



# PJM Winter Storm Communications

Presented to PIEOUG  
February 22, 2023



# Winter Storm Elliott on PJM.com

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## Winter Storm Elliott Info

Winter Storm Elliott impacted the PJM region Dec. 23-25, 2022. This page is dedicated to providing information on the performance of PJM operations and markets during the storm, including PJM's preparations in advance of the event, emergency procedures implemented, generator performance, load forecast, and answers to frequently asked questions, including those related to the general calculation of Capacity Performance bonus payments and penalties.

PJM is conducting a comprehensive analysis of the events with plans to publish a full report, including recommendations and actions.

**Data Requests and Questions**  
[Email PJM Customer Service](#)

### Issue Tracking: Winter Storm Elliott

[View information provided in the PJM stakeholder process meetings](#)

### Other Resources

	Date
<a href="#">Winter Storm Elliott Frequently Asked Questions</a> PDF	1.25.2023
<a href="#">Estimated Demand Response Activity December 23 and 24, 2022</a> PDF	1.5.2023
<a href="#">Department of Energy (DOE) Issues Emergency Order Pursuant to Section 202</a> PDF	12.24.2022
<a href="#">Request for Emergency Order Under Section 202(c) of the Federal Power Act</a> PDF	12.24.2022
<a href="#">Department of Energy (DOE) - Order PJM Exhibit A Update</a> PDF	12.25.2022

<https://pjm.com/markets-and-operations/winter-storm-elliott>

Winter Storm Elliott FAQ

**What Is in This FAQ Document?**

The questions below reflect frequently asked questions received from stakeholders and others regarding Winter Storm Elliott and the events impacting the PJM footprint from Dec. 23–25. PJM will be providing a comprehensive event analysis in the spring, which will address additional items. The answers here are drafted based upon the best information available at the time of publication, and may be amended or updated.

In addition, this document will be updated as new questions come in, with the most recent questions added to the top of the relevant section.

UPDATED: Jan. 25, 2023

**Operations Dec. 23–25**

1. *What were the operating days like on Friday, Dec. 23, and Saturday, Dec. 24?*

At the start of the day on Dec. 23, PJM had approximately 12,000 MW of forced (or non-planned) outages among its generation fleet. To account for the uncertainty of the weather conditions, PJM set up the operating day by committing approximately 133 GW of energy in the Day-Ahead Market and an additional 9 GW of available 30-minute reserves. In addition, approximately 13 GW of short-lead units were reported as available based on the operating parameters submitted to PJM, for a total of 155,750 MW of available generation that Friday. This well exceeded the PJM load forecast peak of about 127,000 MW for the day.

The weather on Dec. 23 was unprecedented for that time of year, given the severe temperature drop and resulting spike in load. The record-breaking plunge of 29 degrees over 12 hours on Dec. 23 surpassed the previous PJM record of a 22-degree drop during the 2014 Polar Vortex.

As cold weather gripped the PJM region and power needs spiked, PJM began seeing high levels of forced generation outages. PJM implemented emergency procedures, including calls for synchronized reserves, an RTO-wide Maximum Generation Emergency Action and a call on demand response.

*The purpose of the Maximum Generation Emergency Action is to increase the PJM RTO generation above the maximum economic level.*

As temperatures fell, power demand rose to a peak of about 135,000 MW Friday evening. Around the same time, forced outages reached as high as 34,500 MW. Shortly before midnight Friday, PJM issued a Call for Conservation for the entire footprint, asking consumers to cut back on their energy use where possible between the hours of 4 a.m. on Dec. 24 through 10 a.m. on Dec. 25.

The demand continued after the peak on Dec. 23 and into Dec. 24. Even the valley, or low-point of demand, on Dec. 24 was significantly greater than any other peak, or high-point of demand, for that date in a decade.

Generation outages further expanded to an estimated level of nearly 46,000 MW by Saturday morning. Factoring in a number of reserve generators that missed scheduled start times Saturday morning or operated at less than capacity, combined with PJM's inability to replenish pumped storage based on the lack of availability of generators overnight, PJM was missing approximately 57,000 MW of its generation fleet by the morning peak of Dec. 24, the

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Winter Storm Elliott FAQ

coldest day of the holiday weekend.

2. *What happened at the evening peak on Saturday (Dec. 24) through Sunday morning peak (Dec. 25)?*

Heading into the peak for Saturday evening, there was still uncertainty about resource performance. Some resources informed PJM that they would come offline at 6 p.m. because of emissions limits. With these factors in mind, PJM submitted a petition to the U.S. Department of Energy (DOE) Saturday afternoon. At 5:30 p.m. the DOE issued an emergency order, under Section 202(c) of the Federal Power Act, determining that an electric reliability emergency existed within the PJM region that required intervention by the secretary of the DOE to keep the power flowing.

The Emergency Order posted was effective Dec. 24, 2022, through noon Eastern Standard Time on Dec. 26, 2022. The order authorized all electric generating units serving the PJM footprint to operate up to their maximum generation output levels under limited, prescribed circumstances, even if doing so exceeded their air quality or other permit limitations.

Two generating units that fell under the DOE order ran at levels that exceeded their environmental permitting limits. The Department of Energy requires PJM to identify those generators, which were Bethlehem Energy in Bethlehem, Lehigh County, Pennsylvania, and York Energy 1 in Peach Bottom Township, York County, Pennsylvania.

Altogether, calls for conservation, a Maximum Generation Action and demand response are believed to have eased operating conditions through the Dec. 24 morning peak of about 129,000 MW and the evening peak that day of about 126,000 MW.

PJM was able to come out of its Maximum Generation Emergency at 10 p.m. on Saturday night, meet the morning peak on Dec. 25 and end all emergency procedures at 10 p.m. Sunday.

3. *Did you consider step 7, Deploy All Resources?*

Yes, the step was discussed in the Control Room; PJM ultimately decided not to implement.

4. *How is it determined what is curtailed for exports?*

This process is detailed in these published [PJM procedures](#).

5. *Were there transmission outages?*

In general, the transmission system performed very well. There were several areas on the system where there were constraints. The greatest challenge was not transmission constraints but keeping up with the load. Perhaps the most challenging constraint was the AEP-DOM interface on the morning of Dec. 24, given the high load, transfers and exports to PJM's neighbors.

6. *How close was PJM to shedding load? In megawatts?*

This question will be addressed in the Winter Storm Elliott Event Analysis.

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PJM has received many inquiries from stakeholders on Winter Storm Elliott. Answers that can be made publicly available will be posted as part of a frequently asked questions document.

This document will be updated as new questions are received.

<https://www.pjm.com/-/media/markets-ops/winter-storm-elliott/faq-winter-storm-elliott.ashx>



# PJM Emergency Procedure Communications

## 1. Emergency Procedures Email List to Consumer Advocates

- Used to communicate emergency system conditions via email to state emergency contacts\*
- System conditions for notification range from weather alerts to emergency actions.

## 2. Member Communications

- Emails sent through PJM's Pardot system to Members
- Emergency Lists include: Members Committee, Markets & Reliability Committee, Operations Committee and PJM News Release lists.

## 3. PJM Now App and Emergency Log

- **PJM Now App:** Instantaneous notifications on advisories, emergency procedures and system conditions (by RTO or by zone)
- **Emergency Procedures:** <https://emergencyprocedures.pjm.com/ep/pages/dashboard.jsf>

\*State emergency lists comprise state contacts as identified by PJM state agencies in coordination with PJM staff.



# Winter Storm Elliott Communications Timeline to Members

Date	Time	Emergency Notification
Dec. 23	7:01 pm	<b>Stakeholder Notice</b> – Max Generation Action (PAI Trigger)
	9:54 pm	<b>TO Communication Notice</b> – PJM schedules cold weather operations call with TO Communicators on Dec. 24.
	11:32 pm	<b>Stakeholder Notice</b> – End of Max Generation Action
Dec. 24	12:31 am	<b>Call for Conservation</b> between the hours of 4 a.m. on Dec. 24 and 10 a.m. on Dec. 25 (posted on pjm.com shortly before midnight on Dec. 23)
	5:19 am	<b>Stakeholder Notice</b> – Max Generation Action (PAI Trigger)
	5:40 am	<b>Call for Conservation</b> news release
	10:31 am	<b>Stakeholder Notice</b> – PJM asks all generation owners with actual or potential emission restrictions to update and maintain this information in the ‘Resource Limitations’ page in Markets Gateway; conveys that this information will be used in a 202(c) filing with the Department of Energy under the Federal Power Act.
	5:38 pm	<b>Stakeholder Notice</b> – PJM submits Section 202(c) request to Department of Energy.
	7:27 pm	<b>Stakeholder Notice</b> – The Department of Energy issues an emergency order pursuant to Section 202(c) of the Federal Power Act.
	10:14 pm	<b>Stakeholder Notice</b> – End of Max Generation Action
Dec. 25	11:54 am	<b>End of Conservation Request</b>

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## ACTIONS

*PAI Triggers*



- Manual Load Dump Action
- Curtailment of Non-Essential Building Load & Voltage Reduction Action
- Deploy All Resources Action
- Emergency Voluntary Energy Only Demand Response Reductions Action
- Maximum Generation Emergency Action
- Emergency Load Management Reductions Action
- Pre-Emergency Load Management Reductions Action

## WARNINGS

- Manual Load Dump Warning
- Voltage Reduction Warning & Reduction of Non-Critical Plant Load
- Primary Reserve Warning

## ALERTS

- Voltage Reduction Alert
- Primary Reserve Alert
- Maximum Generation Emergency/Load Management Alert
- Cold/Hot Weather Alert
- Conservative Operation Declaration





NEWS  
RELEASE

# Conservation Request

FOR IMMEDIATE RELEASE

## **PJM ASKS CONSUMERS TO CONSERVE ELECTRICITY**

*Cold Weather Continues to Push Electricity Use Higher*

(Valley Forge, PA – Dec. 23, 2022) – PJM Interconnection, the electricity grid operator for 65 million people in 13 states and the District of Columbia, has requested the public in its region to conserve electricity. The call for conservation was prompted by continuing frigid weather.

The request is being made throughout PJM.

PJM is asking consumers to reduce their use of electricity, if health permits, between the hours of 4 a.m. on December 24, 2022 and 10 a.m. on December 25, 2022.

Demand for electricity is expected to increase in the PJM region and the regions neighboring PJM because of the extremely cold weather. Electricity customers can take simple electricity conservation steps such as:

- Setting thermostats lower than usual, if health permits,
- Postponing use of major electric appliances such as stoves, dishwashers and clothes dryers until other times, and
- Turning off non-essential electric lights, equipment and appliances.

Conserving electricity as much as possible between the hours of 4 a.m. on December 24, 2022, and 10 a.m. on December 25, 2022, will help ensure adequate power supplies.

PJM continues to carefully monitor the power supply conditions. It will do everything possible to keep power flowing in the region. If necessary, PJM may take additional steps, such as reducing voltage. PJM is coordinating efforts among generators, power suppliers and local utilities.

PJM is communicating about the situation with state government officials throughout the region.

*[PJM Interconnection](#), founded in 1927, ensures the reliability of the high-voltage electric power system serving 65 million people in all or parts of Delaware, Illinois, Indiana, Kentucky, Maryland, Michigan, New Jersey, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia and the District of Columbia. PJM coordinates and directs the operation of the region's transmission grid, which includes over 85,103 miles of transmission lines; administers a competitive wholesale electricity market; and plans regional transmission expansion improvements to maintain grid reliability and relieve congestion. PJM's regional grid and market operations produce annual savings of \$3.2 billion to \$4 billion. For the latest news about PJM, visit PJM Inside Lines at [insidelines.pjm.com](https://insidelines.pjm.com).*

# Important Questions To Discuss

What is the best way to get a conservation message to end-use customers in your jurisdiction?

For states with a partial PJM footprint, what additional advice do you have?

Please contact Jill Gates ([Jill.Gates@pjm.com](mailto:Jill.Gates@pjm.com)) with any questions regarding meeting registration and materials.



### Member Hotline

(610) 666-8980

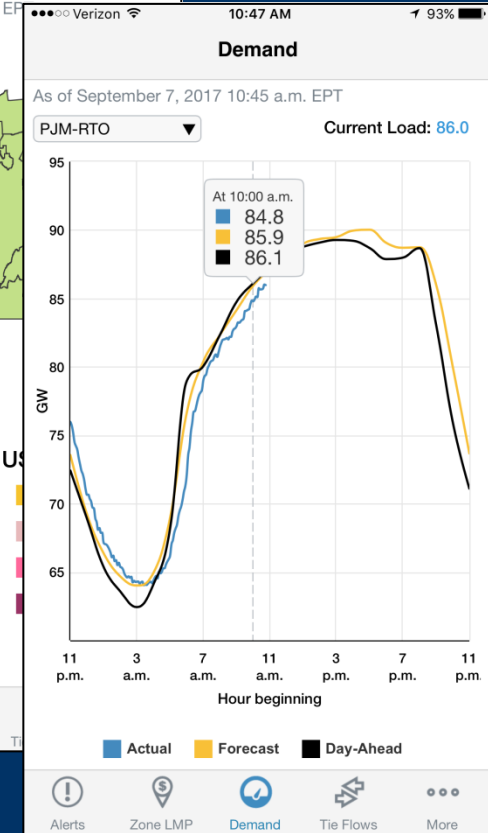
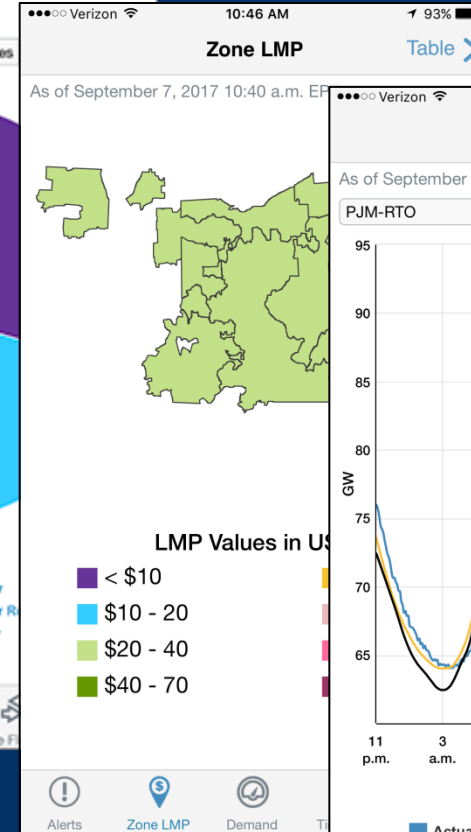
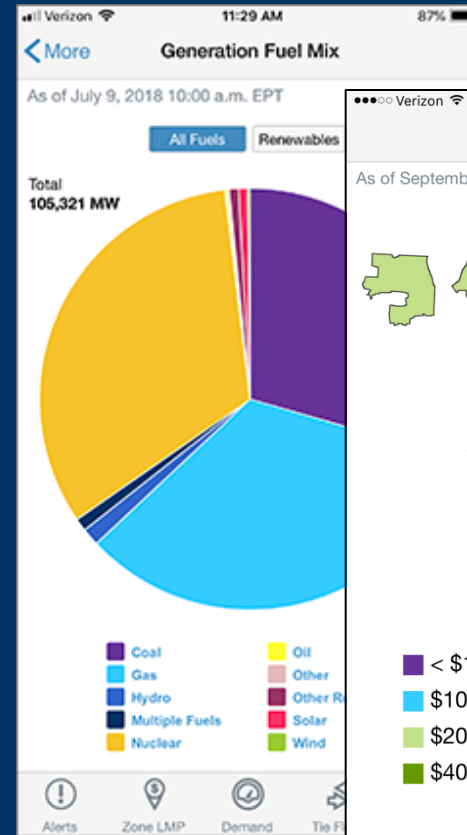
(866) 400-8980

[custsvc@pjm.com](mailto:custsvc@pjm.com)

# Appendix



# Power Up With the PJM Now App!



Track  
Power Prices

Get  
Notifications

See Real-  
Time Demand

Available now!



- **PJM Forums Email** – log into PJM.com -> My PJM Home -> My Email Lists -> Check list you want to join -> Submit -> wait 24 hours. Contact Client Management for support: (866) 400-8980 or [custsvc@pjm.com](mailto:custsvc@pjm.com).
  - To receive emergency-related notifications, please sign up for the Members Committee, Markets & Reliability Committee, Operations Committee and PJM News Release lists.
- **PJM Now App** – Download from Apple or Google app Store -> and select Emergency Alerts: <https://www.pjm.com/-/media/etools/pjm-now/emergencyprocedures-tutorial.ashx>
- **Emergency Procedure Log:** <https://emergencyprocedures.pjm.com/ep/pages/dashboard.jsf>



# Emergency Procedures Page – Winter Storm Elliott

From \* 12/23/2022 To \* 12/25/2022

Message Type	Dec 23	Dec 24	Dec 25
Cold Weather Advisory	■ 1	■ 1	■ 1
Cold Weather Alert	■ 1	■ 1	■ 1
Emergency Load Mgmt Reduction Action	■ 2	■ 3	
Maximum Generation Emergency Action	■ 1	■ 1	
Maximum Generation Emergency/Load Management Alert	■ 1	■ 2	■ 1
Non-Market Post Contingency Local Load Relief Warn	■ 2	■ 2	■ 1
Post Contingency Local Load Relief Warning	■ 25	■ 26	■ 6
Pre-Emergency Load Mgmt Reduction Action	■ 2	■ 3	
Synchronized Reserve Event	■ 2	■ 3	
Voltage Reduction Alert		■ 1	
Voltage Reduction Warning and Reduction of NCPL		■ 1	

- Action
- Warning
- Alert
- Advisory

<https://emergencyprocedures.pjm.com/>