Winter Storm Elliott

Fleet Response & Observations

GPC Plant Manager Meeting
January 18, 2023

Southern Company

Serving Reliably During Winter Storm Elliott

Winter Storm Elliott brought historic, extended frigid temperatures that drove electricity demand to the system's highest-ever December peak load. Teams across Southern Company Operations and the system worked tirelessly 24/7 to reliably serve customers, with strong coordination across the electric generating fleet, retail operating company transmission & distribution, Fleet Operations, Fuels and Energy Trading and Bulk Power Operations. The system retained sufficient reserves throughout the event.

Our reliability is supported by

- State-led IRPs that enable seasonal Target Reserve Margin (25.5% winter) & associated resource plan and investments
- Year-round extreme-weather preparedness
- Design standards for winterization & hardening
- Fuel supply assurance & diverse fuel mix
- Effective procedures, communication and training

Average temperature on Dec. 24, 2022, coldest since 1989
13°F for 5 consecutive hours

As we addressed some system issues during Elliott, we benefitted from

- Peaking generation from both steam units and dual-fuel resources not frequently operated
- Utilization of demand-side options & other system load-management resources
- Emergency Energy purchases across the peak demand hours (see timeline)
- Solar contribution

System weighted average temperature
≤30°F for 55 hours
≤20°F for 15 hours

Extreme Christmas Eve cold
Atlanta, Birmingham & Gulfport
20-30°F below normal
(North Georgia low of 4°F)

Historic system hourly December peak load served
37,577 MW
Dec. 24, 7-8 a.m. CST
(All-time hourly integrated winter peak 39,130 MW Jan. 7, 2014)

Southern Balancing Area winter peak load
45,153 MW
Dec. 24, 7:53 a.m. CST
(All-time winter peak 45,887 MW Jan. 7, 2014)

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Timeline

All times CST

Saturday, 12/24 (Christmas Eve)

Approximately 1:00 AM
EEA 1 declared by SBA due to increasing loads

1:10 AM-5:25 AM
EEA 1 actions included
Voltage reduction program
Additional system peaking capacity requested
Interruptible customer loads curtailed

5:25 AM
EEA 2 declared by SBA due to declining operating reserves and expected load increase
Emergency Energy assistance requested from neighbor utilities

6:00 AM-12:00 PM
Southern Company received 1000 MW of Emergency Energy assistance from Florida

7:00 AM-8:00 AM
Southern Company received 100 MW of Emergency Energy assistance from MISO
SBA Peak load 45,153 MW @ 7:53
Southern Company hits highest December peak on record – 37,577 MW

7:00 AM-12:00 PM
Southern Company provided 100 MW of Emergency Energy assistance to South Carolina

11:08 AM
Interruptible load restoration begins

12:00 PM - 7:00 PM
Southern Company provided 400 MW of Emergency Energy assistance to South Carolina

1:15 PM
EEA 2 downgraded to EEA 1 by SBA

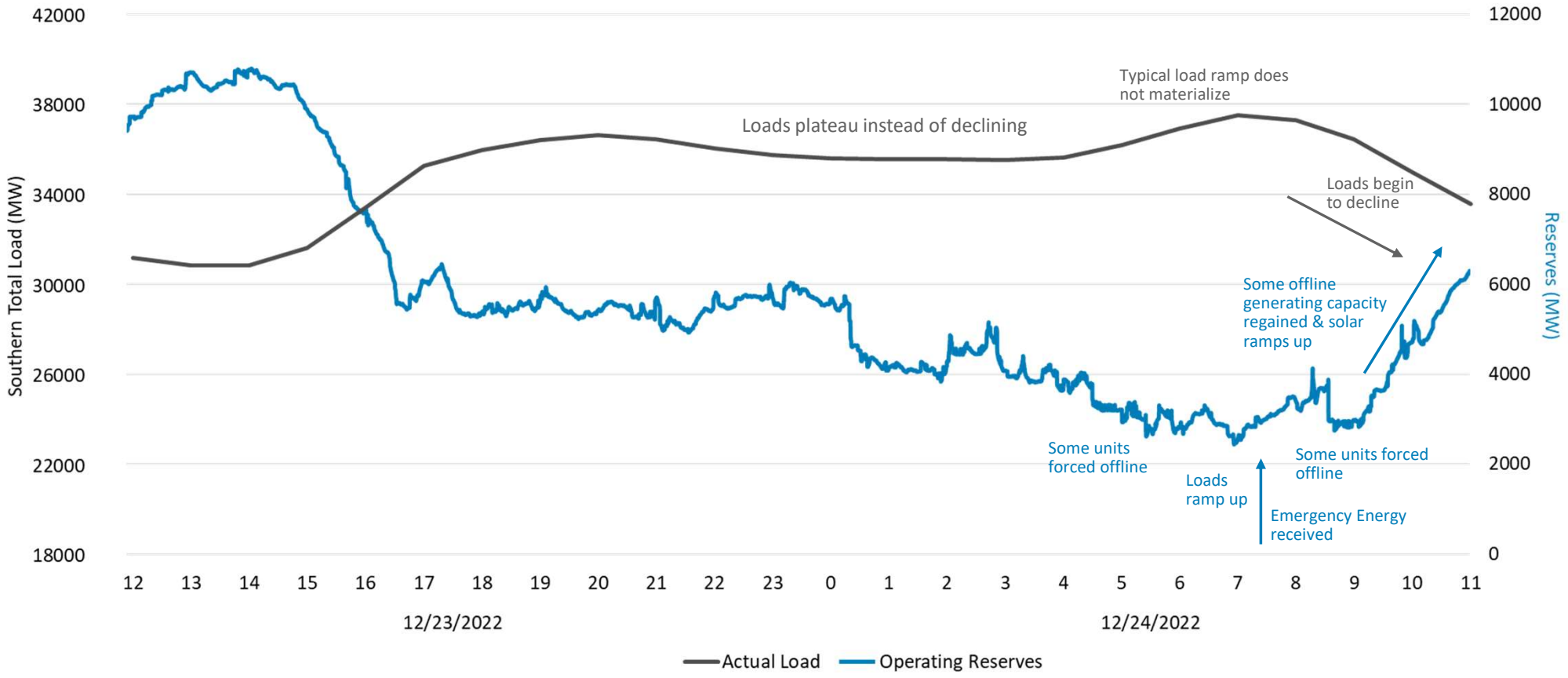
7:00 PM-9:00 PM
Southern Company provided 200 MW of Emergency Energy assistance to South Carolina

Starting at 8:00 AM
Reserve margin improves as loads begin to ease, some offline generating capacity is regained and solar ramps up

11:00 PM - 1:00 AM
~500 MW of gas/oil generating capacity forced offline

1:00 AM - 5:00 AM
Additional ~890 MW of gas/combined cycle generating capacity forced offline

Load and Operating Reserves

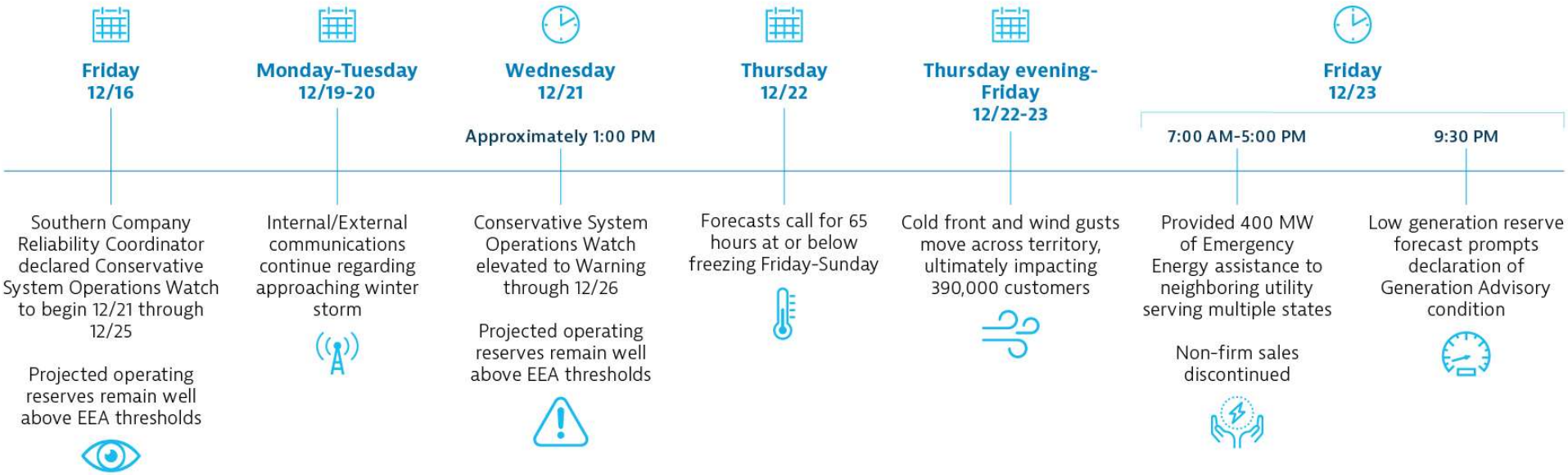


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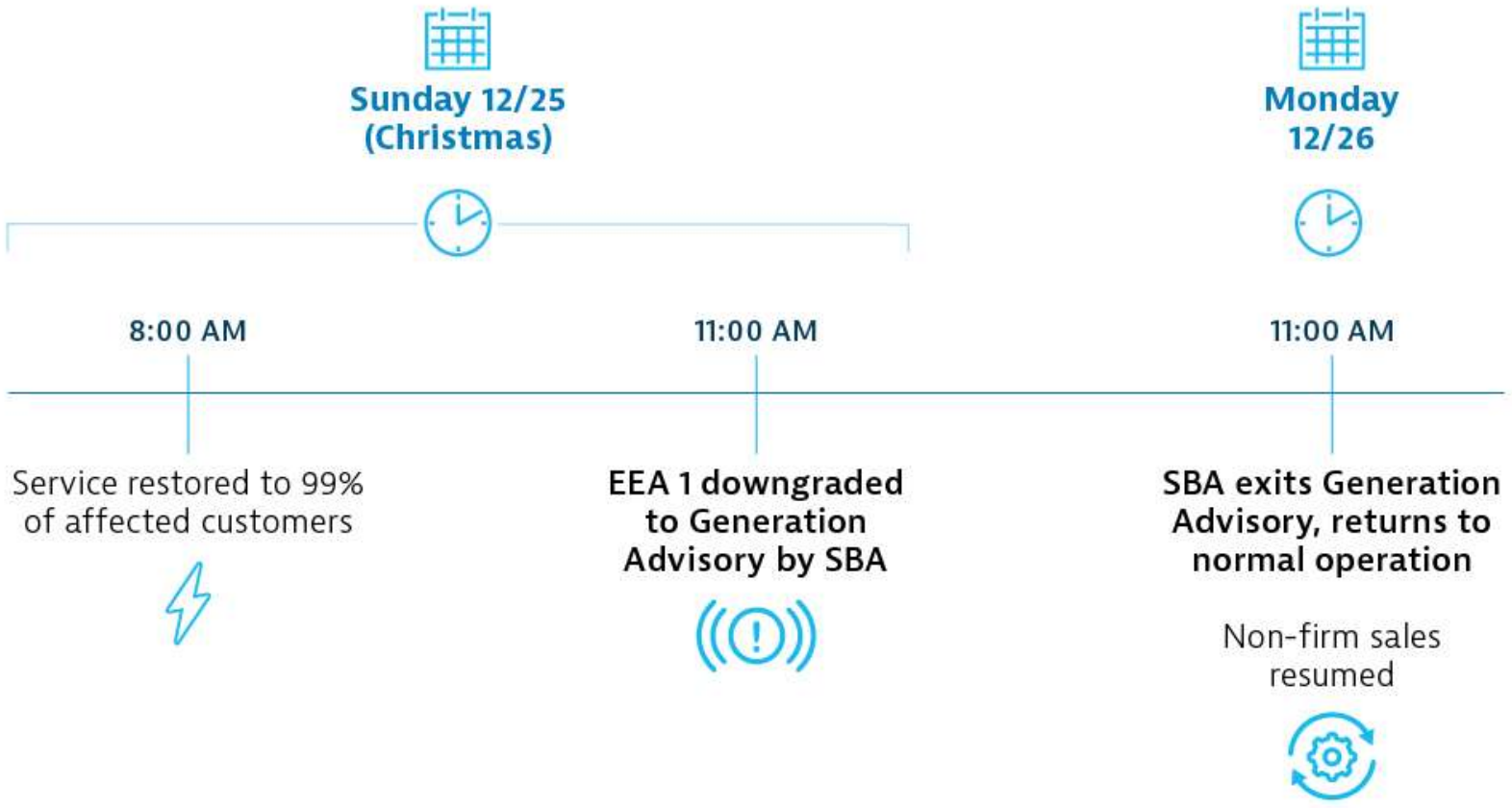

Southern
Company

Timeline

All times CST



Timeline


Sunday 12/25
(Christmas)
Monday
12/26
8:00 AM
11:00 AM
11:00 AM
Service restored to 99%
of affected customers
EEA 1 downgraded
to Generation
Advisory by SBA
SBA exits Generation
Advisory, returns to
normal operation
Non-firm sales
resumed

Regional View

Rolling blackouts across the Southeast as utilities underestimated demand and overrated capacity

TVA had its first ever rolling blackouts on 12/23 and 12/24, shedding 5-10% of system load.
- Load on 12/23 reached a winter record 33,425 MW.
- Forecasting errors reached at least 10%.*
- Two coal units representing 1,873 MW capacity went offline. TVA also acknowledged there were issues at another coal plant and some gas units.
- Net imports peaked at 7,179 MW, mostly from MISO.

Duke also instituted its first ever rolling blackouts, impacting about 500,000 customers in the Carolinas on 12/24.
- Duke Energy Carolinas load peaked at 20,879 MW on 12/24, 12% above forecast; load for Duke Energy Progress peaked at 14,083 MW, 5% above forecast.*
- About 2,500 MW were unavailable including 360 MW CC and 675 MW ST, as previously weatherized instrumentation lines froze, and at least 1,250 MW of firm purchases were cut.

Other South Carolina utilities struggled to meet load on 12/24.
- **Santee Cooper** employed one 15 minute rolling blackout, impacting 12,000 customers.
- **Dominion** announced it "implemented a controlled load shed" in South Carolina.

PowerSouth and **Oglethorpe** set all time winter peaks.
- PowerSouth reached 2,674 MW, 9% above its previous winter peak (2018).
- Oglethorpe peaked at 11,034 MW, 15% above its previous winter peak and 8% above its previous all-time high (June 2022).

The **ERCOT**, **MISO**, and **PJM** systems were stressed but avoided rolling blackouts.
- The DOE waived some emissions standards to allow ERCOT & PJM to maximize generation.
- MISO & PJM declared maximum generation emergencies and took conservations actions.
- ERCOT set a new winter record with a demand of 74 GW and had forecasting errors of up to 10 GW.
- PJM's peak load forecast fell short by about 10% and their overnight valley was 40,000 MW higher than the next highest Christmas Eve.
- Up to 3,000 MW from PJM ended up flowing to the southeast via MISO.

Southern both gave and received emergency assistance during Elliot.
- On 12/23, SO provided TVA with 5,000 MWh.
- On 12/24, SO sent 3,700 MWh to Dominion, while receiving 6,375 MWh from FP&L and 100 MWh from MISO.

*Day ahead forecasts and demand numbers from EIA.