



Winter Storm Landon Action Update

MLGW Committee Debriefing
February 15, 2022

Winter Storm Landon stretched from Texas to Maine dropping snow and ice over 2,220 miles

In the Memphis area we received up to 0.5" of ice accumulation

Dates: 2/3 through 2/14

Peak Outages: 186,000

Total Customers Affected:
233,460

Total Restoration Hours: 272



The storm garnered national attention...

WSJ Wall Street Journal

Tens of Thousands Still in Dark in Tennessee After Winter Storm

Outages are concentrated in the Memphis area, as the eastern U.S. recovers from snow and ice.

2 days ago



The New York Times

Thousands Remain Without Power in Tennessee After Winter Storm

In Memphis, ice began accumulating on Friday from freezing rain, which led to crashes on roads, downed trees and power failures. Officials in...

1 day ago



The Weather Channel

Winter Storm Landon: Two Critical After 16-Car Pileup in Memphis; Power Outages Top 200,000 | The Weather ...

Winter Storm Landon knocked out power to more than 200,000 homes and businesses. - Articles from The Weather Channel | weather.com.

5 days ago



The Washington Post

Major snow, ice storm plastering mid-South, Midwest

In Memphis, ahead of updates from Weather Service that areas are under ice storm warnings, the office of emergency management said to "take time..."

6 days ago





Historical Context

MLGW Major Storm History

- *Winter Storm Landon was the 4th largest event in terms of peak customers interrupted in MLGW history only behind Hurricane Elvis in 2003, the Ice Storm of 1994 and the Tom Lee storm of 2017.*
- *The Total Customers Impacted was 233,640 and at the peak, outages were 186,000. After the peak occurred, customers continued to experience outages due to falling limbs and trees, thus the impacted number continued to grow in the early days of the storm.*

Major Storm Dates	Name	Peak Customers Interrupted	Duration Hours
July 22, 2003	Hurricane Elvis	339,000	379
February 11, 1994	1994 Ice Storm	281,000	333
May 27, 2017	Hurricane Tom Lee	188,000	263
February 3, 2022	Winter Storm Landon	186,000	272
June 12, 2009	Little Elvis	150,000	168
August 29, 2005	Hurricane Katrina	100,000	114
August 22, 2003	Hurricane Echo	74,000	48
April 4, 2011	MLK	70,000	98
April 19, 2011	April Repeat	65,000	67
July 4, 2004	M-80	60,000	36
March 2, 2014	Winter Mixer	51,000	112
February 5, 2008	Super Tuesday	46,000	108
April 26, 2011	April Threepeat	35,000	76
September 25, 2005	Hurricane Rita	35,000	38
May 1, 2010	May Day	32,000	50

Preparation Efforts





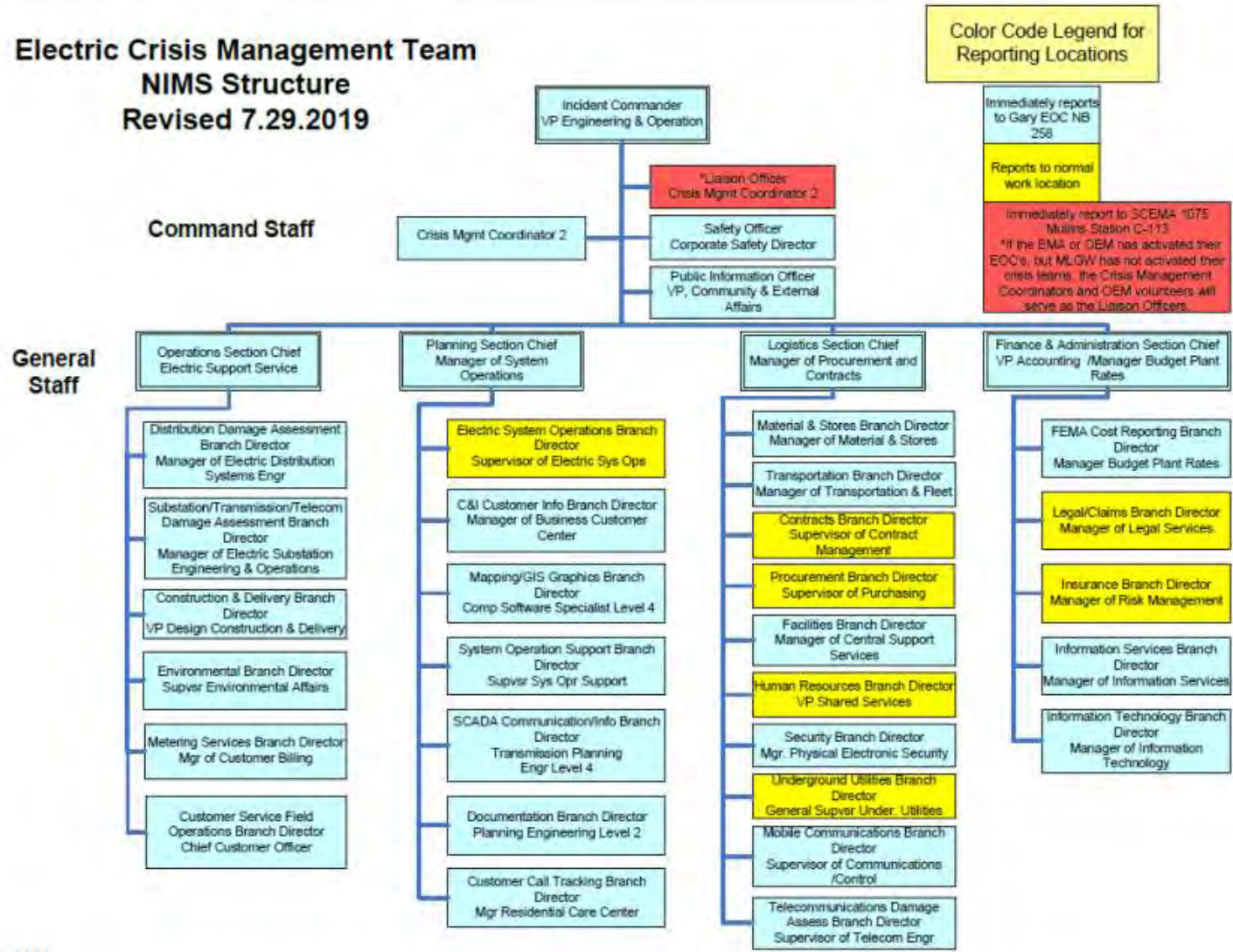
EMERGENCY RESPONSE PLAN 2020



Storm Preparation Activities

- Emergency Response Plan
- Put crews and personnel on Standby
- Assess and replenish fuel supplies for trucks and equipment
- Assess and replenish critical materials needed
- Formulate Storm Kits for the contract crews to utilize during the event
- Pre-event Crisis Team communications
- Ready to activate the Crisis Team

**Electric Crisis Management Team
NIMS Structure
Revised 7.29.2019**



Storm Damage and Outages

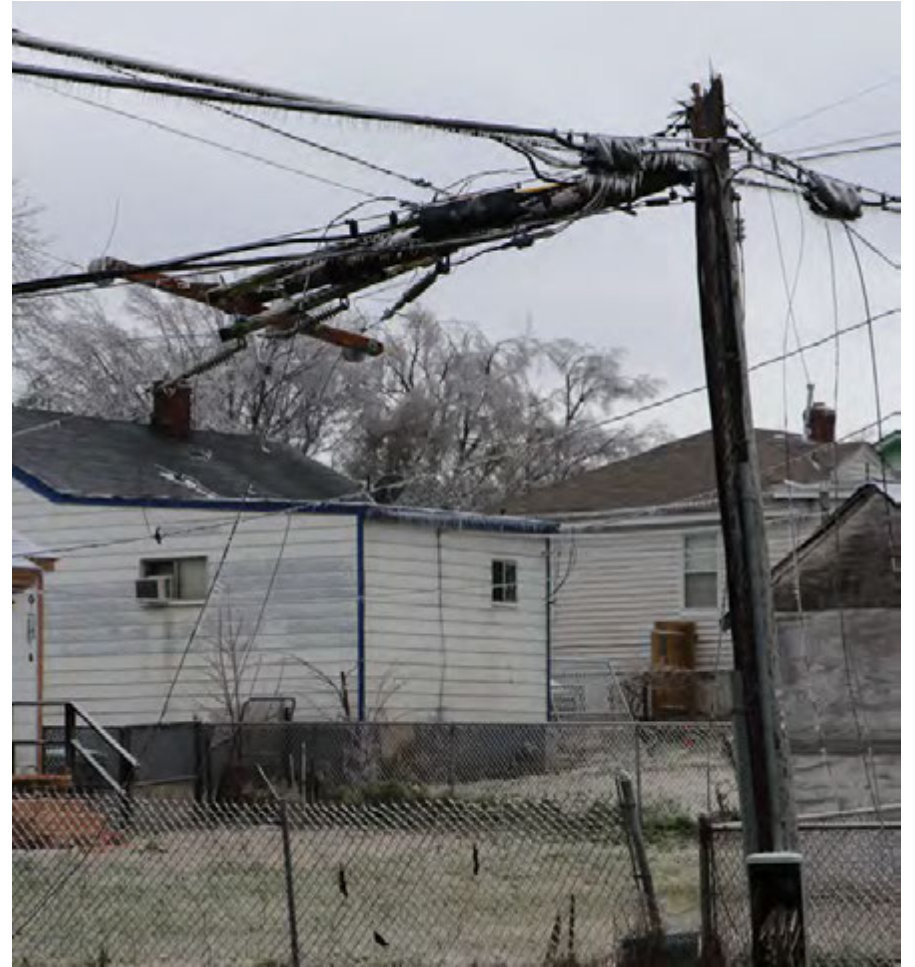


Ice accumulation on tree limbs causes limbs and entire trees to become heavy and to fall into power lines which can snap or affect poles

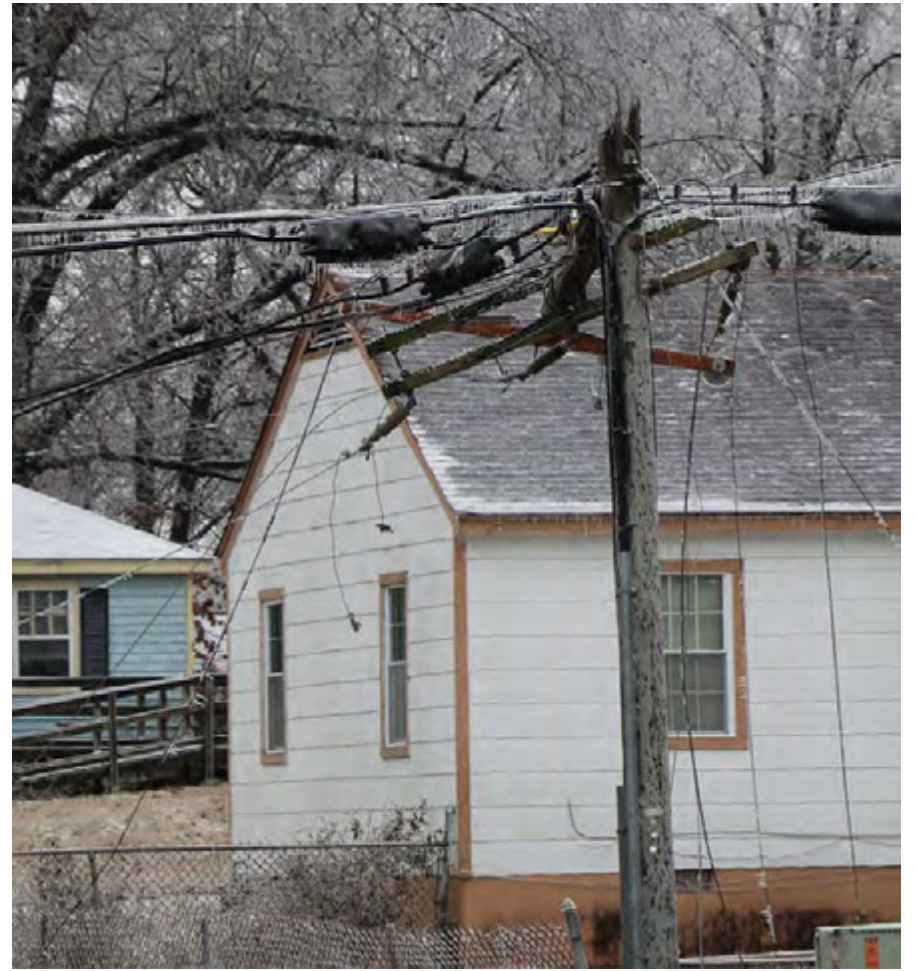


























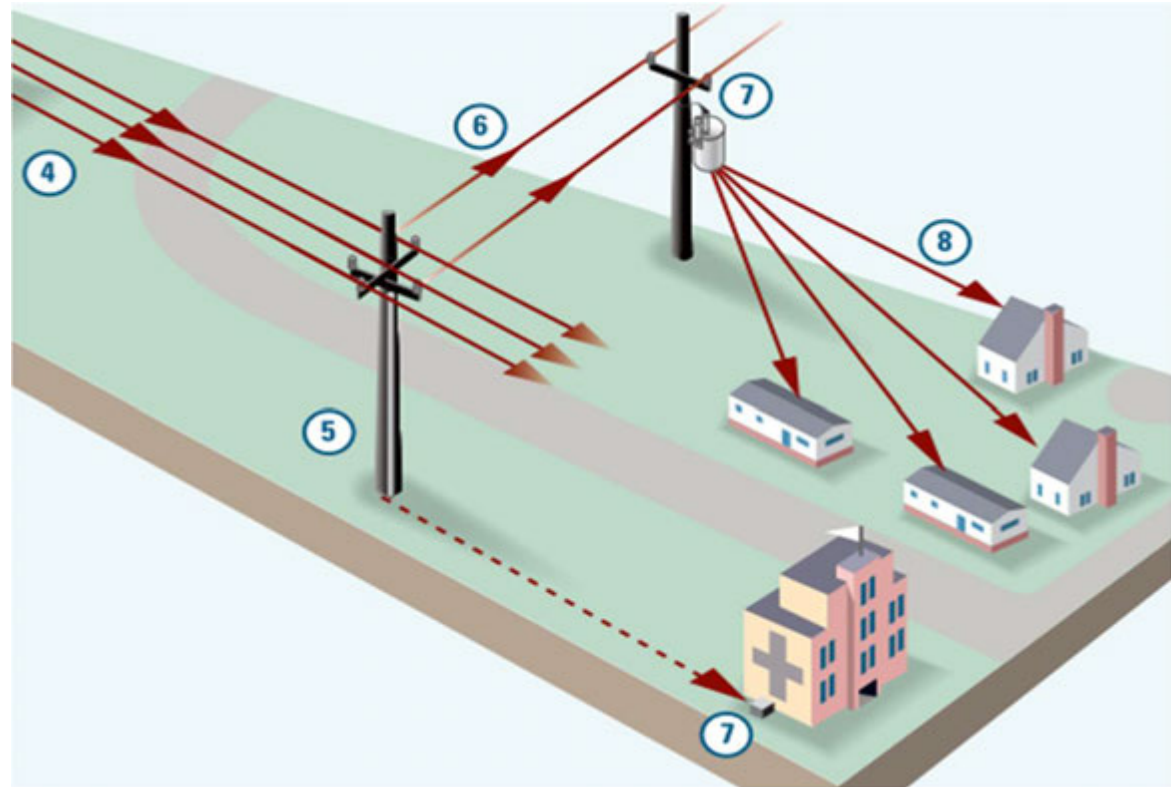


Restoration Prioritization Process



Specific Strategies Employed

- Critical public health and safety facilities (EMA, police, fire, hospitals, water pumping stations*)
- “Biggest Return”
 - Work primary circuit outages (#4 on image to right) out from the substations.
 - Pros: gets most customers back on if there are no further outages downstream in the system (typically impacts thousands of customers)
 - Cons: Leaves potential downstream outages (#6,#7,#8) behind the primary outage.
- “Saturation of Areas”
 - Employed after biggest return revealed there were many downstream outages behind the primary circuit outages.
 - Examples of these are many fuse tap outages (#6) for tap circuits from the primary circuits, transformer outages (#7) and service outages (#8).



* This impacted the water system by reductions in water pressure and limited water availability. MLGW requested the TVA Combined Cycle Plant to limit water usage late Thursday night due to limited well capacity at Davis Pumping Station. In addition, MLGW had numerous water pumping stations with power loss and/or were restricted to one circuit as opposed to the normal two incoming power feeds

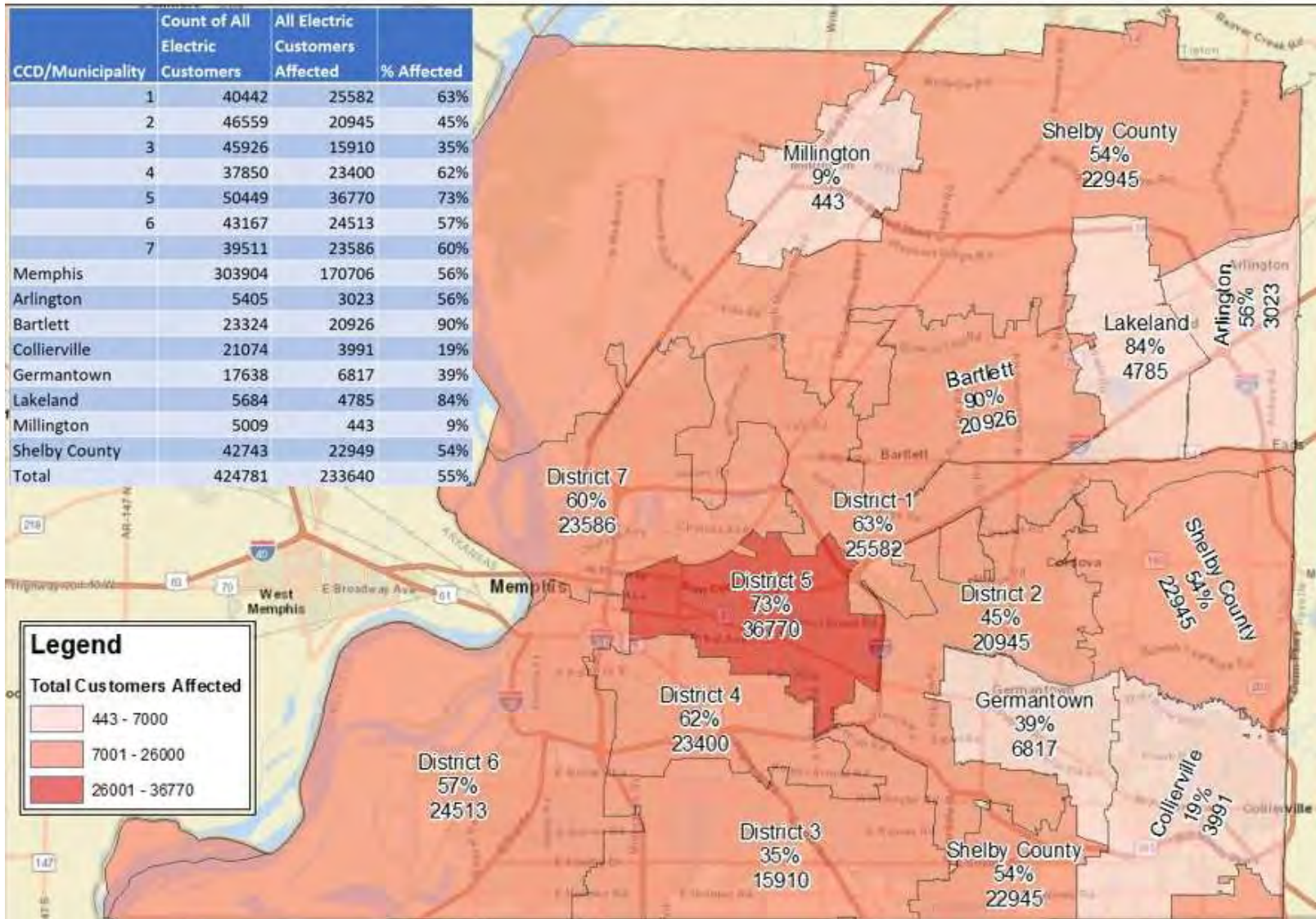


Restoration Timeline

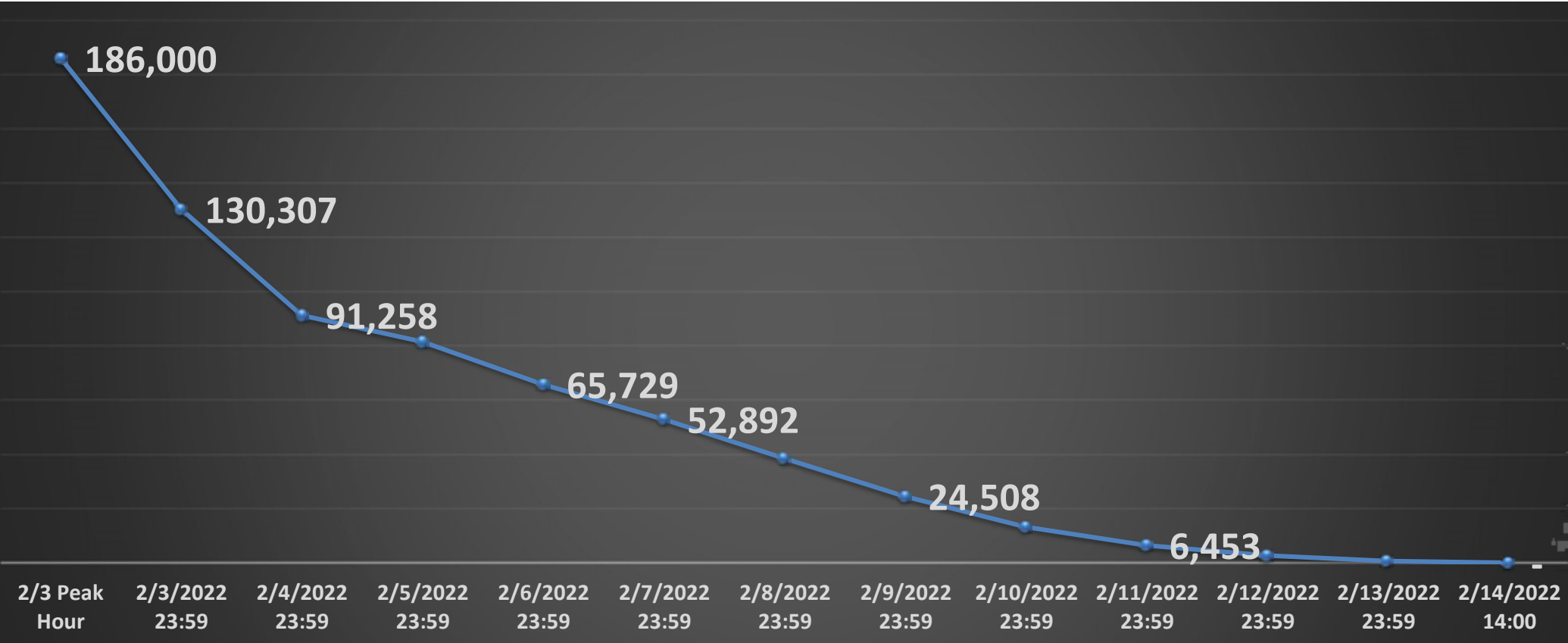
Level Set – Factors to Consider

- **Safety is paramount...**We deploy resources with this in mind.
- Vast majority of contract crews couldn't be released to MLGW until the storm effects were no longer present in their areas.
- We had significant issues with Outage Text Alerts...Due to damaged infrastructure used to help communicate information...The system had just been rolled out and works well in typical circumstances.
- Crews are assigned to the sources of problems on our system, which may not always be visible to customers. Our network spans across both easily seen and not easily seen locations.
- Crews may assess damage and leave without repairing due to the need to optimize our restoration efforts by turning in the damage so that it can be repaired consistent with our prioritization process.
- We remind the public to stay away from any downed lines...To treat any downed lines as energized.

Customers Affected in 2022 Ice Storm by CCD and Municipality



Snapshot of Customer Outages at the End of the Day



*** Excludes counts for which power supply cannot be taken at home or commercial facility.**



Resources Deployed

Resource Availability “Boots on the Ground”

- 40 MLGW Troubleshooters (first responders, damage assessment)
- 26 MLGW Overhead, Shift, Network Crews, ~136 people
- 78 Contracted Tree Trimming Crews, ~273 people (grew over time)
- 90 Contracted Line Crews (from various states), ~450 people (grew over time)
- 25 Electric Substation/Meter Operations Crews, ~125 people (primarily assigned to services)
- Retirees and Engineers assisting, ~100

Total field personnel of over 1,100.



Communications Efforts and Community Outreach

Social Media and Web Metrics

- Updated web and social media banners
- Livestreamed press conferences
- Expanded social media response hours
- Ice Storm Update Dashboard added to mlgw.com

Social Media Metrics

- **74,213** overall impressions
- **3,248** new followers
- **18,700** received messages
- **15%** increase in audience growth

Web Traffic on mlgw.com

- **1,057,292** page visits
- **590,570** Outage Map views
- **94,945** Outage Center page views
- **19,617** Report outage page views
- **34,000** My Account page visits
- **16,602** MLGW Outage Dashboard

A graphic for MLGW featuring a logo with a yellow, red, and blue triangle above the text 'MLGW'. To the right is a yellow diamond-shaped sign with a snowflake icon and the text 'WINTER STORM WARNING'. Below the logo and sign, the text reads: 'WE ARE WORKING! Restoration efforts are underway but due to extensive damage to trees and power lines caused by the ice storm, it's going to take several days. We appreciate your patience.' At the bottom, a red banner contains the text 'Outage Reporting: 901.544.6500'.

MLGW

WE ARE WORKING!

Restoration efforts are underway but due to extensive damage to trees and power lines caused by the ice storm, it's going to take several days. We appreciate your patience.

Outage Reporting: 901.544.6500

Data as of 2/10/22



MLGW to Host Virtual Press Conference today at 3 p.m.

(February 9, 2022) – Memphis Light, Gas and Water President and CEO **J.T. Young**; Senior Vice President, and Chief Operating Officer **Alonzo Weaver**; Vice President of Community and External Affairs **Gales Jones Carson**; City of Memphis Director of Public Works Division **Robert Knecht**; and, Shelby County EMEA Director **Brenda Jones** will provide storm restoration updates in a virtual press conference **Wednesday, February 9 at 3 p.m.**

Join Zoom Meeting: <https://mlgw.zoom.us/j/94044393039>

Meeting ID: 940 4439 3039

OR dial +1 301 715 8592, +1 312 626 6799, +1 646 876 9923, +1 253 215 8782

When joining the meeting, please enter your full name and the organization you represent.

Important MLGW contact information for customers:

- Electric Outage Reporting: 544-6500.
- Emergencies: 528-4465 (for electrical lines down, gas leaks, broken water mains inside a building)
- Online Outage Center: mlgw.com/home/outagecenter.
- For details about where MLGW's equipment ends and the customer's equipment begins, please check out the brochure [Weathering Nature's Fury](#).

Customers can now view the Electric Crisis Public Dashboard at mlgw.com. For more on the restoration process, including how outages are prioritized, watch MLGW's video, "[How long will the power be out?](#)"

Download the MLGW app and sign up for the My Account program. This allows customers to report and track outages, sign up for text alerts, handle billing issues, monitor usage and more.

-ENDIT-

MLGW is the largest three-service public power utility in the nation, serving more than 437,000 customers in Memphis and Shelby County



Media Relations

- CNN
- Wallstreet Journal
- Weather Channel
- AccuWeather
- Associated press
- Daily Memphian
- FOX 13
- Local 24
- WREG News 3
- WMC 5
- The Commercial Appeal
- KWAM Radio
- The New York Times
- WKNO
- Tennessee Lookout
- The Wall Street Journal
- Newsweek
- CW30

News Release

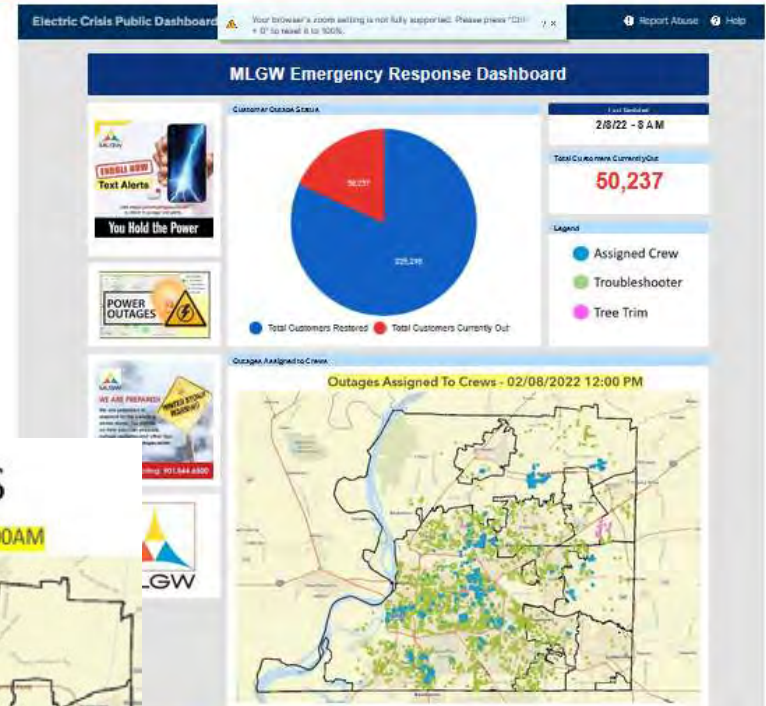
- 21 news releases sent

Media Requests

- 81 media inquiries

Data as of 2/10/22

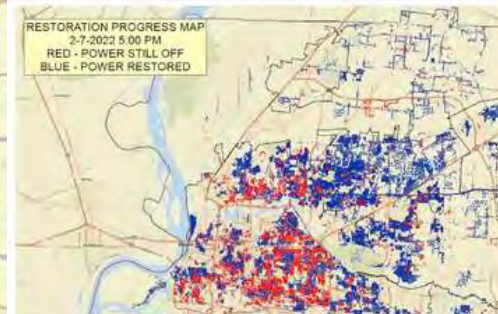
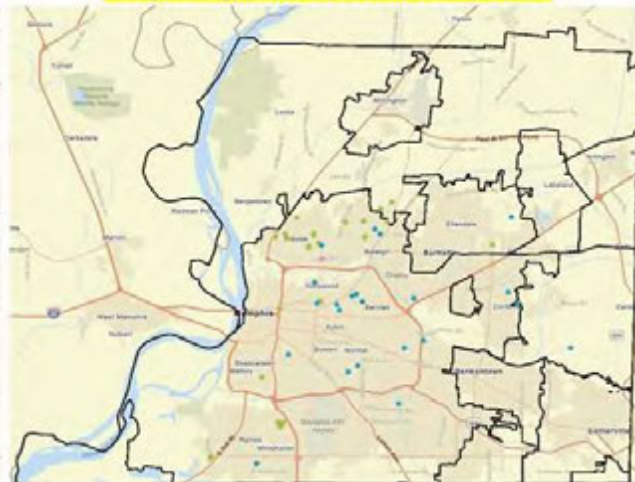
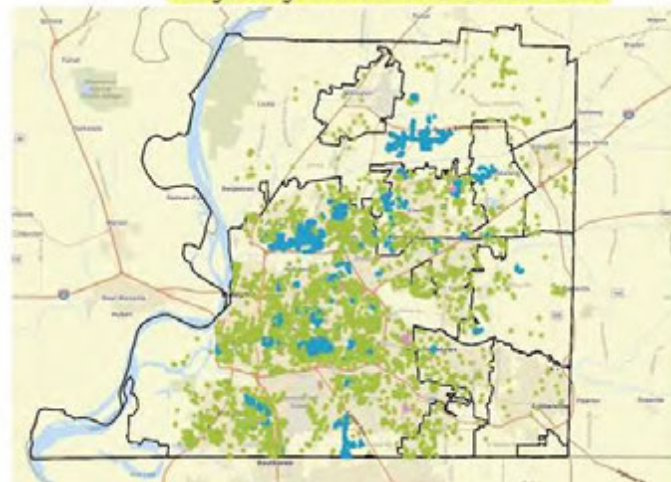
Created new dashboards and crew restoration maps



Outage of Crews Assigned Progress

Outages Assigned To Crews - 02/06/2022 8:00 PM

Outages Assigned To Crews 2/14/2022 - 7:00AM



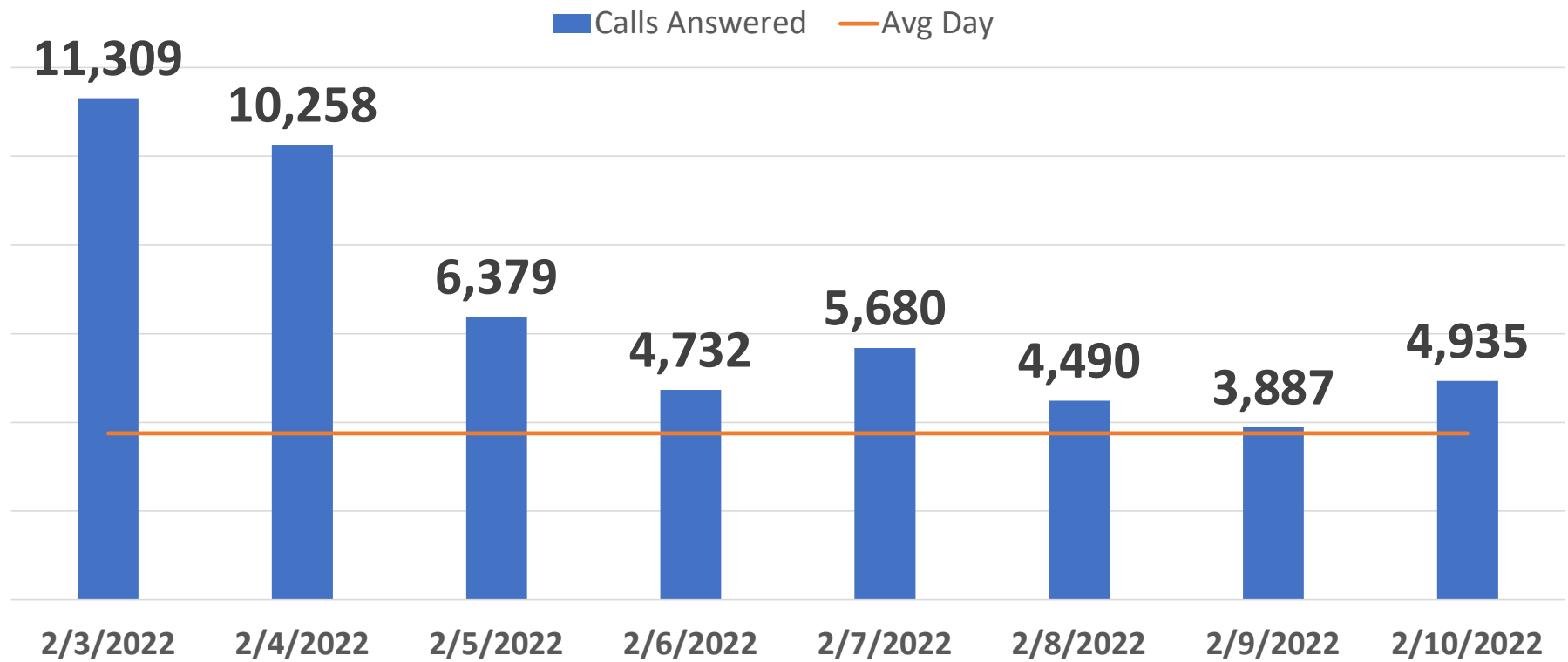
Community Outreach

Community Outreach

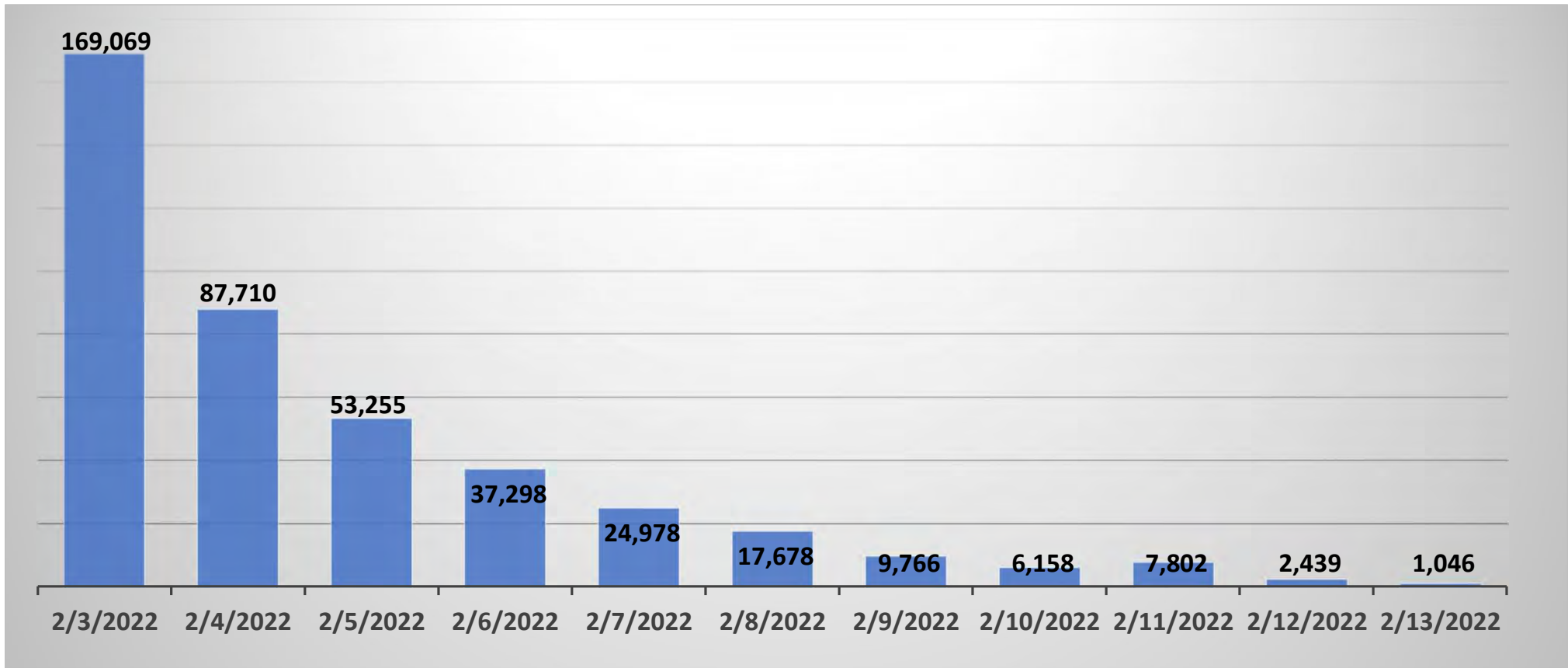
- Communicated with social service agencies regarding community issues and resources related to ice storm and restoration – including senior meal replacement.
- Partnered with Mid-South Food Bank to host Mobile Food Pantry on February 8 and February 11. Tennessee Highway Patrol volunteers assisted on February 8.
- Communicated with the Department of Human Services regarding replacement of SNAP benefits. Current DHS clients who experienced an outage of 12 hours or more will be eligible for replacement after total restoration is complete.



Customer Care Center Phone Calls Answered



Outage Hotline Calls by Day (544-6500)



Cost Projections



Cost Projections

- Submitted preliminary cost estimate of \$14 million to TEMA/FEMA for a disaster declaration request from the Governor to the President.
- If a disaster is declared, MLGW will be eligible for a 75% reimbursement of the eligible costs.
- For historical context, the 1994 Ice Storm (14 days) and 2003 Hurricane Elvis (16 days) were approximately \$14.5 million and \$31 million respectively.



FEMA



Early Lessons Learned

Early Lessons Learned

- Provide more timely information to our Customer Care team so that they can be better prepared to answer customer questions about restoration efforts.
- Disable our text alert/outage status information because our infrastructure damage was too severe to allow it to function as intended...The system works very well under normal conditions...make appropriate fixes to this system asap.
- Reevaluate our damage assessment strategy to ensure that it is optimized in all areas to allow for safe, efficient, timely, flexible/expandable infrastructure damage tracking.
- Explore the pre-arrangement of staging locations for outside crew trucks and similar pre-arrangement for crew transportation to and from lodging locations to their vehicles and other logistics to optimize outside crew efficiency.
- Have a prioritized list (prior to the storm's arrival) of traffic signals at key intersections and coordinate early on with affected municipalities in our restoration process.

Early Lessons Learned (cont.)

- Ahead of the storm, give customers a better estimate (erring on the side of a worst-case scenario) of how long they could be without power.
- Reevaluate our Crisis Management Team structure and associated processes for needed tweaks to ensure proper prioritization of actions needed during restoration.
- Work through our partnerships within the American Public Power Association (APPA) and similar utility industry affiliations to glean best practices in ice storm restorations.

Accountability

- Annually, we will review with our Board and the Council our storm restoration plan with any updates incorporated and we should include the updated plans in bill inserts and via online access.
- Community engagement opportunities acknowledging our commitment to meeting customer expectations.
- Once we activate our Crisis Team in advance of a storm, we will notify our Board, City Council, Mayors and other elected officials throughout Shelby County regarding our plans and they will be updated at least daily regarding the status of our restoration efforts.

Next Steps

Now that we've restored electricity, we must work to restore trust and credibility with our customers, community and all stakeholders. We will do this by:

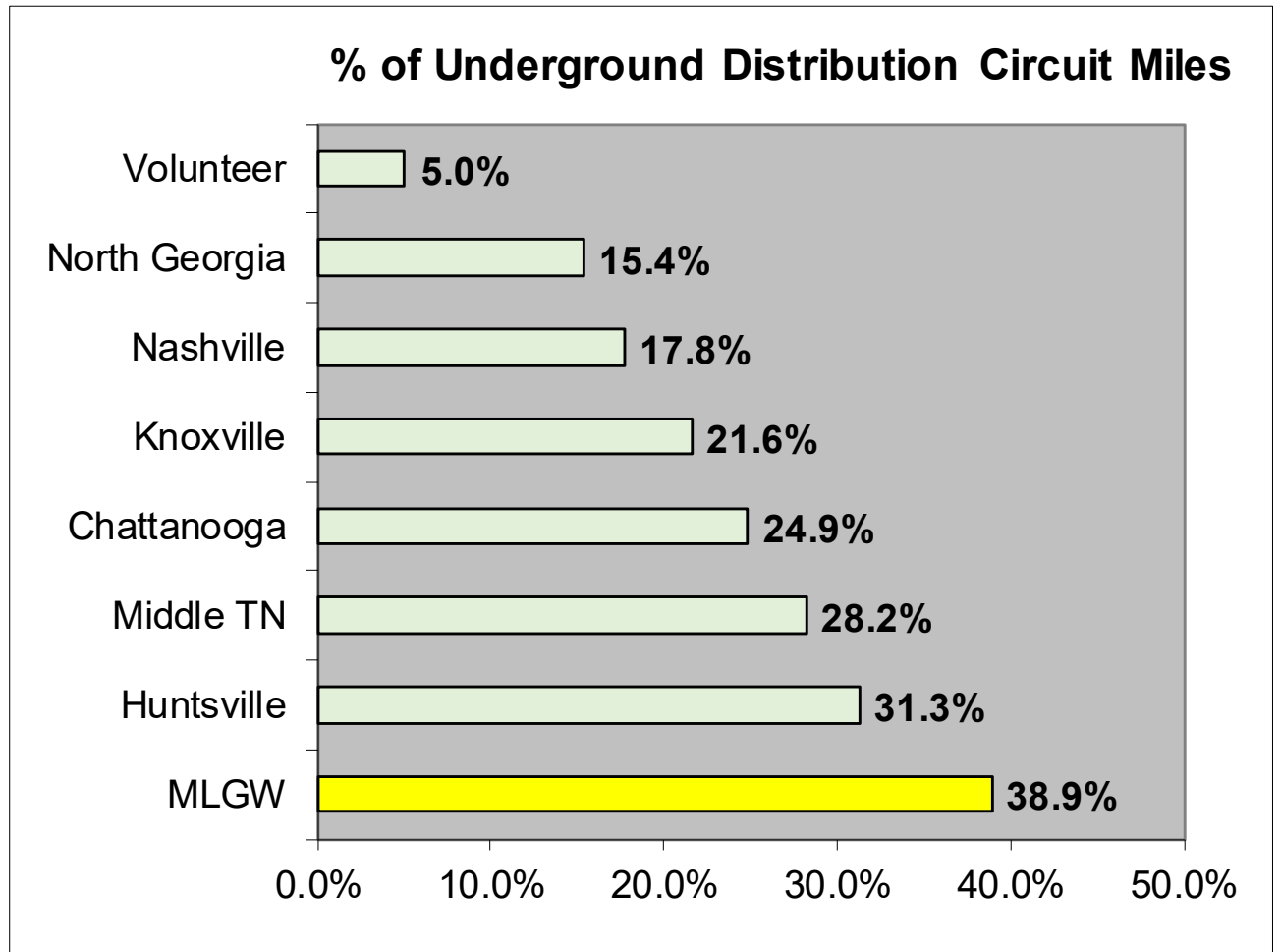
- ✓ Suspending disconnects for non-payment for a period...
- ✓ Offering additional bill payment assistance...
- ✓ Considering no interest loans to assist eligible customers with costs for electrician work associated with storm damage to their service apparatus (i.e. weather head, piping, meter can replacement, etc.)...Final decision later this week...
- ✓ Mobile food pantries...
- ✓ Consideration of an expansion our infrastructure improvement plan to include storm-hardening elements such as undergrounding in certain locations, acceleration of pole changeouts and tree trimming.
- ✓ **Formation of the *Outage Improvement Advisory Team*...**
 - ✓ Will focus on viable options for improvement
 - ✓ Will kick off in late March with a goal of completion of review and presentation of options by end of June

Overhead vs Underground



Overhead vs Underground

MLGW currently has almost 40% of its distribution system underground and that is the highest percentage among the Big 8 distributors in the Tennessee Valley.



Overhead vs Underground (cont.)

- An estimated cost is \$1.3 million per mile (may be on the lower end)
- Cost of various options
 - \$6+ billion to covert 100% of MLGW's remaining overhead distribution miles.
 - \$2+ billion to convert the primary backbone circuits, about 38% of overhead distribution miles.
 - \$1+ billion to convert 100% of the rear property line circuits and rear property line services (about 28% of overhead distribution miles and includes cost estimate for service lines).



Summary

- Winter Storm Landon was the 4th largest event in MLGW history and the restoration timeline was similar to the Tom Lee event.
- Storms and outages will always be a part of our business.
- We realize that customers don't really want to have to think about their electrical service.
- Will improve restoration and communication processes based on our lessons learned.
- Will evaluate strategic underground conversions of parts of the distribution system.
- Thanks to all the MLGW personnel and contractors who are the heroes.



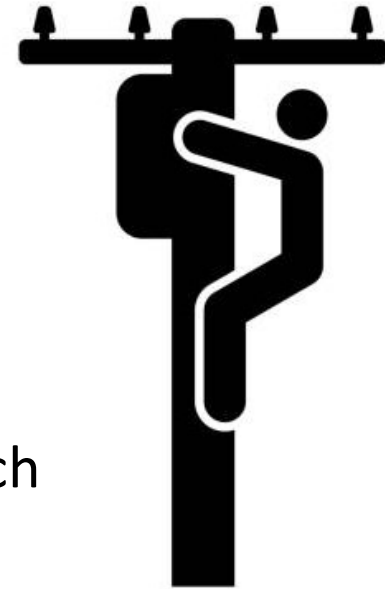
Questions



Appendix

Outline

- Historical Context
- Preparation Efforts
- Storm Damage and Outages
- Restoration Prioritization Process
- Restoration Timeline
- Resources Deployed
- Communications Efforts and Community Outreach
- Cost Projections
- Early Lessons Learned
- Next Steps



Overhead vs Underground (cont.)

- MLGW's practices of overhead vs. underground installation are similar to utilities across the nation. Electric utilities in North Carolina and Florida, which are highly susceptible to hurricanes and storms, have overhead electric distribution systems and have recently commissioned studies to investigate the feasibility of converting overhead systems to underground systems.
- After numerous hurricanes in 2008, many utilities began to study the costs and benefits of putting significant portions of their distribution system underground.
- Converting overhead electric distribution systems to underground is expensive—the cost runs about \$1.3 million per mile (2022 dollars) and generally is not cost-effective, says a report by utilities in Florida. **The report*, which reviews a large number of studies on the topic in the United States and around the world, concludes that the costs of undergrounding "are far in excess of the quantifiable benefits,"** except in rare cases.

* *Undergrounding Assessment Phase 1 Final Report for Florida Electric Utilities, InfraSource Technology, p2*

Overhead vs Underground (cont.)

- Putting electric wires underground, where they are out of sight, can improve the visual appeal of a neighborhood, but it is also likely to **increase customers' electricity rates by 100%, the report says.**
- **Other disadvantages exist besides its higher cost, the report found.** Those include:
 - possible negative effects on the environment;
 - higher costs to local businesses;
 - lower life expectancy of underground equipment;
 - reduced operational flexibility; and
 - higher costs for some types of maintenance.
 - **"It is a common perception that underground systems are more reliable than overhead systems,"** but this perception is oversimplified, the report said. "When underground systems are installed in conduit, manholes and vaults, the underground electric lines are vulnerable to damage from backhoes, excavators, post-hole diggers, shovels and pickaxes, and uprooted trees the report said.
 - **When a fault occurs on an underground system, it typically takes at least twice as long to locate and repair, compared to a fault on an overhead system, the report said.**

** Undergrounding Assessment Phase 1 Final Report for Florida Electric Utilities, InfraSource Technology*

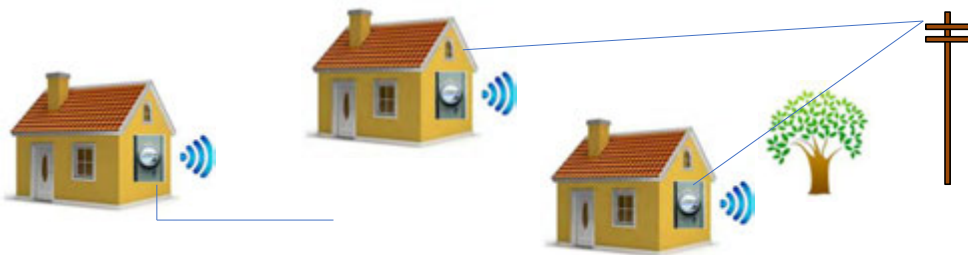
MLGW SMART METER

Power Status Check

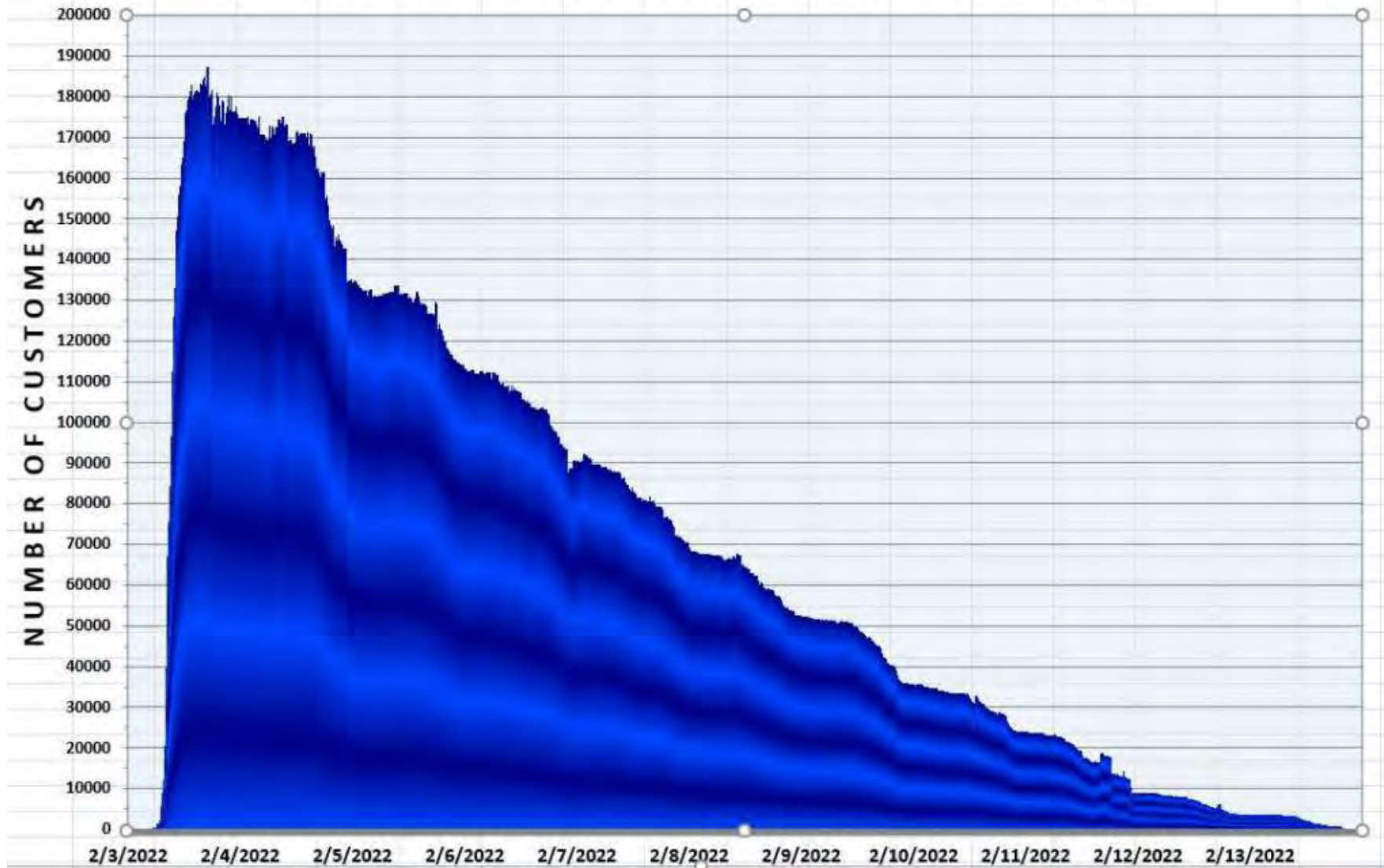
The Smart Meter system has two-way communication that transmits commands across the network and return confirmation that the commands have been performed. MLGW is able to remotely disconnect or reconnect electric accounts, perform on-request reads, download new firmware, diagnose smart service elements for possible tampering and perform power status checks.

A Power Status Check (PSC) is the ability to communicate to a smart meter to see if it has power.

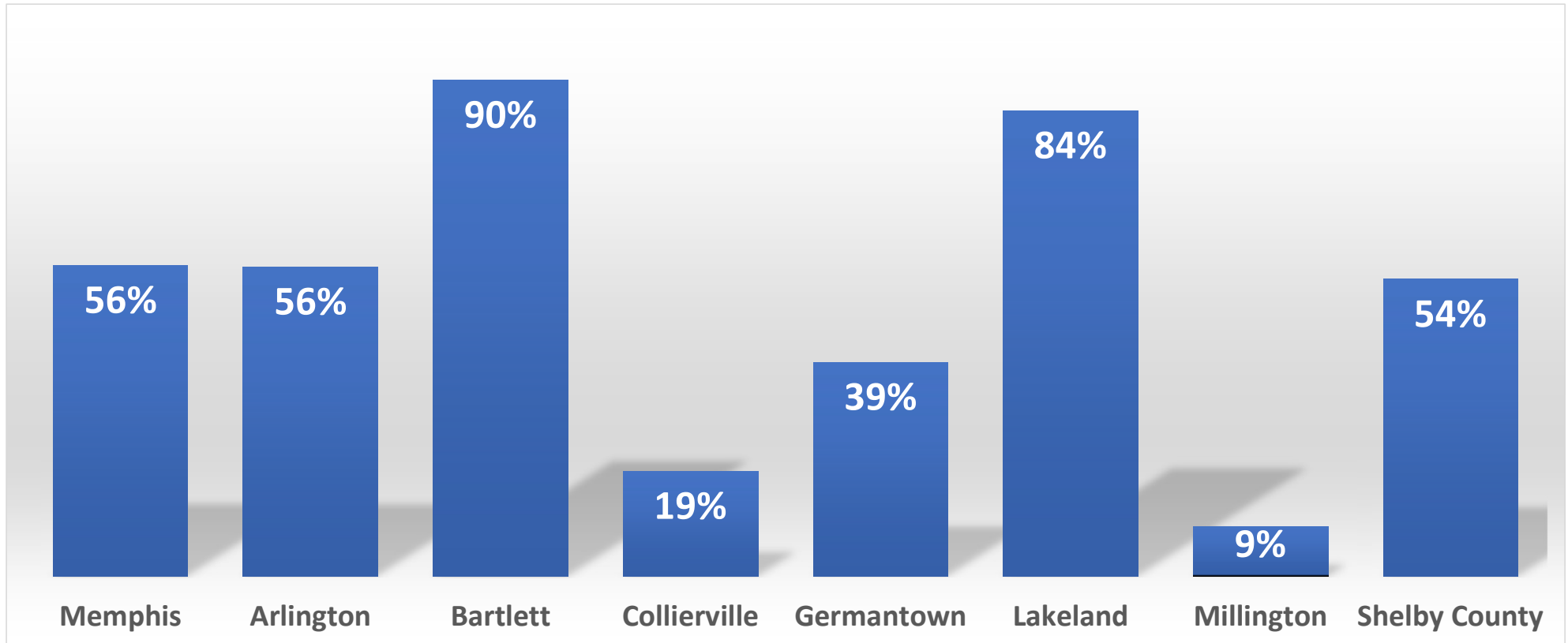
The remote power status check of the meters is automated through our Outage Management Systems to verify power is restored to individual homes as needed. The Meter Data Management team can also verify power to customers when researching customer outages.



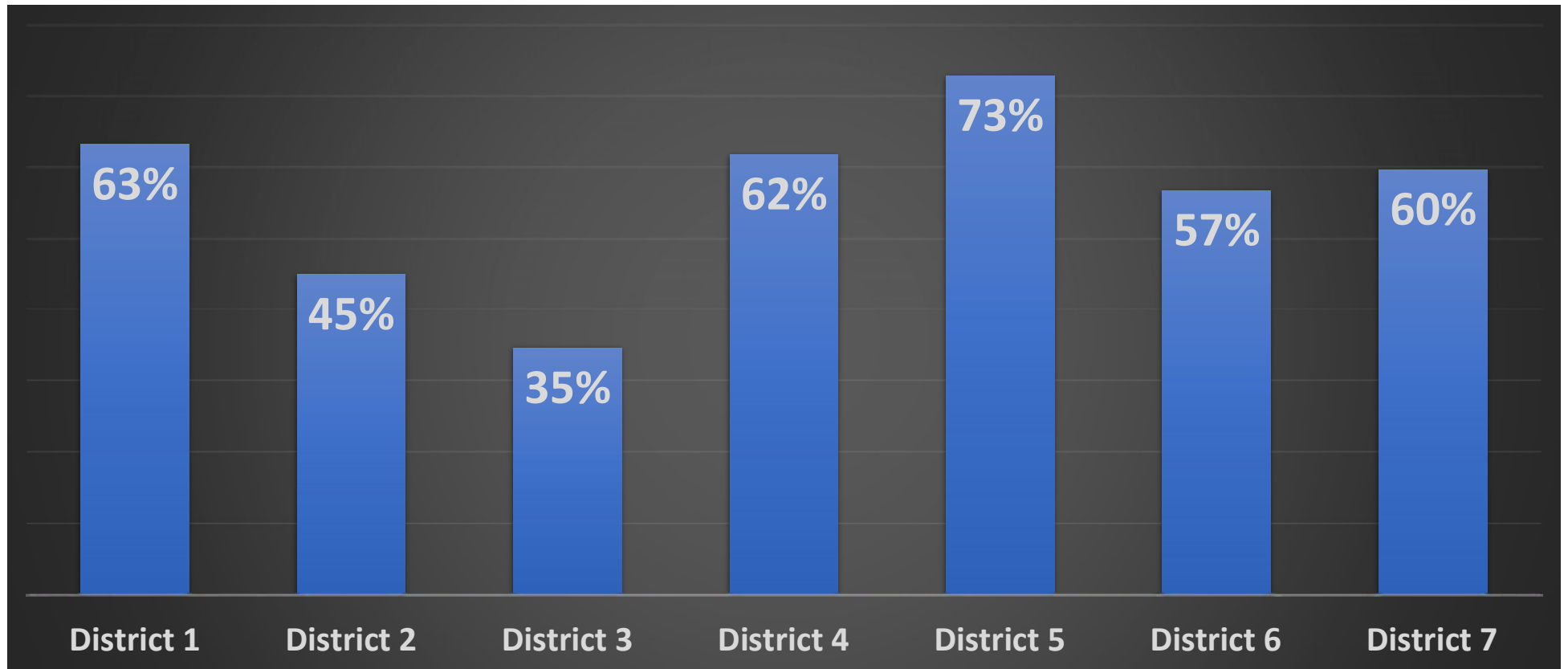
February 3, 2022 - Restoration - Winter Storm Landon

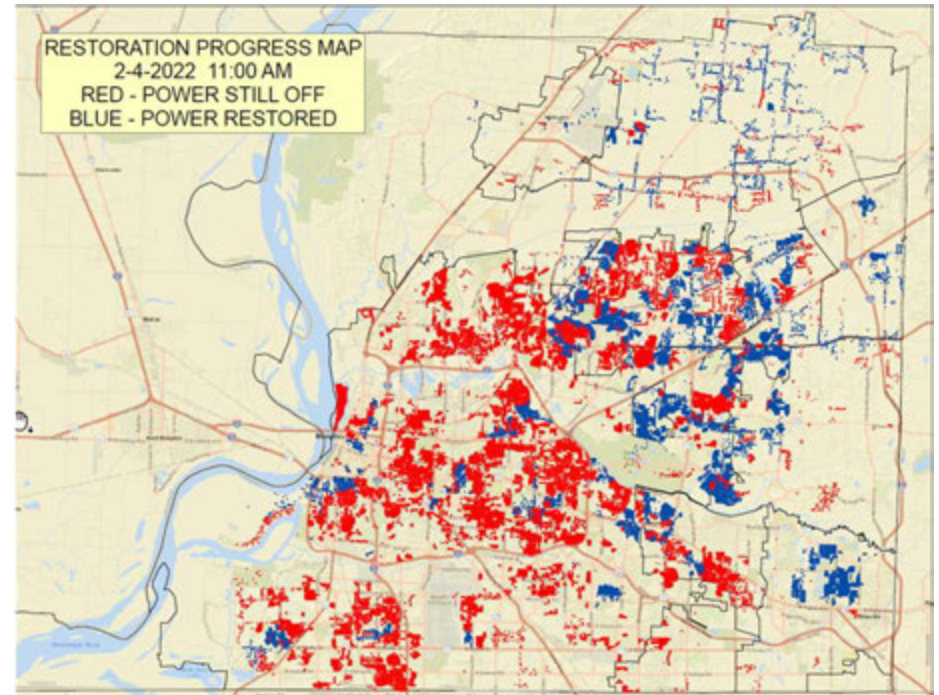
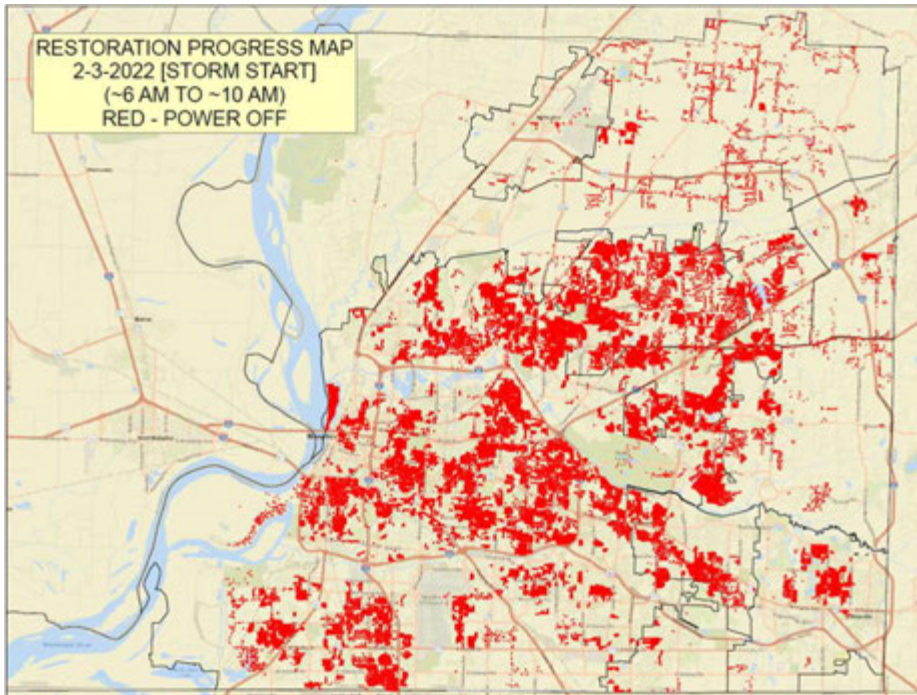


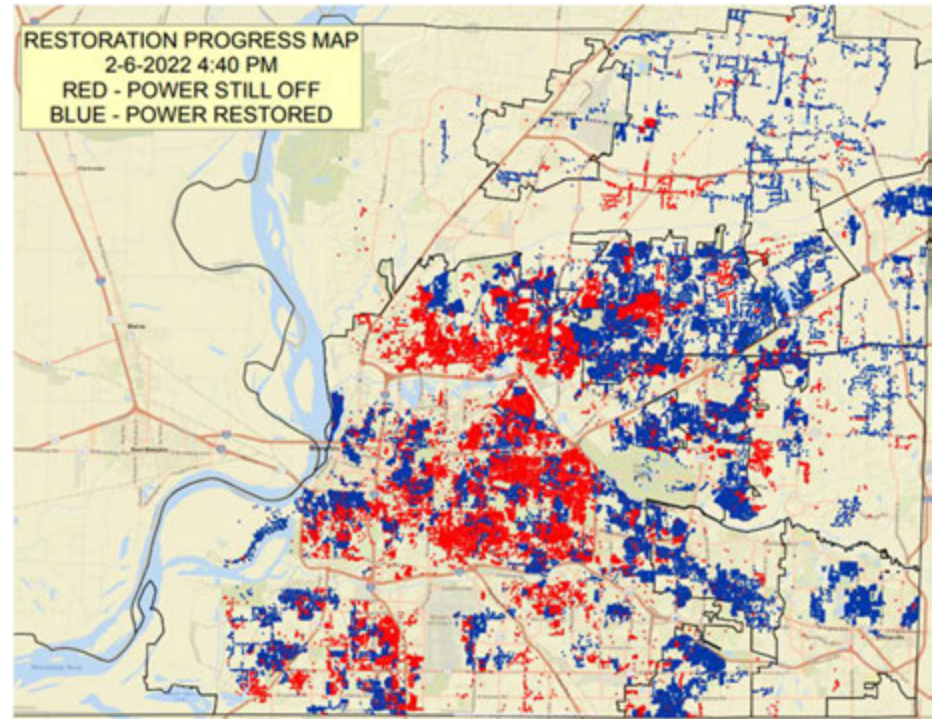
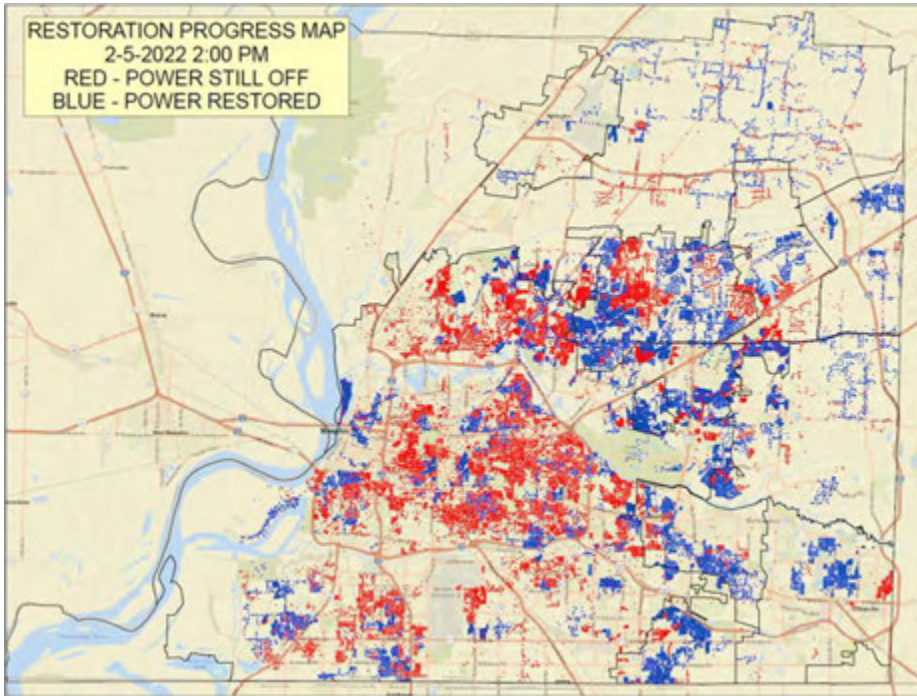
Percentage of Customers Affected by Municipality

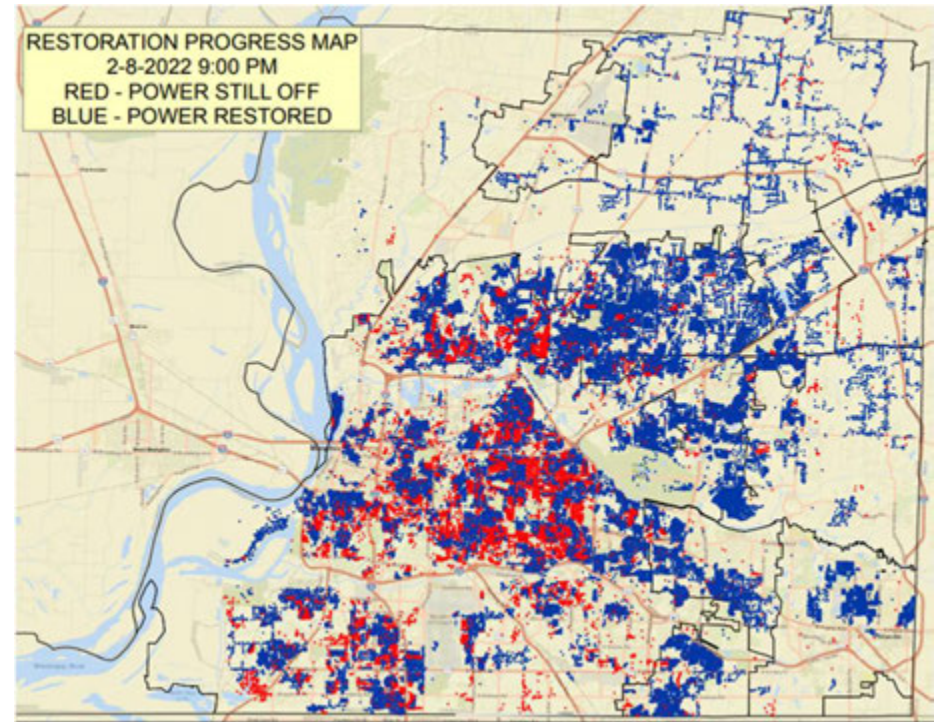
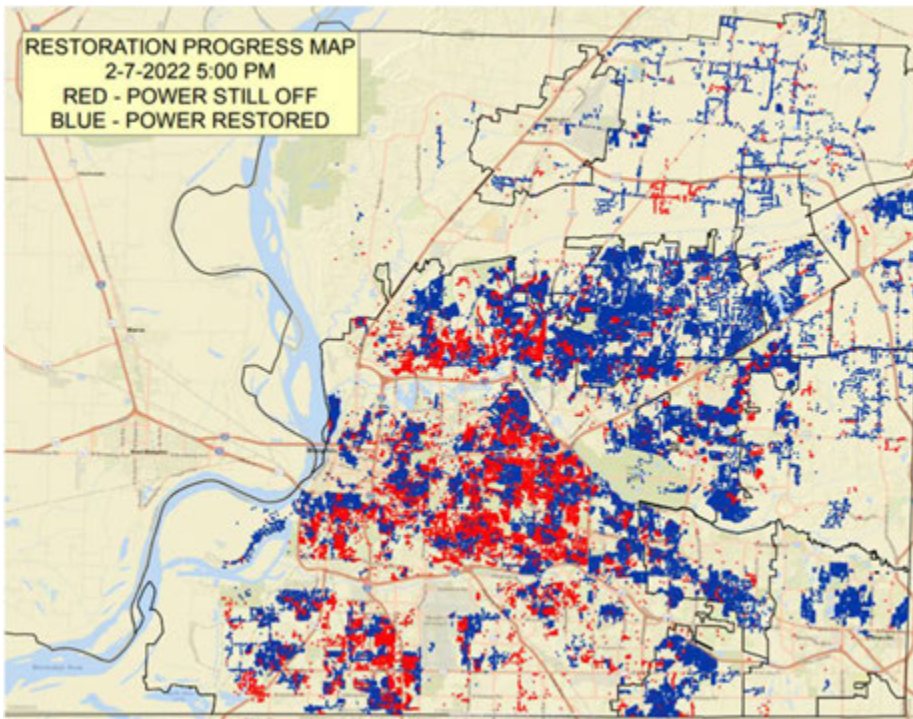


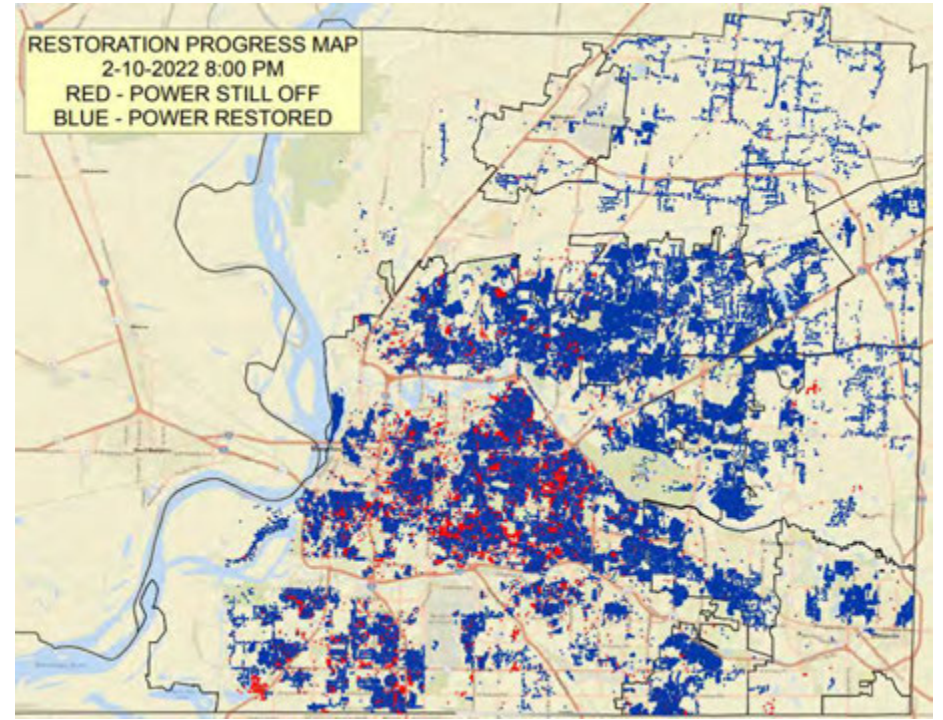
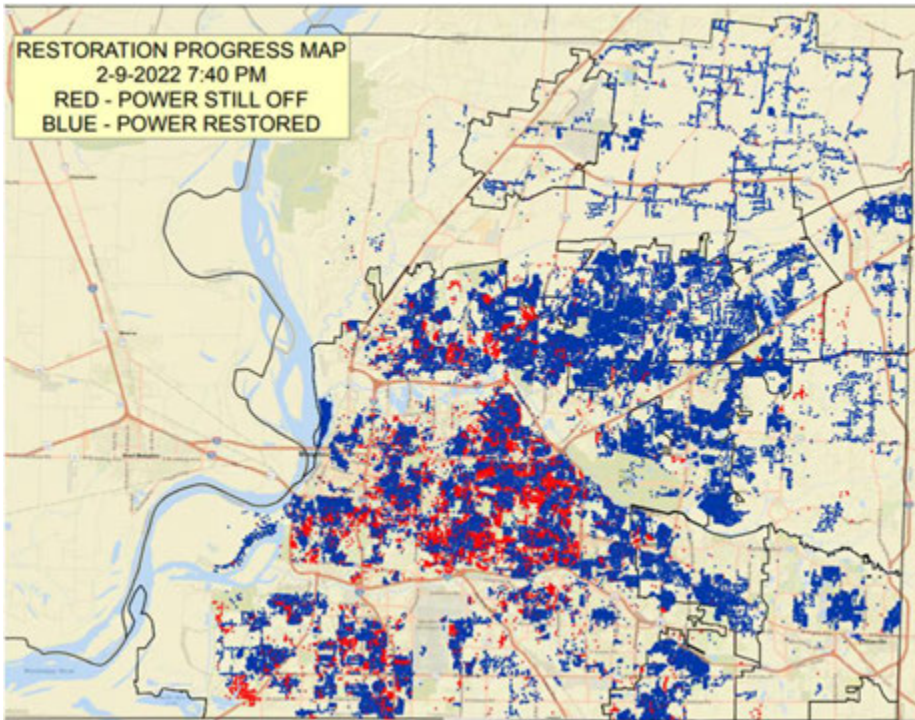
Customers Affected by Council District

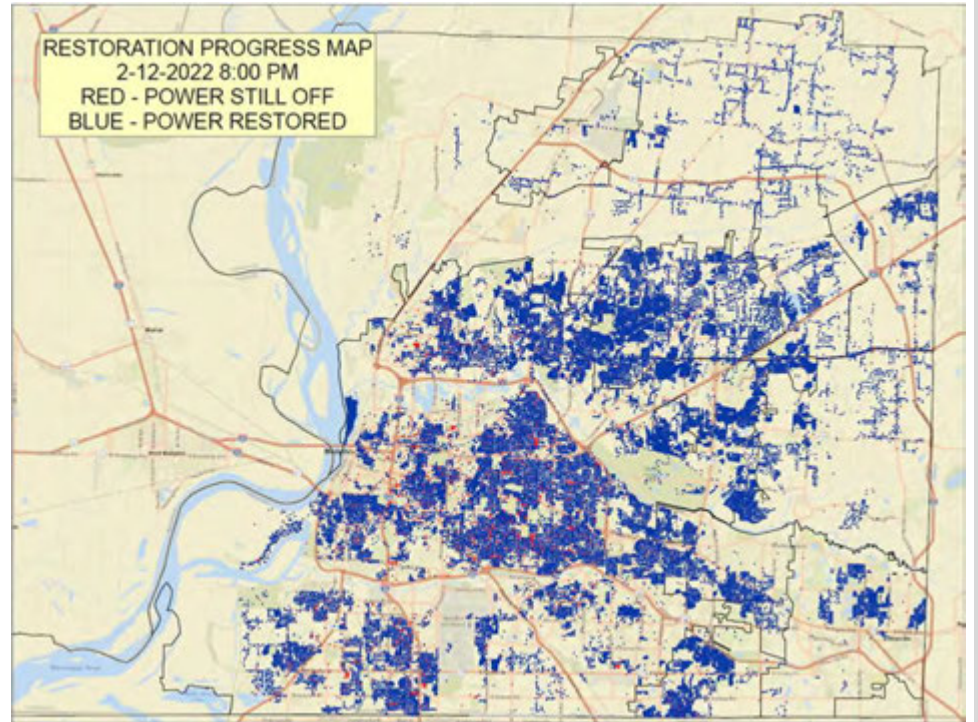
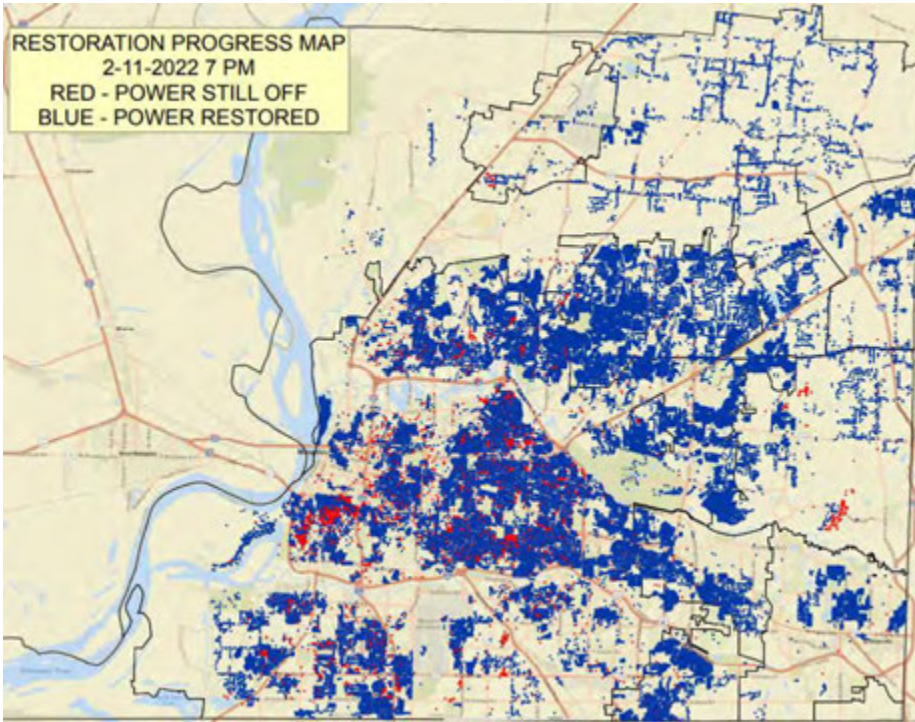












Effectively Executing Plans and Projects

MLGW Committee Update
February 15, 2022





Key Focus Areas

- 1.) Effectively executing plans and projects**
 - *Timing; budget; proactive engagement; power supply*
- 2.) Preparing and equipping our workforce**
 - *Safety; training and development; succession planning; employee feedback*
- 3.) Reshaping the customer experience**
 - *Reliability; billing; contact; energy burden; renewables/EV's; customer feedback*
- 4.) Building on technology integration**
 - *Leveraging and expanding technology solutions; operational efficiencies*
- 5.) Elevating our image and public perception**
 - *Community and economic impacts; soliciting public feedback; leveraging metrics*
- 6.) Promoting good governance and compliance**
 - *Internal approvals; seeking appropriate legislation; contract approval management*





Continuation of 5-Year Service Improvement Plan

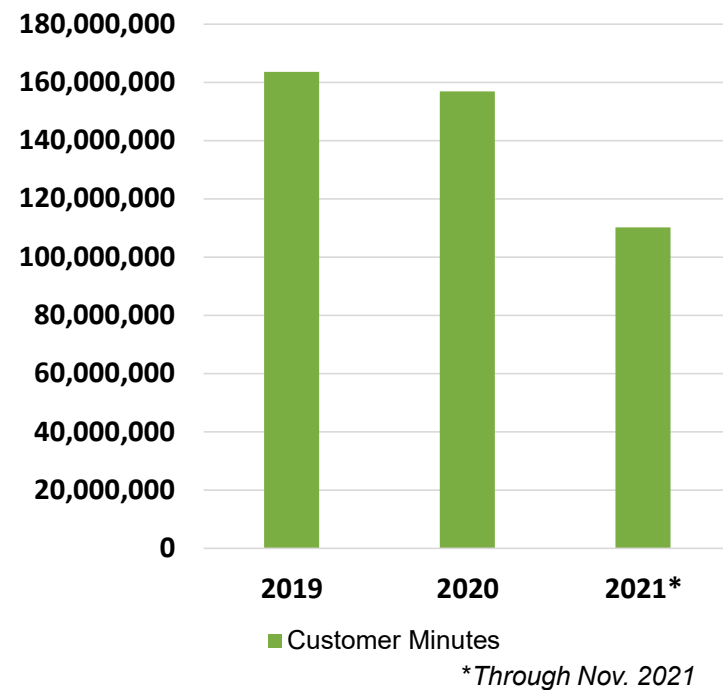
Reliability: Five-Year Improvement Plan

Areas of Focus

- Replacement of Defective UG Cable
- Wood Pole Management
- Tree Trimming
- Aging Substation Equipment
- Automation of Distribution System
- Hardening of OH Electric System



Customer Minutes Interrupted



Planned Electric Infrastructure Investment

Asset Affiliation	Description	Consequence	5 Year Spending Target	Spending through Dec-21	% Spend to Date	Remaining Expenditure
Asset life	Substation equipment needs to be maintained and components need to be replaced periodically to extend asset life.	Depending on the equipment that fails, a long duration outage could occur.	\$54.7 Million	\$23.5 Million	43%	\$31.2 Million
Vegetation management	Vegetation-caused outages.	Vegetation is the leading cause of MLGW outages. Need to reduce trim cycle.	\$98.5 Million	\$14.3 Million	14.5%	\$84.2 Million
Underground cable	1960-1980 vintage UG cable failures.	Cable segment failures lead to long duration outages.	\$54 Million	\$6.2 Million	11.5%	\$47.8 Million
Grid modernization	Technology needs to be upgraded	Delays in implementing can create an inability to implement upgrades in an optimal manner.	\$130 Million	\$11.1 Million*	8.5%	\$118.9 Million
Wood poles	Wood poles have been inspected and rated. Not all identified poles have been replaced.	To the extent that those identified have not been replaced, additional pole failures are likely to occur.	\$15 Million	\$6.1 Million	40.7%	\$8.9 Million

(Excerpts from HDR Engineering Study's Risk Register)

**Cust. Mins. Interrupted (CMI) ~25% below 2019 levels*

Planned Gas Infrastructure Investment

Asset Affiliation	Description	5 Year Spend Target	Spending through Dec-21	% Spend to Date	Remaining Expenditure
Regulatory, System Reliability & Integrity	Cast Iron Retrofit of Mains	\$7 Million	\$5.9 Million	84.2%	\$1.1 Million
Regulatory, System Reliability & Integrity	Steel Tap Replacements	\$17 Million	\$1.9 Million	11.4%	\$15.1 Million
System Reliability & Integrity	Gas Transmission & Extra High Pressure Pipelines	\$21 Million	\$1.5 Million	7.1%	\$19.5 Million
System Reliability & Integrity	Regulator Stations	\$5.4 Million	\$0.38 Million	7.1%	\$5.02 Million

Planned Water Infrastructure Investment

Asset Affiliation	Description	5 Year Spend Target	Spending through Dec-21	% Spend to Date	Remaining Expenditure
System Reliability & Integrity	Production Wells	\$28.6 Million	\$3.9 Million	13.6%	\$24.7 Million
System Reliability & Integrity	Pumping Stations Rehabilitations	\$59.4 Million	\$0.62 Million	1.0%	\$58.78 Million
System Reliability & Integrity	Lead Service Line Replacements	\$12.5 Million	\$2.7 Million	21.6%	\$9.8 Million
System Reliability & Integrity	Digital Process Control Systems	\$4.8 Million	\$1.6 Million	33.3%	\$3.2 Million

Reliability: Contracts Executed

Contract #12163/Davis H. Elliot – Electric C & M/Overhead

- Contract Value: \$55.3 million
- Contract Term: 4/12/2021 -4/11/2026
- Replacement of Defective Wood Poles
- Automation of Distribution System
- Hardening of OH Electric System

Contract #12198/Standard Electric Co. – Electric C & M/Underground

- Contract Value: \$69.7 million
- Contract Term: 9/2/2021 - 9/1/2026
- Replacement of Defective UG Cable



Reliability: Contracts Executed

Contract #12077/Asplundh Tree Expert – Line Clearance

- Contract Value: \$97.4 million
- Contract Term: 10/7/2019 - 10/6/2024
- Electric Distribution Line Clearance

Contract #12151/ABC Professional Tree Services – Line Clearance

- Contract Value: \$30.0 million
- Contract Term: 1/3/2021 - 1/2/2026
- Electric Distribution Line Clearance



Questions