

# WEATHERING CHANGE

*Forecasting for Resilience*



Georgia **System Operations**

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ANNUAL REPORT 2024





# Executive Message

These days, the key word for the electric utility industry is *change*. Georgia is now a two-season peaking state, which has necessitated shorter-term operational planning and coordination requirements. New systems are being implemented to address these changes.

And then there's the weather. Over the past few years, we've battled more extreme weather, such as September's Hurricane Helene, which wreaked havoc across the state and throughout the Southeast. We must weather these changes and demands to the system in order to keep the lights on for our Members and their members.

Our System Operations team is focused on how to approach this new utility environment, studying and applying the latest technology to address changing energy resources and the aging grid. Regulatory requirements such as NERC's Bulk Electric System Audit, which we passed successfully in 2024, help us identify areas in which we can be even stronger. Our team is involved in industry committees and groups to stay educated and informed on new developments.

Another concern we're weathering is cybersecurity. GSOC has critical infrastructure that must be protected from cyber attacks, and we're working together every day to strengthen our cybersecurity protocols.

While we operate to supply energy at the moment it's needed, we're also working toward the future — from facing increasing winter season demands to managing an increasing array of energy sources. Along with Oglethorpe Power and Georgia Transmission, we were approved for the Grid Resilience and Innovation Partnership (GRIP) Grant from the U.S. Department of Energy. This grant will help us fund grid improvement projects for our future.

We're also preparing our changing workforce. Many are retiring and a new generation of employees is coming on board. One process we've introduced is a new System Operator Training Program, where newly hired employees are targeted and trained as system operators so they're equipped for a role in our control centers.

As we weather the changes ahead of us, we'll continue to meet our primary mission in support of our Members: to provide safe, reliable, independent electric system operations, delivering affordable power for more than four million Georgians — every day, every hour.



Gregory S. Ford  
President & CEO



# On the System

Our Members' system is now a two-season peaking system, with seasonal winter peaks continuing to eclipse the summer peaks. Though summer predominantly remains the season with the most cumulative energy delivered, meeting winter peak loads bring a completely different challenge from a system reliability perspective.

Unlike summer loads, which peak in the afternoon when the temperatures are highest, winter peaks most often occur in the early morning when the sun is still down and temperatures are lowest. During winter peaks, solar power is not typically generating yet in these critical early morning hours. Dispatchable power, such as natural gas and coal, has been crucial to meeting these early morning demands. In the past year, Oglethorpe Power Corporation (OPC) added 775 MW of dispatchable generation to the system, including natural gas combustion turbines and combined cycle units, and bolstered baseload with the addition of Vogtle Unit 4. While many traditional resources are being retired in the Southeast and across the nation, load continues to increase, and our system will continue to need reliable and dispatchable generation resources. Solar resources are being added to the system; however, these resources alone are unable to reliably provide the necessary power to meet system demand during cold winter mornings.

GSOC is planning for the load growth on the system while remaining resilient for significant weather events. We are methodically

increasing the winter planning reserve margins from the current 13% to a target of 20% for the 2026–27 winter season. These changes will allow the system to reliably have enough generation on reserve for future winter storms that bring single-digit temperatures to the state. Beyond the 2026–27 winter season, GSOC is currently performing a study to provide longer-range planning reserve targets to help ensure system reliability in an ever-changing energy landscape.

We have also implemented shorter-term operational planning and coordination requirements. In the past, lack of visibility regarding shorter-term purchases led to uncertainty about total supply and reserve positions. This is not an enviable position to be in when we see big-impact events on the horizon. In 2024, Georgia System Operations instituted a lead time to plan for Member energy needs for as many as seven days. This new requirement will allow us to make better decisions for the operation of the system, have solid generation unit commitments, and ensure that we are meeting the operating reserve margins for optimum system reliability.

Beyond preparing ourselves for increasing Member loads and a changing generation portfolio, these new requirements will put GSOC in the best position to ensure long-term system reliability and to prepare to meet new resource adequacy standards currently in development with the North American Electric Reliability Corporation (NERC).



## Staying Balanced

Safety and reliability in delivering power to our Members is our core mission. GSOC operators do this through voltage and frequency control and balancing between load and generation in a real-time fashion. Committing generation units and adjusting power production output are critical components of maintaining balance, but in some cases, it isn't enough. In 2024, Georgia Transmission Corporation (GTC) added new technology to the system that helps support that balance — a piece of equipment called a static synchronous compensator, or STATCOM.

The system was installed in northeast Georgia to accommodate for variations in transmission line voltage. The STATCOM helps ensure stable system voltage in that it reduces excess voltage while also providing voltage support when system voltage drops. Traditional generation units can adjust for changes in voltage on the system, but because most units are further away from that section of the state, they are unable to compensate for voltage changes fast enough. Although more inverter-based resources (IBRs) such as solar have been installed on the system, these resources are located in our southern footprint and are unable to supply the voltage support needed in the northeast region of our state.

The STATCOM helps fill the reaction time gap, providing fast-acting reactive power to stabilize the line voltage and helping system operators keep the electric grid within proper operating parameters.



## Audits

Routine assessments, whether internal or external, are imperative to maintaining reliability and security of the system. In February, the Bulk Electric System (BES) audit was completed by the SERC Reliability Corporation, a nonprofit regulatory authority for administration of the bulk power system reliability in 16 Southeastern states. There were no findings or issues of noncompliance, no areas of concern, and in fact, SERC had positive observations for our emergency procedures and evacuation checklist practices, as well as the controls in place with our in-house training program.

Internally, Georgia System Operations conducted its own compliance assessment. This assessment was designed to simulate a SERC audit focused on reliability standards of personnel and training, data security, and communication among our control centers. It's a testimony to our commitment to always operate the system in a reliable and compliant manner.



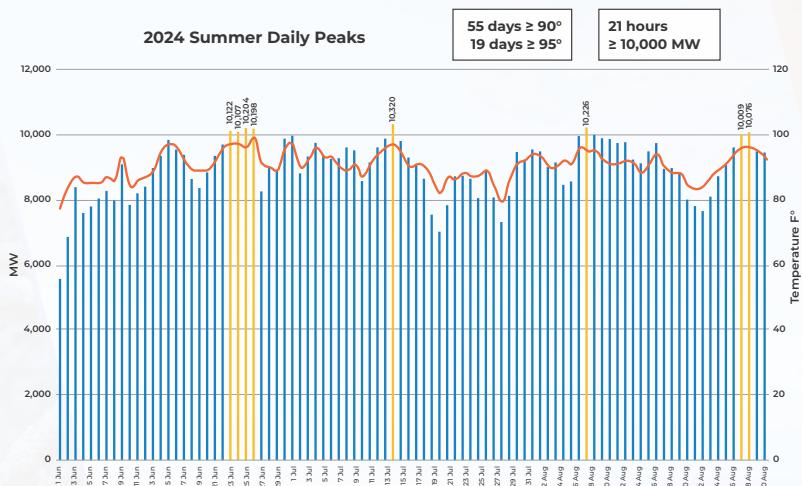
# Extreme Weather

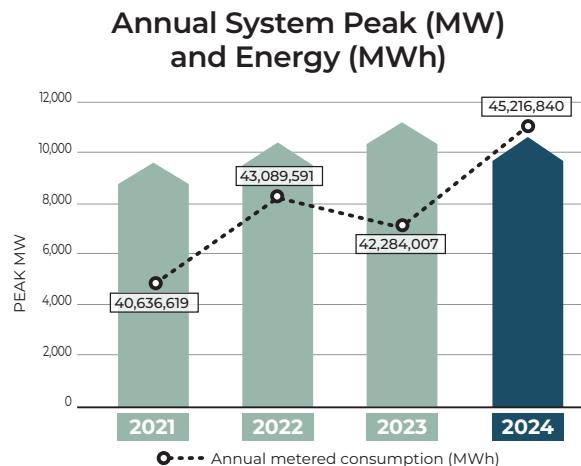
Weather in the past year has been some of the most impactful in Georgia's history. Planning and forecasting system load is based in part on historical average peak loads; however, several events in 2024 were anything but average.

In January 2024, Winter Storm Heather dropped temperatures to the teens across the state, which resulted in GSOC setting its annual system peak. Less than a week later, Winter Storm Indigo again brought low temperatures into the teens and lower 20s for three days. Though Indigo was not as cold as Heather, the energy delivered over the three-day cold period far surpassed the winter peak and energy delivered by Heather.

The cold weather drove five hourly loads greater than 10,000 MW during the 2024 winter, and 16 hours were greater than 9,000 MW.

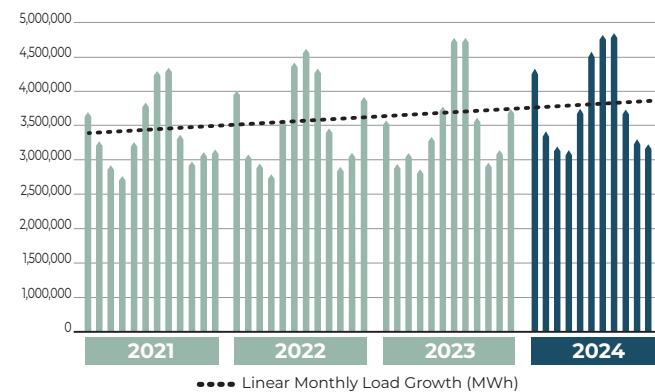
In comparison, in the summer of 2024, there were 21 loads greater than 10,000 MW, with a new record summer peak of 10,320 MW on July 14. During the summer, there were 241 loads greater than 9,000 MW on a system that crossed the 10,000 MW threshold only two years ago.





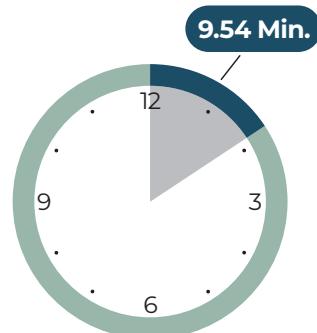
This bar graph reflects the annual system peak results during the past four years. Although the all-time record set in December 2022 still stands, 2024 broke the summer peak record with 10,320 MW on July 14. The accompanying line represents the annual metered consumption in MWh during the same four-year period (excluding Rocky Mountain Hydroelectric Facility pumping).

### Monthly Load Trends (MWh)



Monthly load trends for 2024 increased over 2023. The summer season saw record monthly loads — June (4,546,826 MWh), July (4,821,889 MWh), and August (4,848,289 MWh) — as well as in January 2024 (4,277,902 MWh).

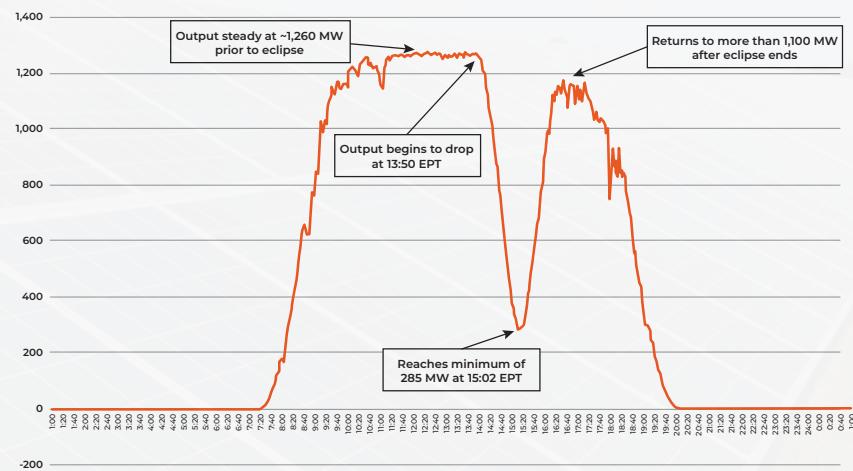
### SAIDI: System Average Interruption Duration Index



A part of our mission is to provide reliable power. In 2024, in partnership with GTC, we achieved an average power outage duration per delivery point of 9.54 minutes.

The system continues to grow. The portfolio of generation resources available to meet that load is diverse, and over the past several years, it has seen a rapid increase of solar resources, which creates some unique celestial challenges for GSOC system operators. This can be seen by calculating the amount of solar generation impacted by the eclipse of April 8, 2024. Solar capacity affected by the 2024 eclipse totaled about 1,260 MW. The moon obscured 80–85% of the sun, dropping output across solar installations by nearly 1,000 MW — nearly 80% of the total capacity. Seven years earlier, the 2017 eclipse was a near-total coverage of the sun — 90–100% across Georgia — but affected solar generation of only 80 MW in those early days of solar growth.

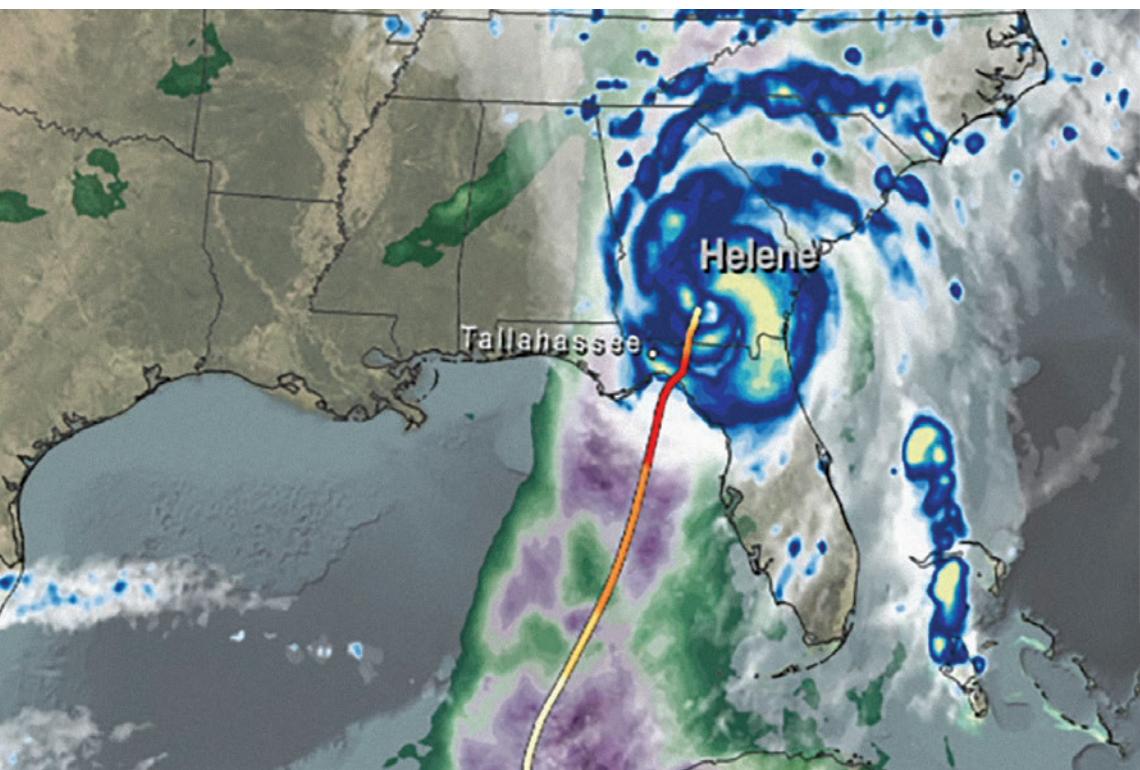
### Solar Output on April 8, 2024



# Hurricane Helene

At 10:10 p.m. on Sept. 26, Helene made landfall in the Big Bend of Florida as a 140 mph Category 4 hurricane. The intensity as the storm crossed from the Gulf to just southwest of Perry, Florida, made it the strongest hurricane on record to strike the region, and the deadliest to strike the mainland U.S. since Katrina in 2005. More than 30 of the 219 deaths were in Georgia. The storm cost nearly \$80 billion in damage, ranking it as the seventh costliest storm to hit the U.S., behind Ida, Sandy, Maria, Ian, Harvey, and Katrina.

Hurricane Helene was the most devastating storm to ever affect Georgia's Integrated Transmission System. Although the storm made landfall as a Category 4, it ripped across Georgia as a Category 2, extensively damaging the system and pulling the plug on more than a million EMC customers in Georgia.



In response, operators executed nearly 550 switching orders and fielded more than 6,500 phone calls during the event. With mutual aid and assistance across the Southeast, all transmission lines and GTC substations were energized within one week — a noteworthy and unprecedented accomplishment.

While the transmission system was fully operational by Oct. 4 — a week later — it would take weeks for affected Members to restore their distribution systems, as some ended with 100% of their infrastructure on the ground.



## On the Network

The integrated transmission system wasn't the only network severely impacted by Hurricane Helene; the statewide fiber network was also damaged. When the entire electrical transmission network was restored by Oct. 4, over 97% of fiber network was also restored.

While communication on the GTC/GSOC operational network remained resilient during and after the storm, it was the expected deenergizing of transmission substations that caused most of the operational communication outages.

An integral part of the disaster response planning partnership between the two companies involves weaving together alternative methods of communication and stopgap measures to restore Member communications. These redundancies include satellite and cellular communication uplinks. To provide connection to those hit harder by the tropical system, a cellular blimp was deployed to the Wrens area.

Beyond reacting and responding to disasters on the fiber network, significant effort and planning have been put toward fortifying the light-speed communication infrastructure across Georgia and increasing its resiliency and redundancy.

The Rocky Mountain Pumped Storage Hydroelectric Plant has now been added to the fiber network to provide a more reliable connection and increase the response time for dispatch to the grid.

With hundreds of miles of fiber already laid across Georgia, additional routes have been identified and secured to add redundancy should an issue arise along a primary route. GTC has acquired new fiber routes to the eastern part of the state to increase the resiliency of our network, but it will also serve to support EMC telecommunications and broadband internet for rural communities along this route.

One of the most significant 2024 accomplishments for the fiber network came from the hard work of a collaboration between our Legal & Compliance and Power Technology departments.

After extensive legal analysis and negotiations, a new agreement was reached with a major third-party internet service provider. This contract benefits cooperatives supplying fiber to GTC substations and partnering with the third-party provider for broadband internet services. The new agreement allows us to leverage connectivity that is managed by the third party and, in turn, our Members receive credits from GSOC.

The changing types of circuits available in recent years have led GSOC to be especially vigilant in managing our connectivity portfolio. Shifts in technology, end-of-life circuits, and the rapid growth of broadband services have also contributed to the changing landscape. With this new contract, we are making positive steps toward maintaining a diverse portfolio that mitigates some of the risk associated with third-party connectivity. Additionally, it enables us to further expand and diversify our connectivity portfolio, supporting our goal of ensuring reliable and resilient grid connectivity.



# Cybersecurity

Maintaining and operating a statewide fiber network is an immense task in and of itself, but in the 21st century, digital threats are imminent. As a response to the dynamic landscape of the digital world — and supporting a critical physical infrastructure — our Security Operations and Shared Services IT groups have increased cybersecurity protocols to align with the National Institutes of Standards and Technology (NIST) framework.

The NIST Cybersecurity Framework is designed by cybersecurity experts from industry, education, and government sectors. It is scalable to help companies reduce their cybersecurity risk and protect their networks and data. The framework is voluntary, providing an outline of best practices to help decide where to focus time and resources for cybersecurity protection.

Improvements made from this framework fortify security in our enterprise supply chain and educate and protect employees from phishing attacks. Our goal is to continue to improve security as threats evolve and keep the network secure to protect the system, our employees, and our Members.



# In the Company

Georgia System Operations is a services company. Secondary to operating the statewide grid for our Members, we provide IT, human resources and benefits, and communication services to OPC and GTC.

We continue to prepare and accommodate for changes in the business and digital landscapes, with the changing workforce being one of our foremost challenges. Longtime employees are retiring, taking institutional knowledge with them, while competition for well-qualified candidates remains fierce. In 2024, we brought on a significant number of new employees; we expect that to continue for the foreseeable future. We are keenly focused on finding and hiring qualified, talented employees and have updated our recruitment efforts to support that initiative. Our recruiters have invested in methods, resources, and materials to appeal to a wider talent base at career fairs, and our onboarding efforts have been tweaked to provide a better welcoming experience for employees.

In 2024, we kicked off a new System Operator Trainee Program designed to hire outside candidates and train them, so they're equipped for the system operator role. This includes taking the requisite NERC licensing exam.

## INFORMATION TECHNOLOGY INITIATIVES

The Shared Services IT group has been hard at work supporting and modernizing the technology at the three companies. Our IT employees successfully completed the migration of internal human resources and payroll systems under one program to modernize functionality and improve the user experience.

The IT group has also been working with and supporting GTC's expansion and move to a new headquarters building, providing a high-speed fiber connection to our data center and network resources. During the network infrastructure buildout of the new office space, we also migrated the GTC supply chain under a new software solution to better support their evolving business processes.

OPC has acquired several new generation units. To properly monitor, control, and dispatch these resources, they must be integrated into Georgia System Operations' energy management system. These new generation resources and their employees must also be integrated into the enterprise technology suite and network security protocols. For the corporate location in Tucker, Georgia, System Operations' IT professionals implemented new financial software to allow for better management of capital projects, budgeting, treasury, and long-range financial forecasting.



# Georgia System Operations



## For the Future

There is no shortage of change in the electric utility industry. To remain a trusted leader in the growth, development, and reliable operation of our Members' electric system and to provide independent electric system operations and Member-driven services, we must plan for the future.

With that goal in mind, GSOC has been using NERC's long-term reliability assessment (LTRA). Summer and winter peaks have been growing at a rate of 1.8% and 1.4%, respectively. This increase equates to an annual load increase of 150 to nearly 200 MW. Meeting those increasing load requirements becomes increasingly difficult with the retirement of dispatchable generation and the increase of non-dispatchable resources such as solar and nuclear.

The biggest factor in preparing for future load delivery and energy demand is extreme weather events. GSOC holds energy in reserve, ready to be dispatched on a daily basis. But as generation units are retired or slated for retirement, our planning reserve margins will drop to as low

as 13% by 2034 without solutions in place. In fact, retirement of current dispatchable generation resources is happening faster than the siting and permitting lead times for new resources. This could become a significant factor in long-term reliability.

To mitigate any potential issues with generation retirement and resource availability, OPC, GTC, and GSOC have collectively applied and been approved for a Grid Resilience and Innovation Partnership (GRIP) Grant from the U.S. Department of Energy. GSOC was awarded a portion of the total grant, co-funding \$35 million in advanced control systems. The grant will be used to offset the cost of evaluating the current state of our Members' electrical grid and implementing the systems we use to manage it. This will aid in the long-term reliability of the system, as well as provide investment into a working group to evaluate the implementation and benefits of distributed energy resources (DERS) and their management systems (DERMS).



## Board of Directors



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Chairman



Neal Shepard  
Vice Chairman



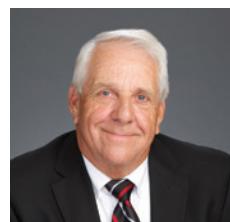
Harry Park  
Secretary-Treasurer



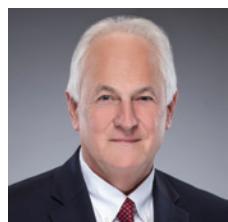
Jerry Boatright



Gary Branch



Donnie Cordell



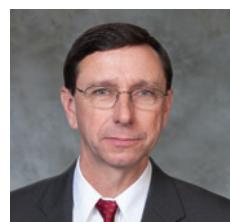
Michael Goodroe



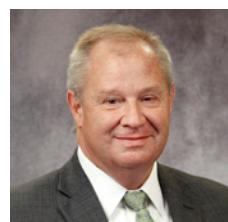
Chip Jakins



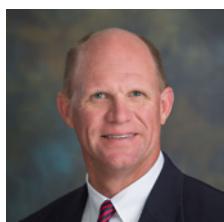
Wayne Livingston



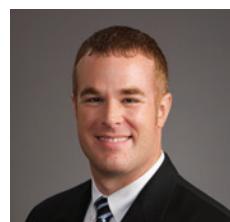
Mike McDonald



Lou Oberski



Greg Proctor



Lewis Sheffield



Greg Ford  
President & Chief  
Executive Officer



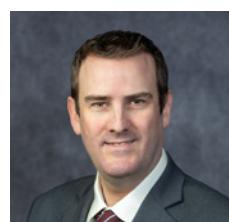
Nathan Brown  
Executive Vice President  
& Chief Operating Officer



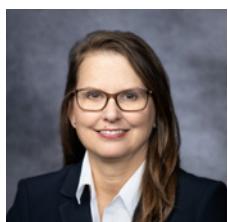
Jeff Thompson  
Vice President,  
Chief Legal &  
Compliance Officer



Dewane Daley  
Vice President,  
Corporate Planning &  
Member Support



Matt Hyatt  
Vice President,  
Power Technology



Susan Irwin  
Vice President, Shared  
Services Administration



Gary Jenkins  
Vice President,  
Engineering



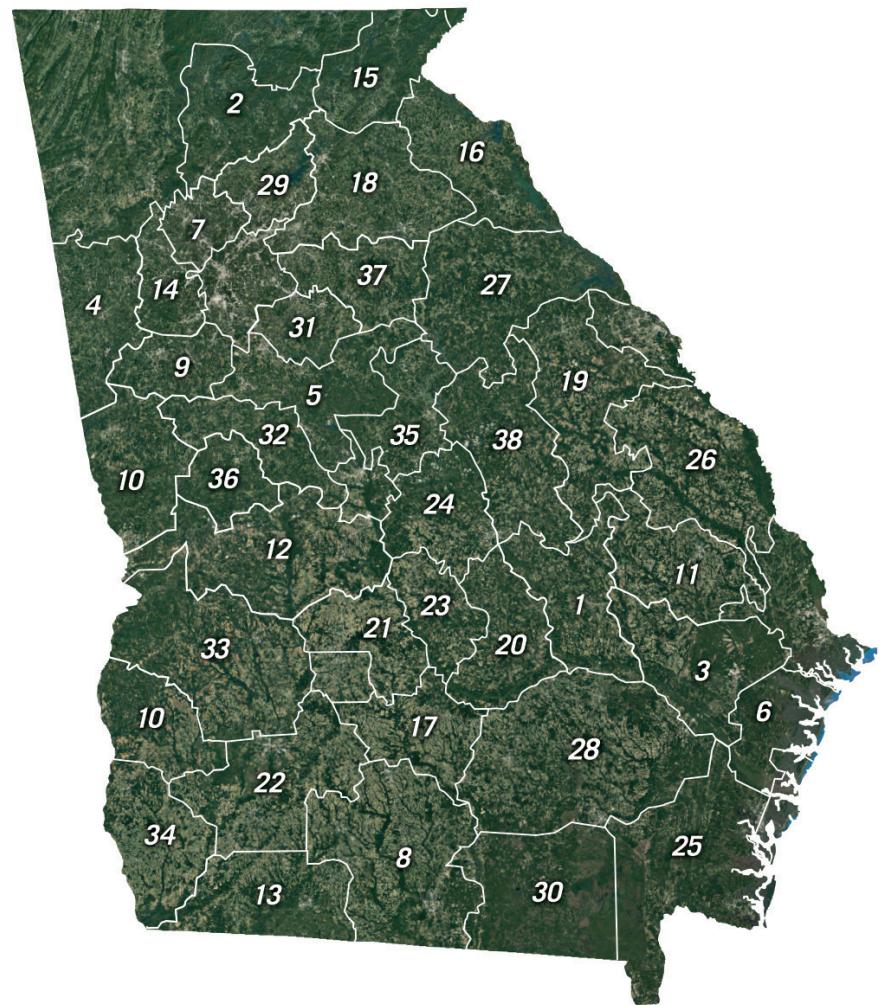
David Revill  
Vice President,  
Chief Information Officer



Paul Turner  
Vice President,  
System Operations

# Member Systems

Member System	Member System Representative	Manager
1. Altamaha EMC	Robert E. Youmans	George McLendon
2. Amicalola EMC	John H. Bennett Jr.	Todd Payne
3. Canoochee EMC	Lavanda Lynn	Michael Wasson
4. Carroll EMC	Alvin W. Ginn	Timothy C. Martin
5. Central Georgia EMC	D.A. Robinson III	George L. Weaver
6. Coastal EMC d/b/a Coastal Electric Cooperative	John B. Kearns	Christopher W. Fettes
7. Cobb EMC	David Tenant	Kevan Espy
8. Colquitt EMC	B. Don Copeland	Danny Nichols
9. Coweta-Fayette EMC	James W. Fulton III	Christopher L. Stephens
10. Diverse Power	Harrell L. Landreth	Wayne Livingston
11. Excelsior EMC	Amy Hendrix	Greg Proctor
12. Flint EMC d/b/a Flint Energies	Clarence J. Robinson Jr.	Jeremy Nelms
13. Grady EMC	Eric Cohen	John W. Long
14. GreyStone Power	Cherise A. Braxton	Gary A. Miller
15. Habersham EMC	Dan Thurmond	Bryan Ferguson
16. Hart EMC	Guerry Hall	Jeffrey W. Murphy
17. Irwin EMC	Phil Gilley	Randy Crenshaw
18. Jackson EMC	Shade Storey	Ernest A. Jakins III
19. Jefferson Energy Cooperative	Thomas Phelps	Wayne A. Gossage Jr.
20. Little Ocmulgee EMC	Jim Knight	Lewis Sheffield
21. Middle Georgia EMC	Wes Hopper	Randy Nichols
22. Mitchell EMC	W. Lucius Adkins Jr.	Tony F. Tucker
23. Ocmulgee EMC	Barry H. Martin	W.H. Peacock
24. Oconee EMC	Juanita Austin	Terri Howard
25. Okefenokee REMC	Terrell Brazell	John Middleton
26. Planters EMC	Stanton R. Hillis	Norman Williams
27. Rayle EMC	Jackie Copelan	Tony Griffin
28. Satilla REMC	Robert L. Lewis Jr.	Romeo A. Reyes
29. Sawnee EMC	Gary Porter	Michael A. Goodroe
30. Slash Pine EMC	Louis Cassotta	J. Timothy Register
31. Snapping Shoals EMC	Jake Carter	Shaun W. Mock
32. Southern Rivers Energy	Stephen Goodman	Michael J. McMillan
33. Sumter EMC	Cecil O. Myers	Rene Smith
34. Three Notch EMC	Steve Holt	Janet T. Grimsley
35. Tri-County EMC	George Comer	Ray Grinberg
36. Upson EMC	Ronnie Hendricks	Kenneth E. Simmons
37. Walton EMC	Dr. Michael Lowder	Ron Marshall
38. Washington EMC	Mike McDonald	Wendy H. Sellers







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