Winter Storm Elliott Recap

December 2023

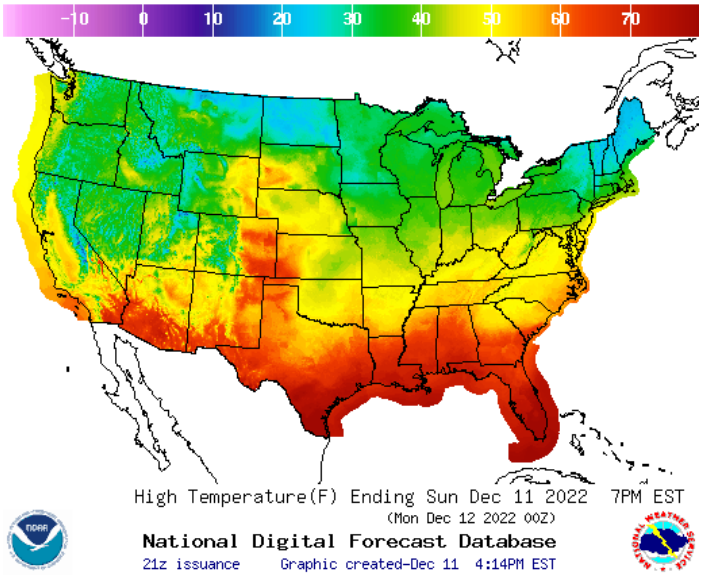
Transmission Operations

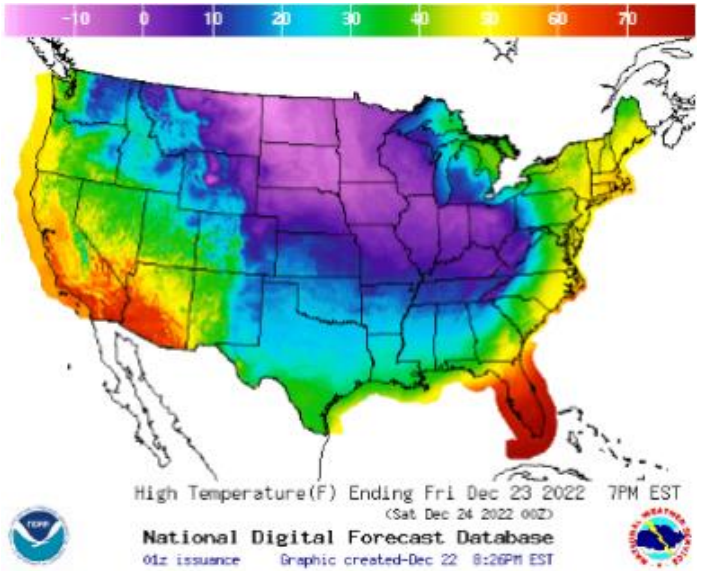
***DRAFT** – For Discussion Purposes Only*

LG&E KU
PPL companies

Weather Conditions

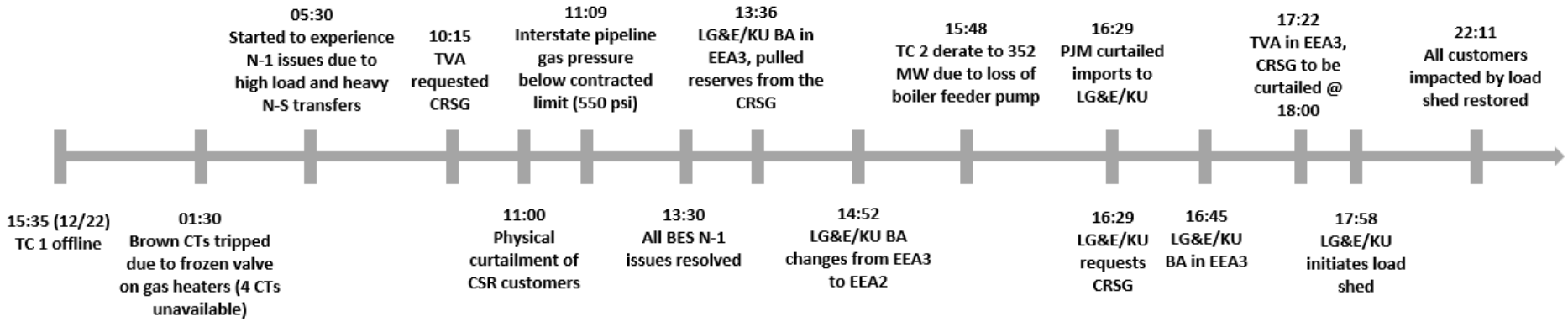
- As Winter Storm Elliott moved across Kentucky, the storm transitioned from rain to ice then snow. Elliott's conditions included:
  - Temperatures as low as -8 degrees, the lowest in the Louisville area since 1994;
  - Windchills exceeding 30 degrees below zero and wind gusts of 30-40 miles per hour;
  - Snowfall of 1-5 inches.
- The storm set new all-time December electric peaks within the LG&E and KU system on Friday, Dec. 23rd
  - Total Daily Energy Usage was 141,613 MWh.
  - The previous combined (LG&E and KU) all-time December daily total of 134,600 MWh was set on Dec. 14, 2010.
  - Peak load of 6407 MW (hour-ending 18:00)
    - ~6559 MW instantaneous





Summary of Events

Friday, December 23, 2023



Confidential

***DRAFT** – For Discussion Purposes Only*

LGE-KU003_0001562

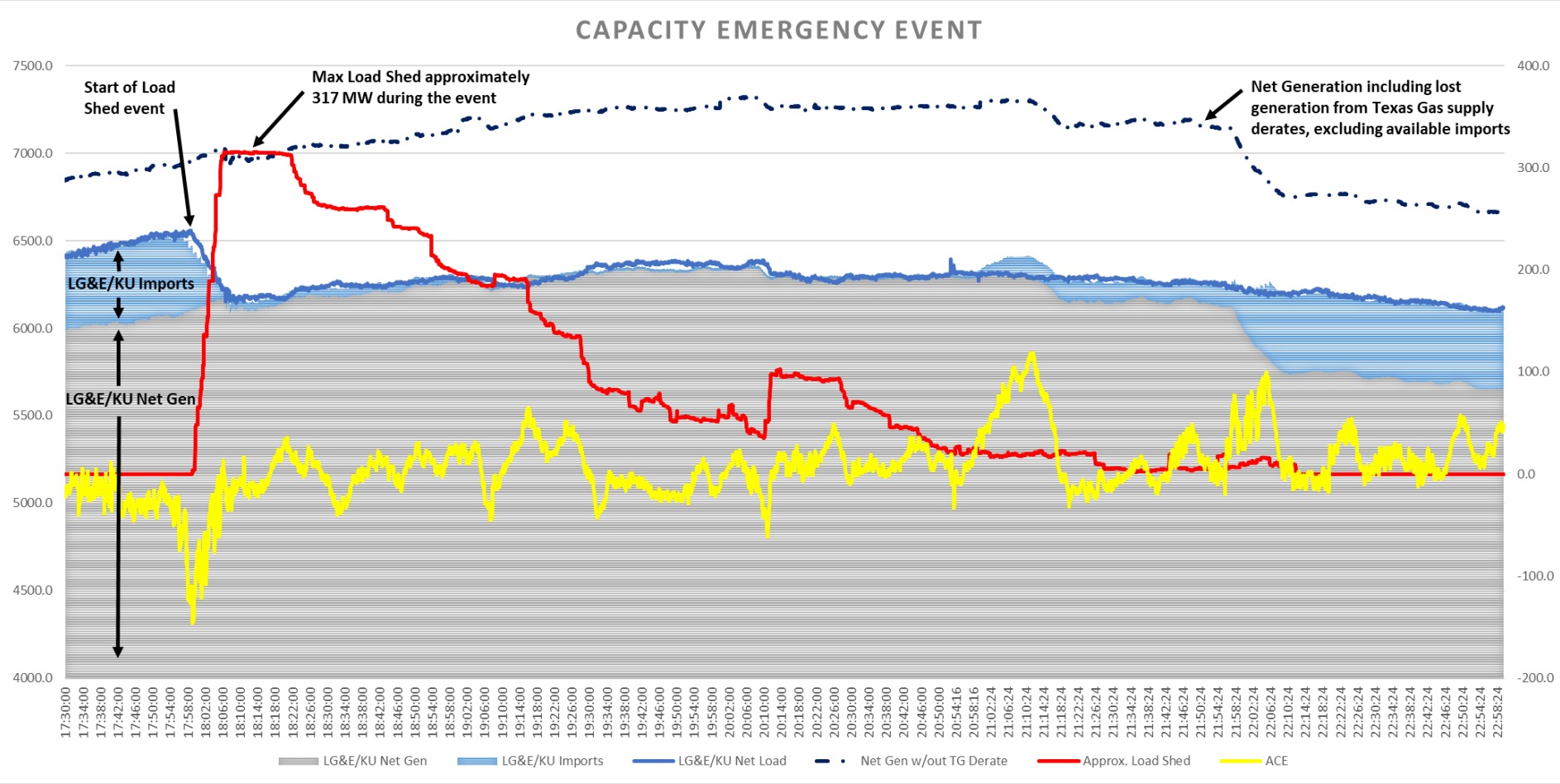
[redacted]

[redacted]

[redacted]

[redacted]

Capacity Emergency

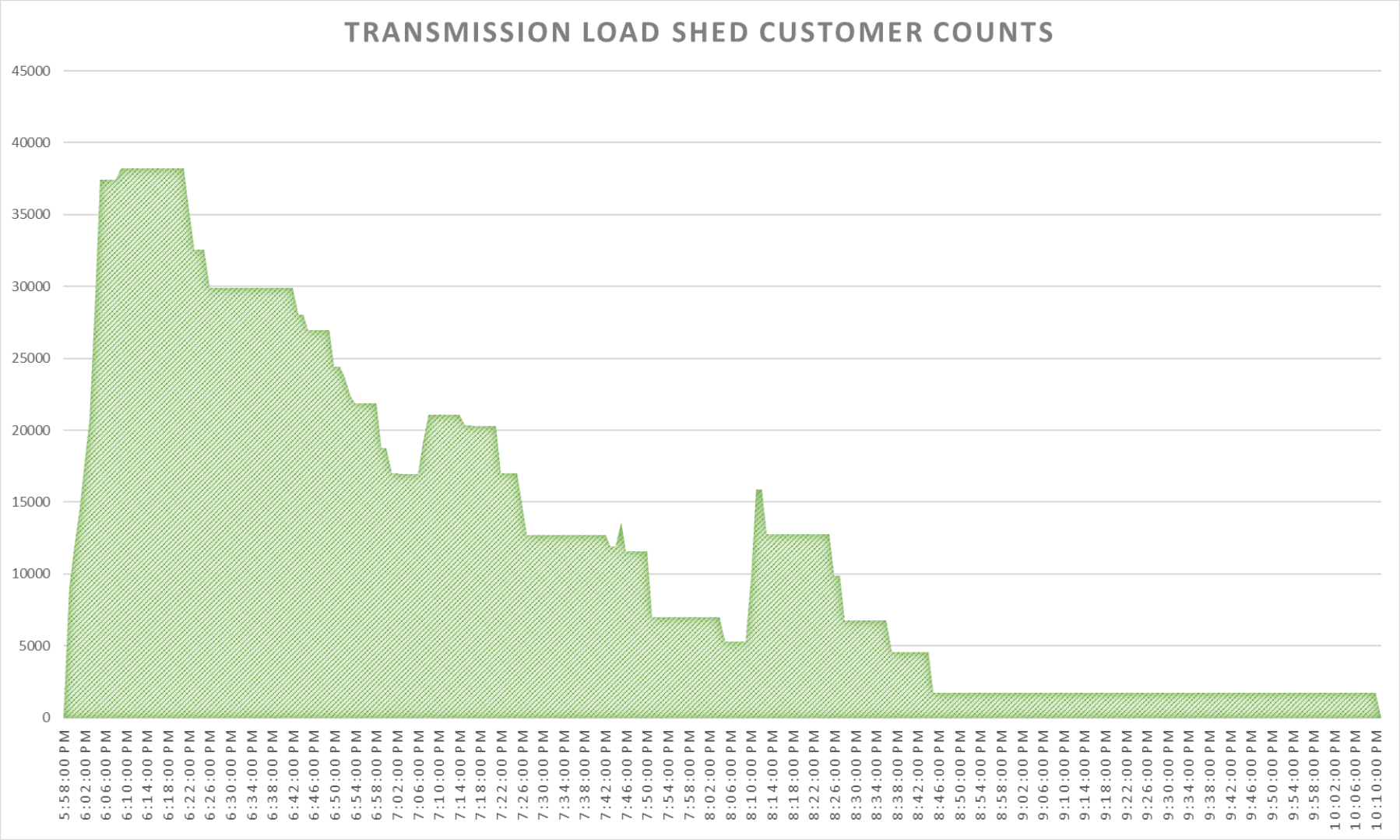


Confidential

***DRAFT** – For Discussion Purposes Only*

LGE-KU003_0001567

Customer Impact



Confidential

***DRAFT** – For Discussion Purposes Only*

LGE-KU003_0001568

Lessons Learned & Next Steps

- **Transmission**
  - Further discussions within Transmission to evaluate potential system upgrades and/or Op-Guides to address operational issues
  - Follow-up discussions with TVA and EKPC to evaluate options to better manage the impacts of heavy transfers across our system during extreme weather events
- **Capacity Emergency Event**
  - Working on policies and processes to improve communication internally and externally
  - Reviewing load shed plan; looking to implement load shed from Distribution level

Appendix

[redacted]

Capacity Emergency

- A *capacity emergency* exists when a Balancing Authority Area's operating capacity is inadequate to meet its demand (load) plus its regulating requirements.
- The LG&E/KU BA entered into a *capacity emergency* that required load shed in the evening of December 23, 2022 after regional interstate natural gas pipeline issues resulted in the inability to supply the required pressure to LG&E/KU generating units.
  - December 23, 2022 is the first time where it has been necessary for the LG&E/KU Balancing Authority to shed load due to a *capacity emergency*.
- If **controlled manual load shed** is not implemented immediately when capacity is unable to meet demand (load), the result could include **wide-spread uncontrolled blackouts**.

Capacity & Energy Emergency Operating Plan

- Due to the severity of capacity emergencies, NERC Reliability Standards (EOP-011) require the LG&E/KU BA to take certain actions, up to and including firm load shed, to mitigate capacity emergencies
- LG&E/KU has a plan in place to address this type of emergency called the **Capacity & Energy Emergency Operating Plan**
- While these types of events are extremely rare, training is completed at least twice per year

R2. Each Balancing Authority shall develop, maintain, and implement one or more Reliability Coordinator-reviewed Operating Plan(s) to mitigate Capacity Emergencies and Energy Emergencies within its Balancing Authority Area. The Operating Plan(s) shall include the following, as applicable: *[Violation Risk Factor: High] [Time Horizon: Real-Time Operations, Operations Planning, Long-term Planning]*

2.1. Roles and responsibilities for activating the Operating Plan(s);

2.2. Processes to prepare for and mitigate Emergencies including:

2.2.1. Notification to its Reliability Coordinator, to include current and projected conditions when experiencing a Capacity Emergency or Energy Emergency;

2.2.2. Requesting an Energy Emergency Alert, per Attachment 1;

2.2.3. Managing generating resources in its Balancing Authority Area to address:

2.2.3.1. capability and availability;

2.2.3.2. fuel supply and inventory concerns;

2.2.3.3. fuel switching capabilities; and

2.2.3.4. environmental constraints.

2.2.4. Public appeals for voluntary Load reductions;

2.2.5. Requests to government agencies to implement their programs to achieve necessary energy reductions;

2.2.6. Reduction of internal utility energy use;

2.2.7. Use of Interruptible Load, curtailable Load and demand response;

2.2.8. Provisions for operator-controlled manual Load shedding that minimizes the overlap with automatic Load shedding and are capable of being implemented in a timeframe adequate for mitigating the Emergency; and

2.2.9. Reliability impacts of extreme weather conditions.

[redacted]

[redacted]