Regional Supply Constraints

Texas and Pennsylvania, among the top U.S. natural gas producing regions, experienced supply disruptions.

Freeze-offs in the Permian Basin materially reduced supply.

Regional Power Price Divergence

In MISO, Tuesday morning prices diverged sharply, with negative pricing observed in the western regions while prices spiked in the eastern portion of the market.

Contact:

peter@noreva.ai

Noreva

675 Third Ave, 31st Floor

NY, NY 10017