2023 GRID PERFORMANCE REPORT

SRP

Delivering water and power®


IBEW
L.U. 206

Table of Contents

SRP's fiscal year runs from May 1 through April 30.

MESSAGE FROM LEADERSHIP

A reliable power system doesn't just happen by accident. Delivering on our promise to provide the safe, reliable, affordable and sustainable electricity our customers count on takes a concerted effort — and proactive planning. Team members from across SRP work together behind the scenes every day to ensure that happens.

At SRP, we run a comprehensive asset management program so we can repair or replace aging equipment before it becomes a problem, such as our 15 kV breaker maintenance initiative. Whether our team members are deploying helicopters to inspect our transmission lines and towers, using drones to assess our hydroelectric dams, or employing state-of-the-art infrared technology to evaluate our distribution and transmission assets, we're continuously keeping an eye on our power system to ensure it is in top working order at all times.

SRP also proactively invests in the latest state-of-the-art equipment and technology to ensure we are prepared for system challenges that may arise.

For example, we employ devices on the power lines that can alert SRP if there is a problem on the circuit, which allows us to quickly isolate outages and minimize the number of customers impacted. We also continue to add to our fleet with the latest tools and machinery, such as our new Bronto truck, so we are able to respond safely at a moment's notice to issues in the power system and minimize any potential impacts on our customers.

The current supply chain has made that more challenging than normal, but it hasn't held us back. Our team members have kept our warehouses full of essentials, and we haven't skipped a beat.

It takes all of us working together as One SRP to ensure the power stays on when you need it. That commitment was on full display at Super Bowl LVII, where we provided power for the big game and its famed halftime show. Thanks to meticulous planning by dozens of SRP team members, it went off without a hitch. And if something had come up, we were ready to respond with crews standing by.

Whether we're providing power for a world-class sporting event, sensitive equipment at a large manufacturing company, a typical day at work or movie night at home, our promise is the same: We'll continue to serve our customers with safe, reliable, affordable and sustainable power now and in the years to come. Thanks to the expertise and proactive approach of our team members, you can count on it.

John Coggins
Associate General Manager
& Chief Power System Executive

ABOUT THE POWER DELIVERY SYSTEM

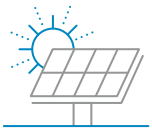
SRP provides power to more than 1.1 million customers in a 2,900-square-mile service area. There are more than 1,198,000 advanced meters serving SRP customers. Of these, approximately 813,970 second-generation advanced meters have been deployed. In addition, there are approximately 206,000 prepay meters that also have advanced features but without the enhanced capabilities of SRP's second-generation advanced meters.

1.1 MILLION+ CUSTOMERS

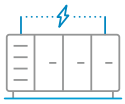
2,900-SQUARE-MILE SERVICE AREA

For more than 10 years, SRP has been steadily investing in utility-scale solar energy to meet the clean energy demands of our customers. SRP purchases solar energy from 10 utility-scale solar plants, including one with on-site storage, for a total capacity of 559 megawatts (MW). In addition, SRP utilizes 10 MW of solar-charged storage and 25 MW of grid-charged storage to allow energy to be used during times of highest demand.

559 MEGAWATTS CAPACITY



In total, 51,287 customer-owned Distributed Energy Resources (DERs) are interconnected with the SRP grid, including standalone solar generation, solar paired with battery storage, and standalone battery storage. Of those DERs, 50,468 are residential and 819 are commercial. These DERs provide a total generation capacity of 472 MW and a battery storage capacity of almost 16 MW.



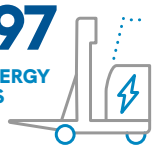
16 MW DER BATTERY STORAGE CAPACITY

Energy Efficiency (EE) programs saved SRP customers 616,847 megawatt-hours (MWh) of energy. The Residential and Commercial Demand Response (DR) portfolios have subscribed a combined 128 MW of cumulative dispatchable capacity, with the residential SRP Bring Your Own Thermostat Program™ (BYOT) having 76,143 smart thermostats enrolled and nearly 500 customer sites participating in the Business DR program at fiscal year-end.

616,847 MWH OF ENERGY SAVED FOR CUSTOMERS

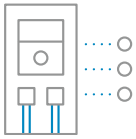
SRP's Electric Technology (E-Tech) program provides rebates to commercial and industrial customers who replace fossil fuel-powered equipment, such as forklifts and other systems, with cleaner, cheaper-to-operate and quieter electric equipment. The E-Tech program delivered 15,897 MWh of energy impact this past year. The Transportation Electrification program currently stands at 40,585 light-duty electric vehicles in operation within SRP's service territory. SRP offers a comprehensive portfolio of programs to help educate and offset the cost of chargers for our existing residential and business customers, as well as homebuilders. These efforts are intended to overcome some of the barriers to EV adoption and help transform this emerging market.

15,897 MWH OF ENERGY IMPACT THIS PAST YEAR



Distribution switches are used to facilitate switching customer load from one circuit to another and to interrupt flow in the event of an outage, construction or maintenance. There are 40,279 distribution switches on the distribution system, including 340 automated switches.

340
AUTOMATED SWITCHES



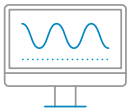
Most of SRP's distribution system is looped, meaning there is more than one path that electricity can travel to serve a customer, but only through one path at a time. SRP operates and maintains 21,736 circuit miles of lines that make up the SRP distribution system, which entails 1,428 distribution circuits.

21,736
CIRCUIT MILES

Service transformers step down the voltage from 12.47 kilovolts (kV) or 21.6 kV to deliver power to customers. There are 183,193 service transformer units making up 173,246 service transformer banks. A transformer bank is one or more transformers that operate together to service customers.

173,246
SERVICE TRANSFORMER BANKS

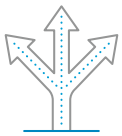
SRP has more than 250 power quality monitors installed throughout its electric system to help ensure that SRP is delivering quality power to its customers.



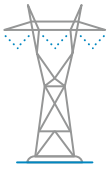
250+
POWER QUALITY MONITORS

SRP operates and maintains 286 substations, including 191 distribution substations that transform power to the 12 kV voltage level to serve neighborhoods and other customers.

286
SUBSTATIONS



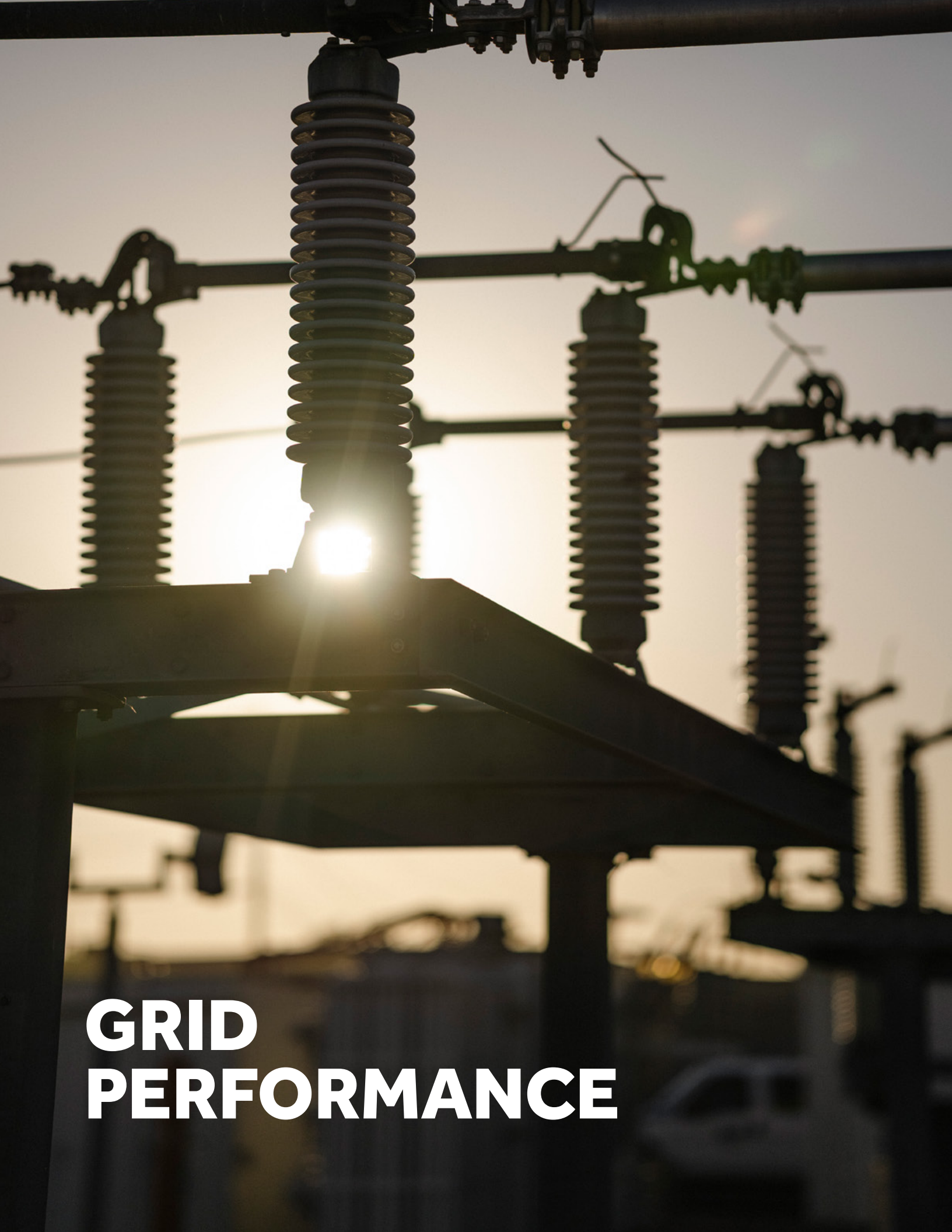
SRP operates and maintains 2,385 circuit miles of three-phase power lines at voltages of 69–500 kV. These power lines, combined with additional equipment such as circuit breakers and transformers, make up the SRP transmission system.



2,385 CIRCUIT MILES

Generating stations and substations contain power transformers that increase or decrease voltage. SRP maintains 585 active power transformers.

585
ACTIVE POWER TRANSFORMERS



GRID PERFORMANCE

Grid Performance Scorecard

Even as the country is seeing an upward trend in outages, SRP continues to maintain some of the highest levels of reliability in the industry. One of the reasons is SRP's attention to metrics — in particular, reliability and power quality performance. Comparing actual performance with goals helps determine whether the system is performing as expected. When goals are not met, performance challenges are researched and analyzed to determine the causes and to find solutions for improvement.

The Grid Performance Scorecard in Figure 1 shows that SRP has met three of six FY23 reliability and power quality goals.

FIGURE 1 | Grid Performance Scorecard

Key Indices

The FY23 Grid Performance Scorecard shows SRP's performance against the following reliability and power quality key indices:

- ***System Average Interruption Duration Index (SAIDI)**: This metric tracks the number of minutes customers are without power for a duration of more than five minutes, averaged over all SRP retail customers. This includes any loss of customer load, planned or unplanned.*
- ***System Average Interruption Frequency Index (SAIFI)**: This metric tracks the number of times customers are without power for a duration of more than five minutes, averaged over all SRP retail customers. This includes any loss of customer load, planned or unplanned.*
- ***Momentary Average Interruption Frequency Index (MAIFI)**: This metric tracks the number of times customers are without power for a duration of five minutes or less, averaged over all SRP retail customers. This includes any loss of customer load, planned or unplanned.*
- ***Sag Count Index (SCI)**: This metric tracks how often a voltage sag event is recorded.*
- ***Forced Outage Rate per Hundred Miles of Transmission per Year (FOHMY)**: This metric tracks the number of unplanned outages per 100 miles of transmission line.*
- ***Transmission Index (TRIND)**: This metric measures each outage based on the voltage level, the type of element lost, the duration of the outage and the cause of the outage.*

DISTRIBUTION RELIABILITY

SRP sets aggressive reliability goals and places a high level of importance on maintaining system reliability. The goals are based on a 10-year average of historical data, plus one standard deviation. If this calculation is lower than the previous goal by greater than 5%, the goal is adjusted downward. As of FY21, the goal will not be adjusted upward. This methodology for setting distribution reliability goals highlights SRP's commitment to operational excellence despite the expectation of future harsh weather conditions. SRP's distribution reliability metrics include all types of interruptions and are not adjusted for major events, weather or planned maintenance.

Customer Minutes of Interruption (SAIDI)

SAIDI is an industrywide metric that measures the number of minutes of customer interruption averaged over all customers. For FY23, SAIDI was 83.3 minutes, which surpassed the goal of 73.1 minutes or less. This means there were 83.3 minutes of customer interruption for the entire year when averaged over all customers.

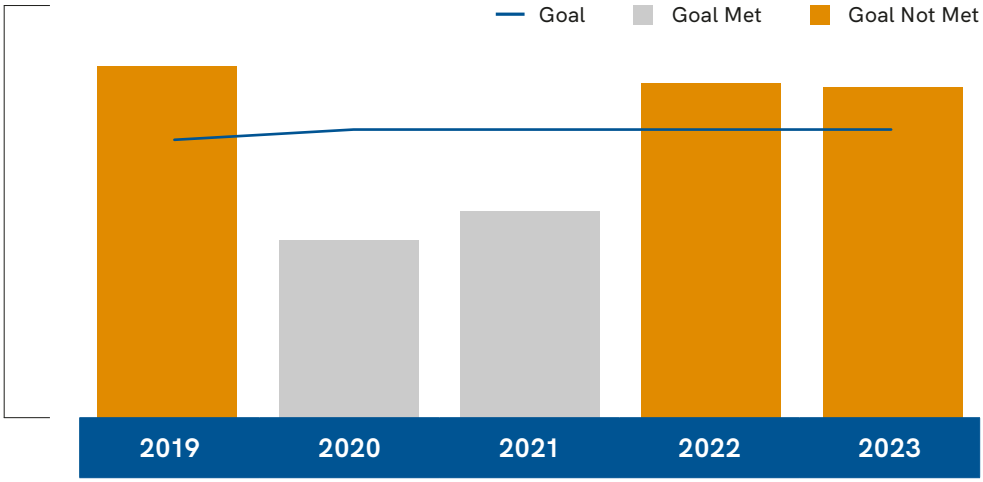
Considerable storm activity occurred in both the first and second quarters of the fiscal year. Every month that equaled or exceeded its SAIDI goal experienced one or more Major Event Days (MEDs). MEDs are days in which a reliability metric exceeds a certain threshold value and are meant to signify days where the system's operational and/or design limits are exceeded. The largest MED impact came on Oct. 3, contributing 11.5 customer minutes due to a storm event.

Figure 2 illustrates the five-year trend for SAIDI and the monthly performance for FY23. Storms were a significant contributor to annual SAIDI, especially in July and October. July 17 was the second-largest MED during which a storm downed 173 poles. This MED accounted for 11.3 minutes in just a single day. SRP exceeded its fiscal year SAIDI goal by 10.2 minutes.

FIGURE 2 | SAIDI | Duration: The Average Number of Minutes Customers Experienced a Sustained Interruption

YEAR

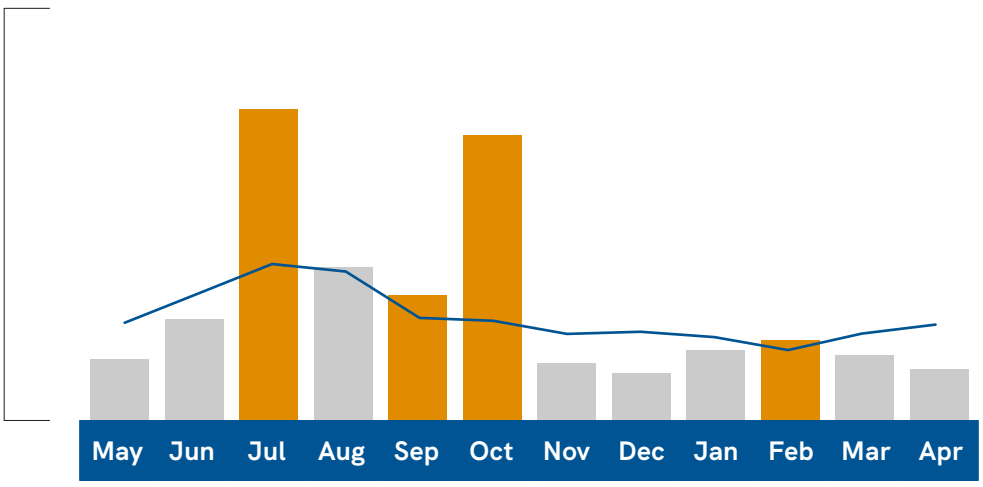
Results - 5 Year Trend (Minutes)



	2019	2020	2021	2022	2023
Actual Result	88.4	44.7	52.0	84.3	83.3
Goal	68.2	73.1	73.1	73.1	73.1
Variance	20.2	-28.4	-21.1	11.2	10.2

MONTH

Results - FY23 (Minutes)

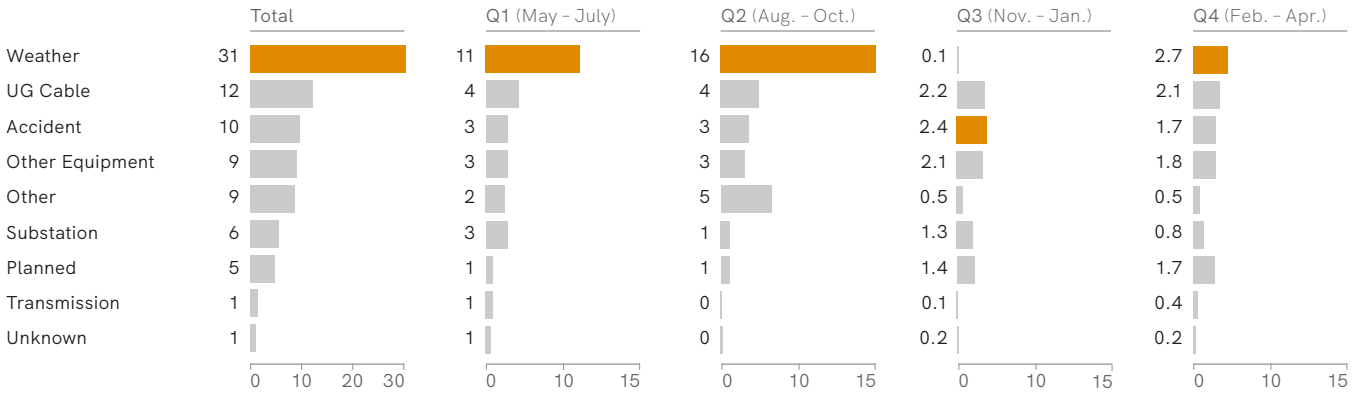


	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
Actual Result	3.6	6.0	18.5	9.1	7.4	17.0	3.4	2.8	4.1	4.7	3.9	3.0
Goal	5.7	7.6	9.6	9.1	6.0	5.8	5.0	5.1	4.8	3.9	5.0	5.6
Variance	-2.1	-1.6	8.9	0.0	1.4	11.2	-1.6	-2.3	-0.7	0.8	-1.1	-2.6

Figure 3 shows the primary drivers of customer outage minutes, with the biggest driver for each fiscal year quarter and fiscal year total highlighted in orange. Weather was the major driver of SAIDI for FY23, accounting for more than double any other category. Weather was the leading cause of all of SRP's seven MEDs. The total impact of all weather-related events equaled 31 minutes, or 37% of overall SAIDI. Underground (UG) cable failure was the second-leading driver of total SAIDI for FY23, contributing 12 minutes. Accidents contributed 10 minutes to the FY23 SAIDI value of 83.3 minutes. The Other Equipment and Other categories each contributed nine minutes. The top two contributors to the Other Equipment category of SAIDI are underground disconnects and switches, and overhead conductors. The top two contributors to the Other category of SAIDI are overhead conductors affected by trees and objects on overhead conductors.

FIGURE 3 | SAIDI | Cause Code Contribution to SAIDI — FY23

Number of Minutes per Customer



Cause Codes

Distribution electric service reliability directly influences the customer experience. SRP investigates outages to determine what caused them and categorizes these causes as follows:

- ***UG Cable**: Underground distribution line failures.*
- ***Other Equipment**: Distribution equipment failures excluding UG Cable, Substation or Transmission.*
- ***Weather**: Primarily storm activity such as high winds, rain and lightning.*
- ***Accidents**: Damaged equipment due to automobile accidents.*
- ***Substation**: Equipment failures inside a substation such as a transformer failure.*
- ***Planned**: System maintenance activities such as cable replacement projects.*
- ***Other**: Combination of all other less impactful causes.*
- ***Transmission**: Transmission line failures.*
- ***Unknown**: No known cause found. The condition was temporary and can no longer be observed.*

Figure 4 shows how UG cable failure (in orange) has contributed to annual SAIDI values over the past 10 years. Over that period, 12%-28% of SAIDI values were due to underground cable failures. The FY23 contribution to SAIDI was 12.3 minutes (14.7%), down from last year's contribution to SAIDI of 13.3 minutes (15.7%).

Figure 5 shows how changes in weather (in blue) have affected annual SAIDI values over the past 10 years. Weather outages primarily stem from storm activity, such as high winds, rain and lightning.

An increase in weather contribution to SAIDI can be seen — 28.6 minutes in FY22 compared to 30.5 minutes in FY23 — as the overall SAIDI value decreases slightly. This shows that while weather has been having a large negative effect on SRP's reliability, the combination of all other causes outside of weather saw an improvement from the previous year.

FIGURE 4

Underground Cable Failure Contribution to SAIDI

Minutes of Outage per Customer

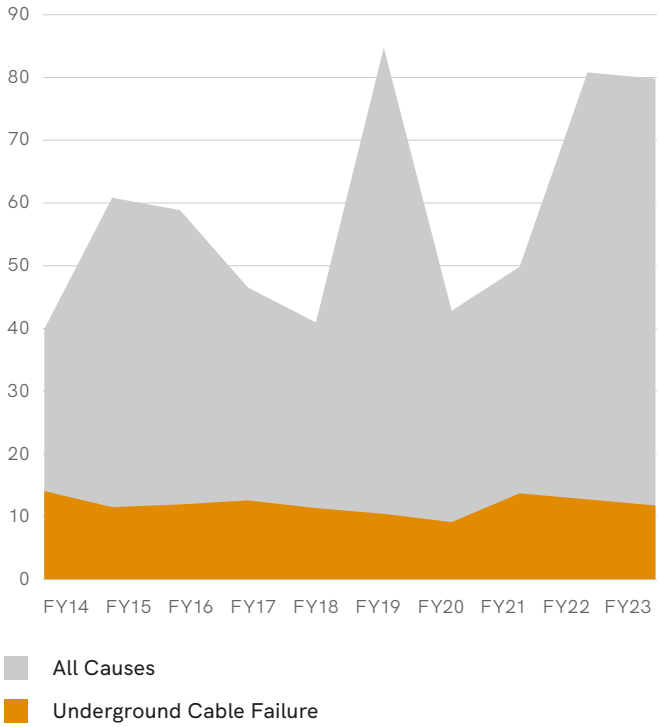
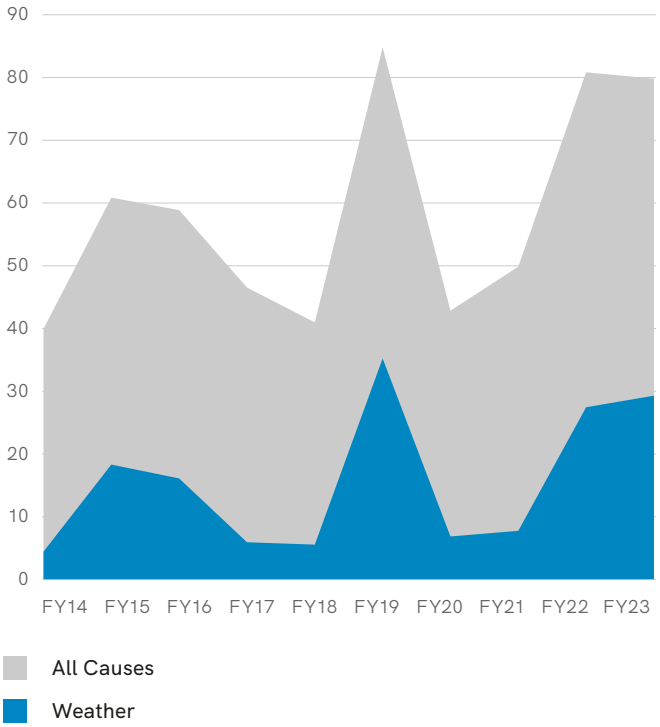


FIGURE 5

Weather Contribution to SAIDI

Minutes of Outage per Customer



Distribution Reliability Performance Relative to Peers

The U.S. Energy Information Administration (EIA), a governmental entity under the U.S. Department of Energy, gathers data from utilities across the country, which are required to file EIA 861 or 861S forms. SRP is using the available EIA distribution reliability data to measure its performance against that of its peers.

For the SRP corporate metric SAIDI, SRP ranked ninth in 2022 among all electric utilities with over 500,000 customers. Figure 6 depicts SRP's ranking for SAIDI performance against all other utilities. Each utility's region is coded by color, with 11, including SRP, located in the Southwest Region.

Figure 7 provides additional information on how SRP's SAIDI performance stacked up against other utilities. The SAIDI scores in the Southwest Region ranged from a low of 62 minutes to a high of 326 minutes. The SAIDI scores for all electric utilities with over 500,000 customers ranged from a low of 23 minutes to a high of 1,151 minutes. SRP's SAIDI score for the 2022 calendar year was 81 minutes, significantly below the median of 203 minutes.

FIGURE 6 | 2022 EIA SAIDI Benchmarking Results (released in 2023)

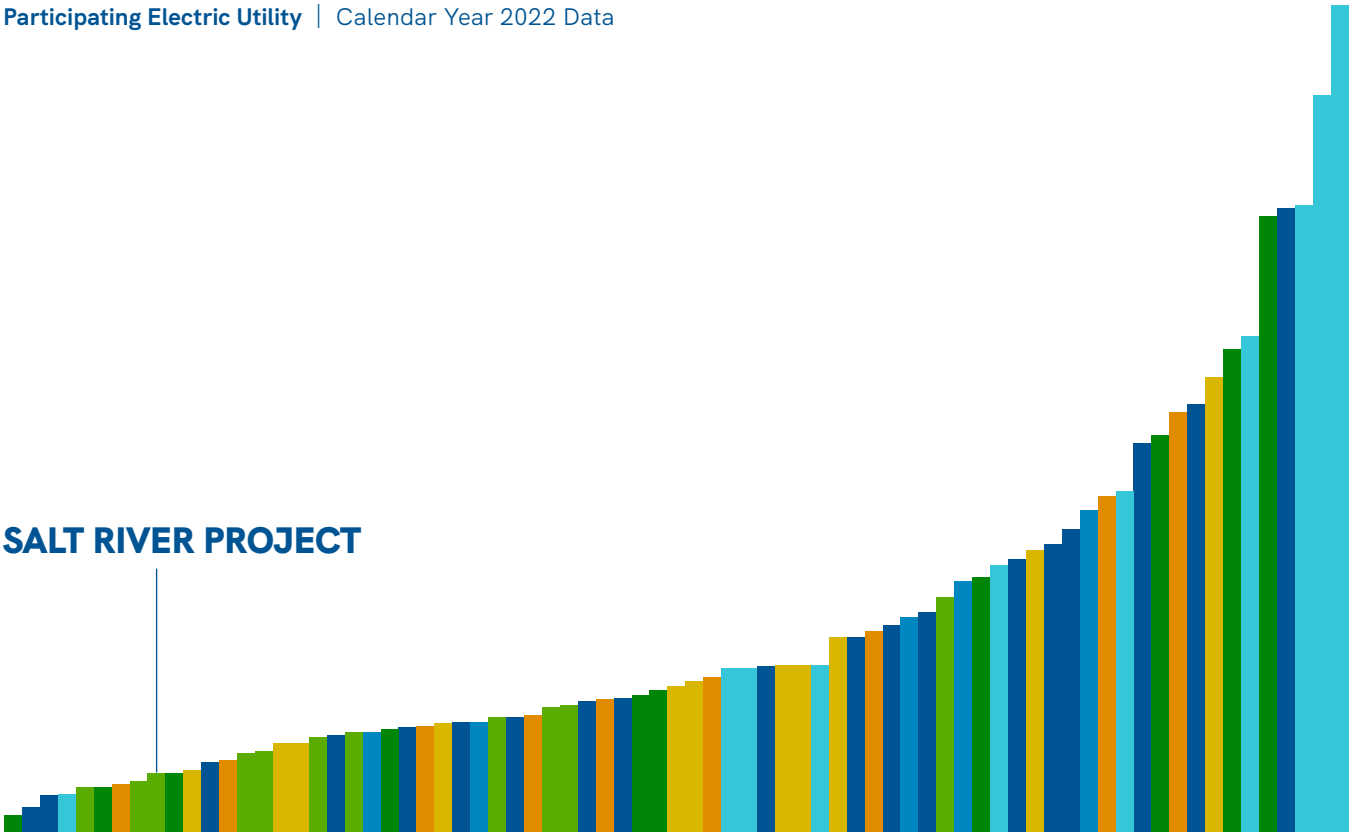
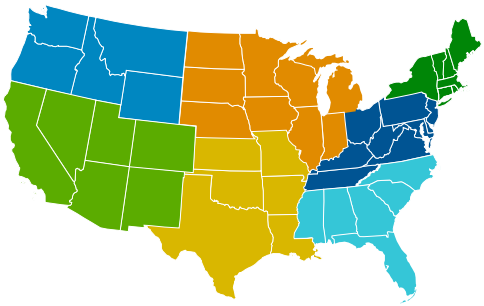


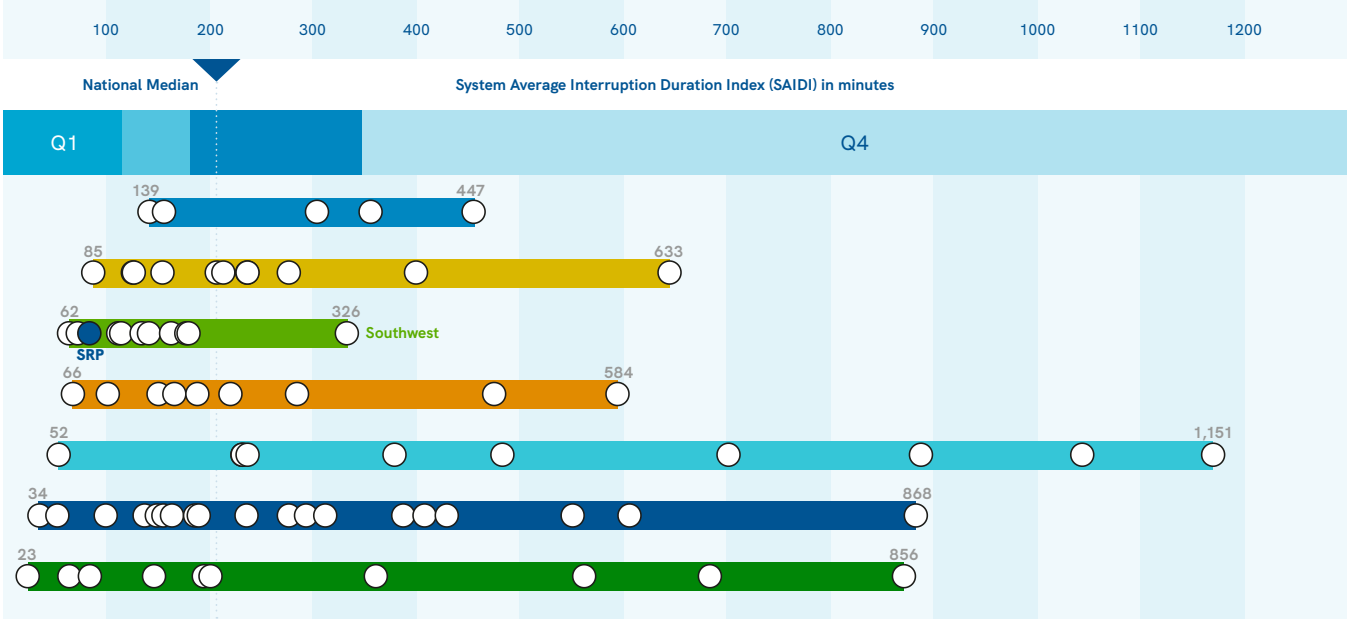
FIGURE 7 | 2022 EIA SAIDI Benchmarking Results (released in 2023)

Distribution reliability performance relative to peers

Based on data from calendar year 2022 for 75 large utilities that filed EIA 861 forms. Each bar represents the range of SAIDI scores for the region, and each circle represents the scores of individual utilities in the region.



Southwest
Northwest
South
Midwest
Southeast
Mid-Atlantic
Northeast



MEDIAN PERFORMERS

The median SAIDI for all large utilities was 203 minutes.

SRP 2022 RESULTS

81 minutes
#9 ranking overall
#3 ranking in southwest

Calendar Year 2022 Data

BEST PERFORMERS

All large utilities in quartile 1 (top 25% of scores) had SAIDI of 134 minutes or less.

SOUTHWEST REGION

62 | 131 minutes | 326
Median
SRP

WORST PERFORMERS

All large utilities in Quartile 4 (bottom 25% of scores) had SAIDI of 380 minutes or more.

LARGE UTILITIES

23 | 203 minutes | 1,151
Median
SRP

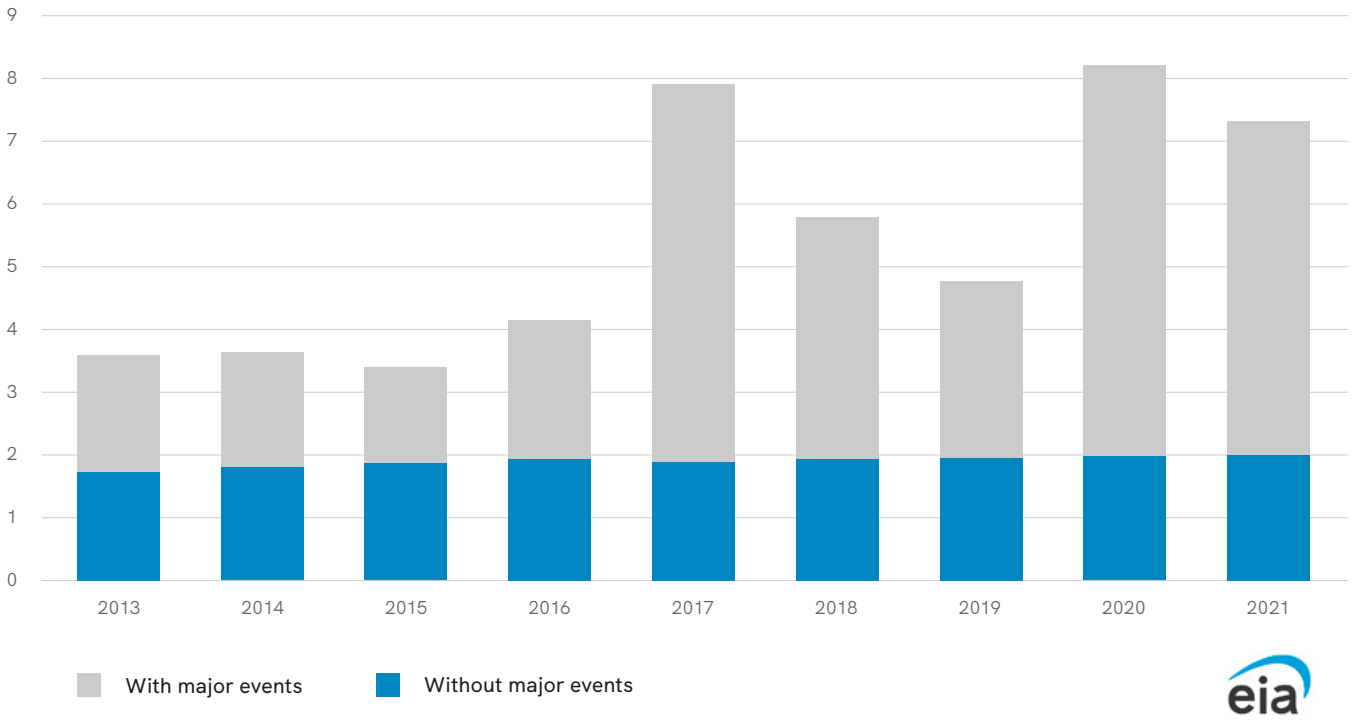
SRP is categorized as a large-sized utility (over 500K customers)

Industry Trending for SAIDI

Figure 8 shows that over the last nine years, ending in calendar year 2021, U.S. customers have been experiencing increasingly long durations of electric power interruptions each year. Major outage events can have many causes, including equipment failure or other non-weather occurrences. However, since at least 2013, the primary cause of the increase in outage duration in the industry is severe weather. This is consistent with the trend SRP is experiencing. In 2021, the latest year for which this data is available, U.S. electricity customers on average experienced just over seven hours of electric power interruptions. This compares with SRP customers' experience in 2021 of 85 minutes, or one hour and 25 minutes of interruption.

FIGURE 8 | U.S. Electricity Customers Power Interruptions in 2021

Average duration of total annual electric power interruptions, United States (2013-2021) hours per customer



Data source: U.S. Energy Information Administration (EIA), Annual Electric Power Industry Report

Customer Sustained Interruptions (SAIFI)

SAIFI, a corporate performance metric, is the frequency at which customers experience a sustained interruption averaged over all customers.

An interruption lasting more than five minutes is considered a sustained interruption. Many faults, however, are transient, caused by events like lightning strikes and arcing, and will disappear in less than a second. These transient faults are not a part of the SAIFI calculation.

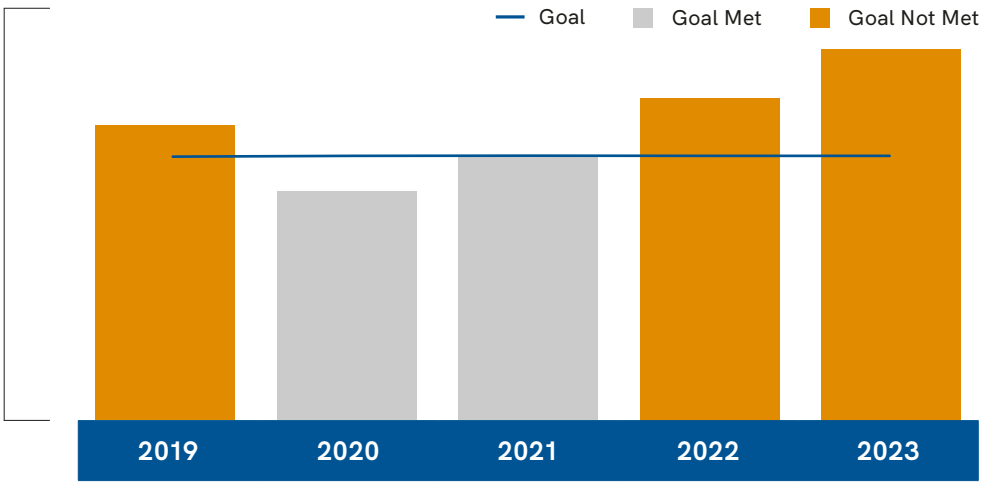
For FY23, the SAIFI result of 1.14 outages exceeded the goal of 0.82 outages or less. A SAIFI performance of 1.14 outages means there was just over one outage per customer during the year when averaged over all customers.

Figure 9 illustrates the five-year trend for SAIFI and the monthly performance for FY23. SAIFI has been trending up with the increased weather-caused outages. Monthly results show the goal was not met June through October or in January and February. The biggest contributing causes to SAIFI in FY23 were Weather, Underground Cable Failure and Accidents.

FIGURE 9 | SAIFI | Frequency: The Average Number of Times Customers Experienced Sustained Interruption

YEAR

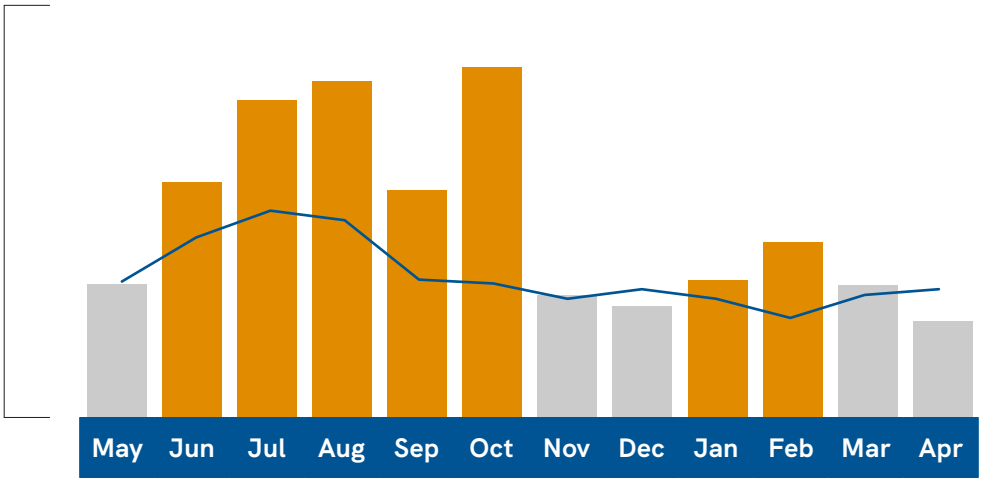
Results - 5 Year Trend (Outages)



	2019	2020	2021	2022	2023
Actual Result	0.91	0.70	0.82	0.99	1.14
Goal	0.82	0.82	0.82	0.82	0.82
Variance	0.09	-0.12	0.00	0.17	0.32

MONTH

Results - FY23 (Outages)



	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
Actual Result	0.06	0.11	0.15	0.16	0.11	0.17	0.06	0.05	0.07	0.08	0.06	0.05
Goal	0.07	0.09	0.10	0.10	0.07	0.06	0.06	0.06	0.06	0.05	0.06	0.06
Variance	-0.01	0.02	0.05	0.06	0.04	0.11	0.00	-0.01	0.01	0.03	0.00	-0.01

Customer Momentary Interruptions (MAIFI)

MAIFI is the frequency at which customers experience a momentary interruption averaged over all customers. These include the aforementioned transient outages, as well as semi-permanent outages that can be caused by animals or branches bridging the power lines that last less than five minutes.

The SRP system contains auto-reclosers that close circuit breakers automatically after a fault. This allows the customer to only experience a short, or momentary, outage in the case of one of the short-lived faults. Tracking MAIFI separately from SAIFI allows SRP to track the frequency of these different types of outages.

For FY23, the MAIFI result of 1.59 momentary outages met the goal of 1.88 momentary outages or less. A MAIFI performance of 1.59 momentary outages means SRP customers had less than two momentary outages during the year when averaged over all customers.

Figure 10 illustrates that SRP has maintained a relatively constant trend for MAIFI over the last five years. The monthly values in Figure 10 show that MAIFI met its goal all but two months in FY23.

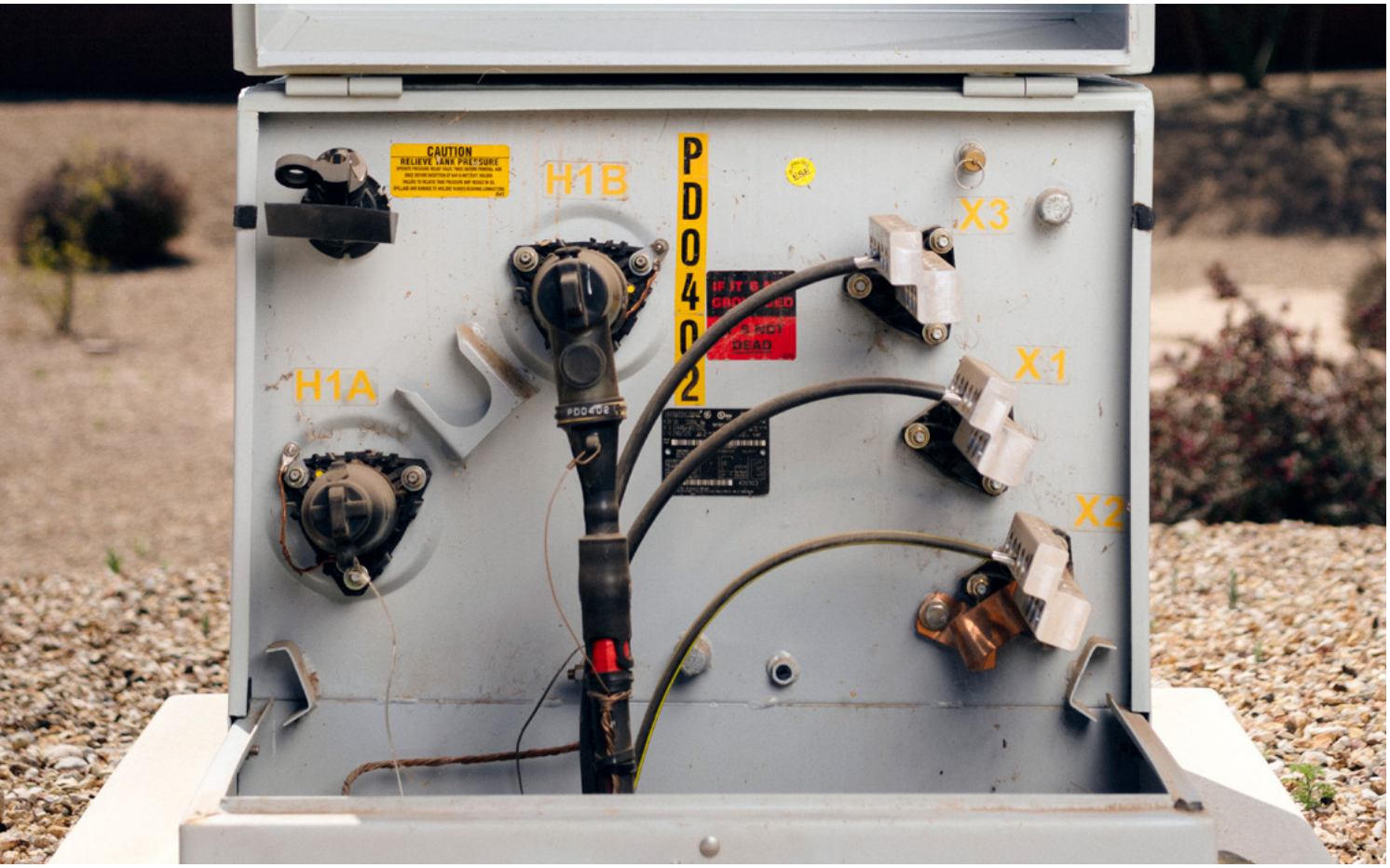
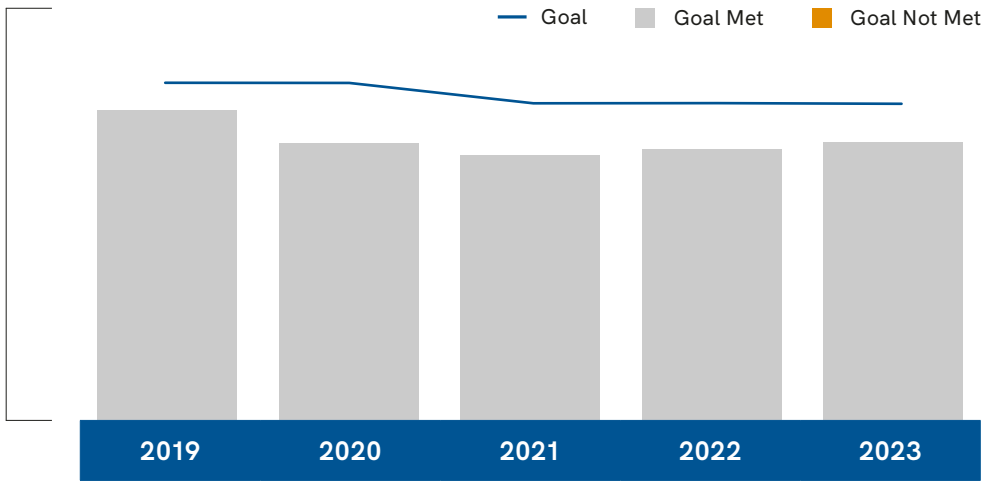


FIGURE 10 | MAIFI | Frequency: The Average Number of Times Customers Experienced a Momentary Interruption

YEAR

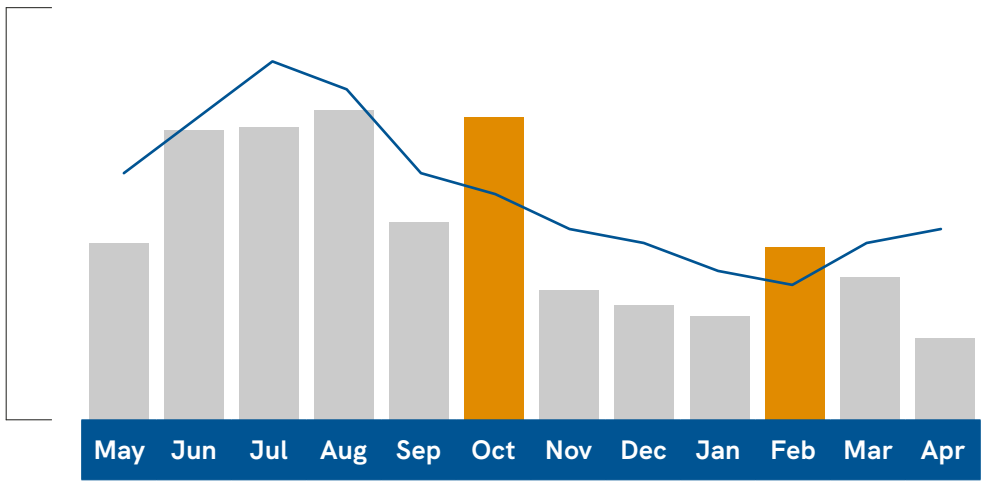
Results - 5 Year Trend (Outages)



	2019	2020	2021	2022	2023
Actual Result	1.78	1.58	1.52	1.55	1.59
Goal	2.00	2.00	1.88	1.88	1.88
Variance	-0.22	-0.42	-0.36	-0.33	0.29

MONTH

Results - FY23 (Outages)



	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
Actual Result	0.12	0.20	0.20	0.21	0.14	0.21	0.09	0.08	0.07	0.12	0.10	0.06
Goal	0.17	0.21	0.25	0.23	0.17	0.16	0.13	0.12	0.10	0.09	0.12	0.13
Variance	-0.05	-0.01	-0.05	-0.02	-0.03	0.05	-0.04	-0.04	-0.03	0.03	-0.02	-0.07

TRANSMISSION RELIABILITY

Measuring transmission system performance is an essential part of maintaining a reliable power grid. SRP uses two measurements of transmission reliability:

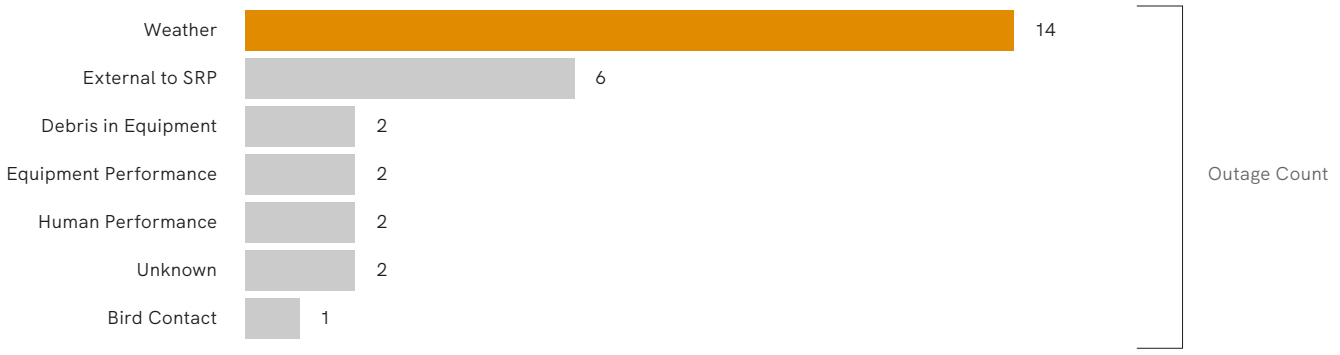
- FOHMY (Forced Outage Rate per Hundred Miles of Transmission per Year), which is established across the industry, and
- TRIND (Transmission Index), which was developed by the North American Transmission Forum (NATF) as a more comprehensive metric.

Unlike distribution metrics, FOHMY and TRIND do not consider planned outages, such as maintenance outages.

Using metrics to compare with other utilities furthers understanding of system performance. SRP participates in the NATF, which collects transmission outage data from participants and allows for collaboration and comparison with other entities.

Figure 11 depicts the outages of transmission lines greater than 100 kV broken down by cause code. The top cause of transmission outages in FY23 was weather-related events, such as lightning and wind. FY23 saw double the number of weather-related events as there were in FY22. The second-highest cause of line outages was external to SRP events, which includes events or equipment failures on neighboring systems that result in a line outage on SRP's system.

FIGURE 11 | Transmission Line Outages - FY23



FOHMY

SRP uses FOHMY to track transmission system performance and benchmark against other utilities.

This metric tracks the number of unplanned outages per one hundred miles of transmission line, enabling performance comparisons between short- and long-distance transmission line owners. Lower FOHMY scores indicate a smaller number of outages and a more reliable transmission system. Currently, SRP is only providing and comparing FOHMY for the bulk electric system (BES), which is transmission operated at or greater than 100 kV.

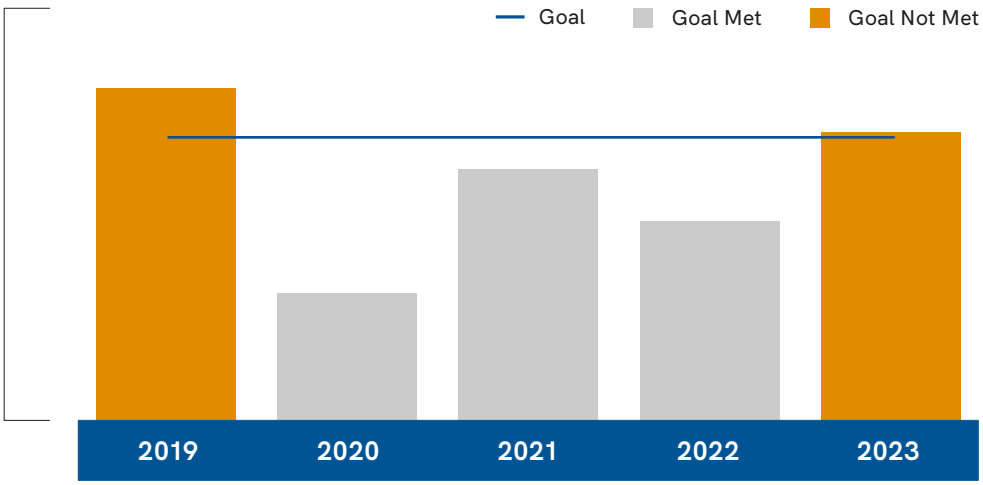
As shown in Figure 12, SRP had 2.03 BES transmission outages per hundred miles, which went over the SRP FOHMY reliability goal of having fewer than 2.00 outages per hundred miles. This is an increase of 0.63 outages per hundred miles from the FY22 result. July and August were the highest months for FOHMY in FY23, with most outages caused by weather events like lightning strikes and strong winds. On average, SRP sees six or seven BES transmission outages caused by weather in a fiscal year. SRP's BES transmission system saw 14 weather-related outages in FY23, which is double the average.

SRP's FOHMY performance ranked eighth among 16 Western Electricity Coordinating Council (WECC) utilities, according to 2022 outage data gathered by the NATF. The NATF promotes best practices to maintain and improve transmission system reliability, and its rankings help SRP understand how to improve performance for its more than 1.1 million power customers.

FIGURE 12 | FOHMY | Forced Outage Rate per Hundred Miles of Transmission per Year

YEAR

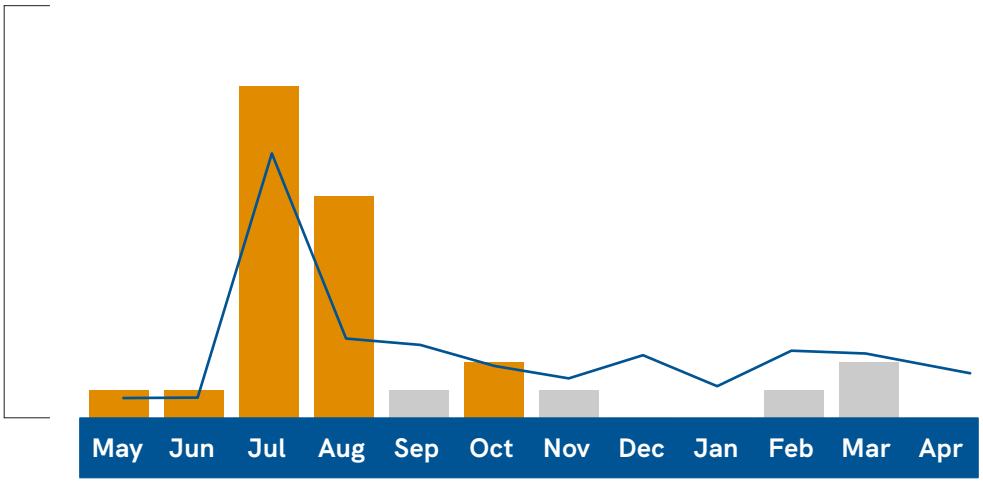
Results - 5 Year Trend (Outages)



	2019	2020	2021	2022	2023
Actual Result	2.35	0.89	1.77	1.40	2.03
Goal	2.00	2.00	2.00	2.00	2.00
Variance	0.35	-1.11	-0.23	-0.60	0.03

MONTH

Results - FY23 (Outages)



	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
Actual Result	0.07	0.07	0.84	0.56	0.07	0.14	0.07	0.00	0.00	0.07	0.14	0.00
Goal	0.04	0.04	0.68	0.19	0.18	0.12	0.09	0.15	0.07	0.16	0.16	0.12
Variance	0.03	0.03	0.16	0.37	-0.11	0.02	-0.02	-0.15	-0.07	-0.09	-0.02	-0.12

TRIND

While FOHMY tracks the number of transmission outages, Transmission Index (TRIND) helps measure the severity of transmission outages. TRIND is a relatively new metric developed by the NATF. TRIND measures each outage based on the voltage level and type of element lost, as well as the duration and cause of the outage. The more severe an outage, the more points that outage is assigned. For example, a 500 kV line outage will have more points than a 69 kV outage of the same duration. This allows a high-level comparison between outages that FOHMY doesn't provide.

The sum of the outage points is then normalized with another score based on system size and average NATF member performance. This allows for better comparison between utilities despite different system sizes. A TRIND score of 50.0 implies an average reliability performance.

FY23 TRIND was 21.0, meeting the SRP goal of being at or below a TRIND score of 25.0. July and August had particularly high TRIND scores in FY23, which is typical as that is in the middle of the monsoon, which can cause a high volume of outages on the electric system. The large number of weather-related events was partially responsible for the high TRIND in July and August, but a couple of station equipment failures at high voltages contributed to the higher TRIND as well.

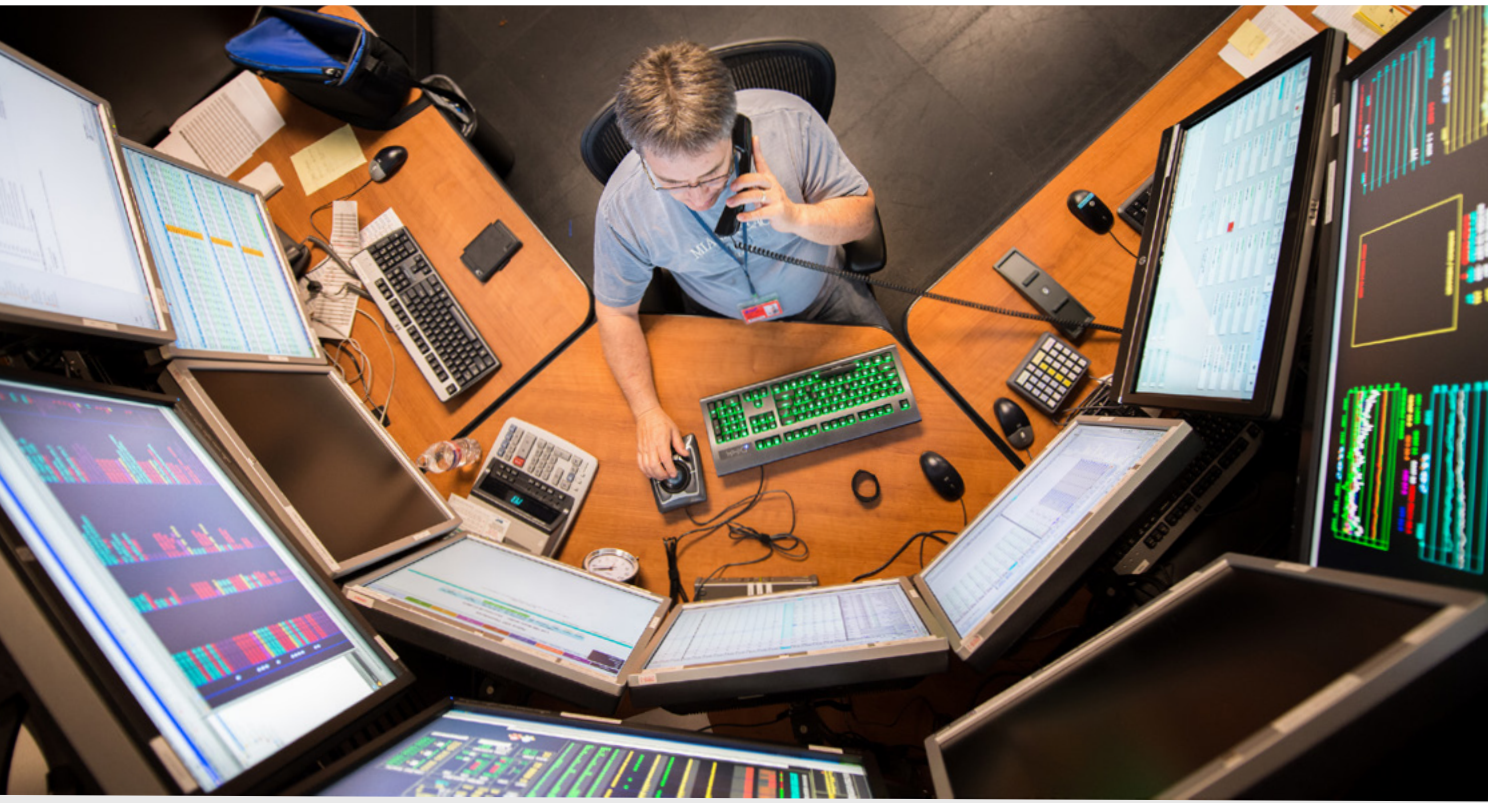
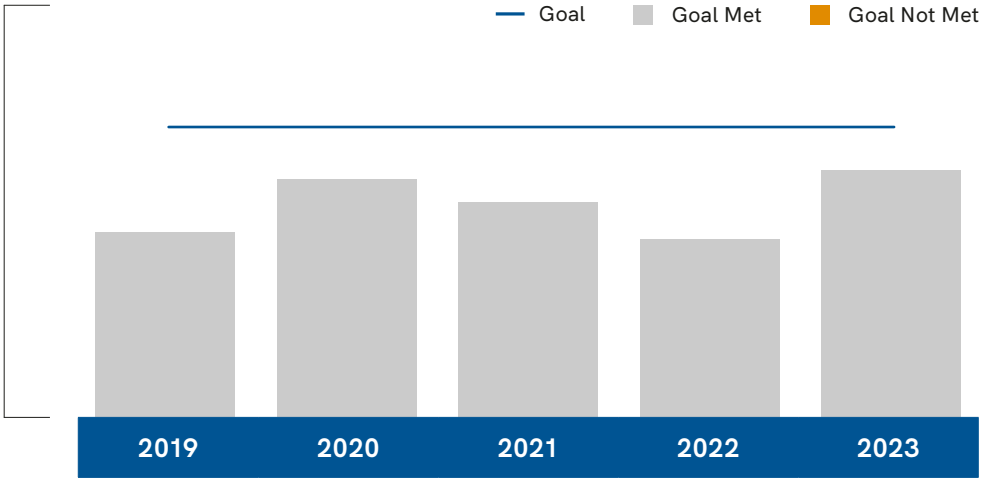


FIGURE 13 | TRIND | Transmission Index

YEAR

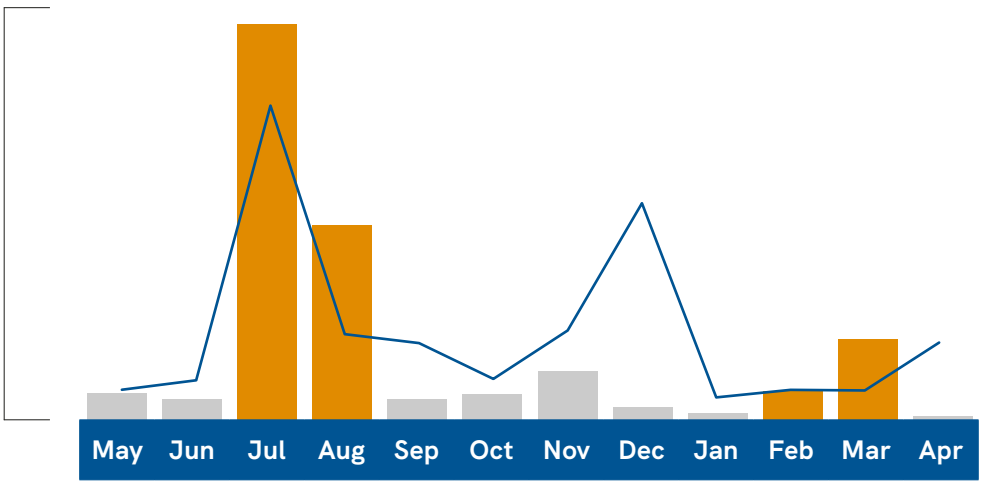
Results - 5 Year Trend (Score)



	2019	2020	2021	2022	2023
Actual Result	15.9	20.5	18.5	15.3	21.0
Goal	25.0	25.0	25.0	25.0	25.0
Variance	-9.1	-4.5	-6.5	-9.7	-4.0

MONTH

Results - FY23 (Score)



	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
Actual Result	0.6	0.5	9.7	4.8	0.5	0.6	1.2	0.3	0.1	0.7	2.0	0.1
Goal	0.6	0.9	7.8	2.0	1.8	0.9	2.1	5.3	0.4	0.6	0.6	1.8
Variance	0.0	-0.4	1.9	2.8	-1.3	-0.3	-0.9	-5.0	-0.3	0.1	1.4	-1.7

POWER QUALITY

Power quality is a measure of how well the electric energy being supplied is able to power customer load without impacting sensitive equipment. With the growth of sophisticated high-tech electronic equipment and processes, SRP's energy supply must meet high expectations for power quality.

The most common type of power quality event is a voltage sag, which is a temporary drop in voltage often for only fractions of a second. Even this short duration can affect sensitive electronic equipment and control systems and cause significant operational issues for industrial and large commercial customers.

Although most residential customers are not usually affected by voltage sags, this may change with advances in home technology. Whether a voltage sag causes a problem for the customer depends on the magnitude and duration of the sag and the sensitivity of the equipment.

Major loads, such as large customer motors, can result in a voltage sag when the equipment turns on. The challenge for SRP is to maintain adequate systemwide power quality levels, which includes helping customers with power quality problems caused by their own power equipment.

Faults at higher voltages, such as 230 kV and 500 kV, generally affect large areas of the grid and more customers. However, these faults are less likely to disrupt customer processes because the magnitude of a voltage sag felt by the customer is normally not severe. Faults at lower voltages, such as 12 kV, affect fewer customers, but they are more likely to be severe and disrupt processes.

SRP's efforts to monitor, quantify and track voltage sag events are aimed at maintaining the electric grid's power quality performance and customer satisfaction. SRP has over 200 power quality monitors that report voltage sag events. This enables SRP to track and plot the location of these events on the system.

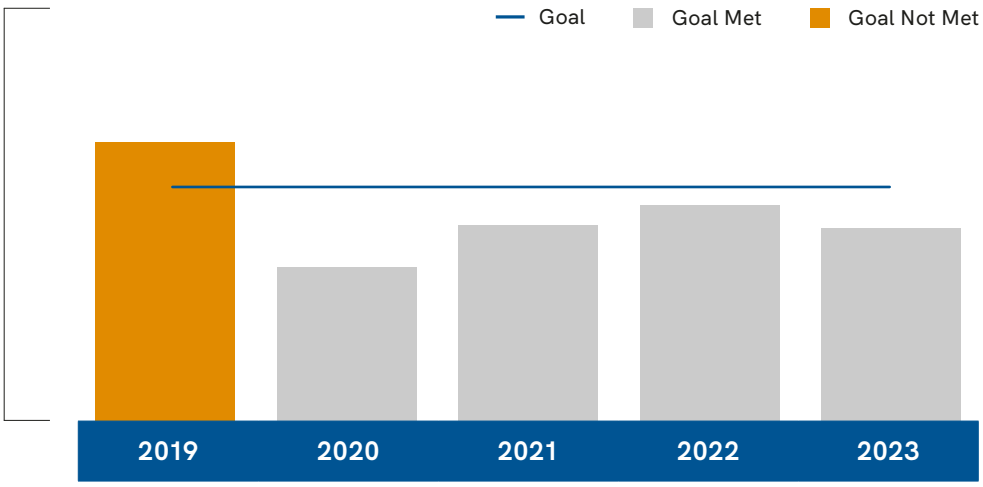
The Sag Count Index (SCI) tracks how often a power quality monitor detects a voltage sag event. A voltage sag event occurs any time the voltage level drops below 90% of the normal voltage level.

Figure 14 illustrates the monthly trend, five-year trend and the variance-to-goal for each of the past five years for SCI. In FY23, the SCI was 1.4 events. This means, on average, that each SRP power quality monitor detected one and four-tenths voltage sag events. Over the past five years, SCI has appeared to become steady. This year's performance was lower than the five-year average of 1.49 events and still well below the FY23 goal of less than 1.7 events per monitor, per month.

FIGURE 14 | SCI | How Often a Voltage Sag Event is Detected

YEAR

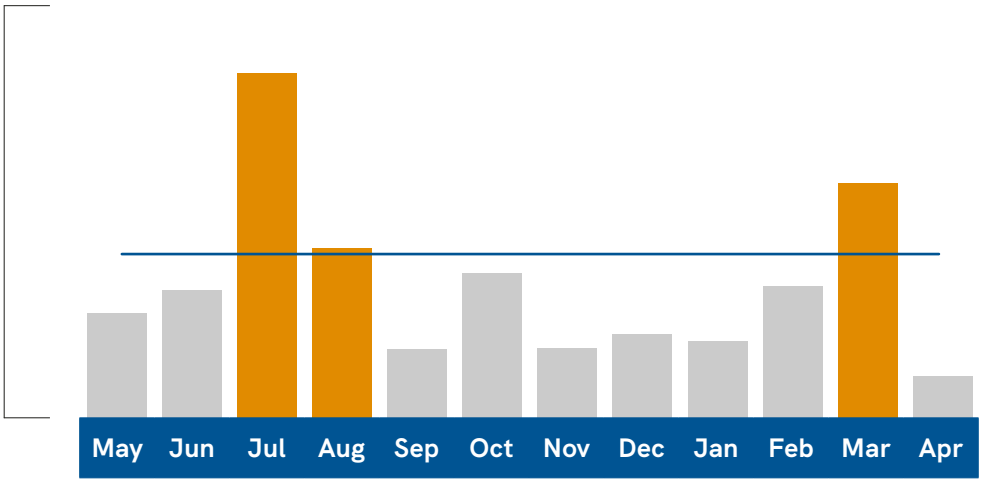
Results - 5 Year Trend (Events)



	2019	2020	2021	2022	2023
Actual Result	2.0	1.1	1.4	1.5	1.4
Goal	1.7	1.7	1.7	1.7	1.7
Variance	0.3	-0.6	-0.3	-0.2	-0.3

MONTH

Results - FY23 (Events)



	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
Actual Result	1.1	1.3	3.6	1.8	0.7	1.5	0.7	0.9	0.8	1.4	2.4	0.4
Goal	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
Variance	-0.6	-0.4	1.9	0.1	-1.0	-0.2	-1.0	-0.8	-0.9	-0.3	0.7	-1.3

OPERATIONAL EXCELLENCE

In this section of the Grid Performance Report, you will see several examples of initiatives that demonstrate SRP's commitment to operational excellence and continuous improvement. Through this work, SRP is ensuring that our power delivery system is optimally maintained and operating at the highest standards.

Stories

SRP WINS BIG AT SUPER BOWL LVII

When the referee tossed the coin to officially kick off Super Bowl LVII at State Farm Stadium on Feb. 12, 2023, all eyes were on the big game, which was expected to require an estimated 8.3 MW of power. Behind the scenes, dozens of employees from 11 organizations at SRP had been preparing for the Super Bowl since January 2022 to ensure it all went off without a hitch.

It takes a lot of electricity to operate the stadium, which was filled to capacity with fans, officials, vendors, concession stands, reporters from around the world, as well as a high-production halftime show. In addition to their power needs, wireless carriers also required an electrical power source for the portable cell towers they installed to boost their networks to accommodate tens of thousands of fans streaming live videos, posting to their social media accounts and texting in real time during the game.

In the year leading up to game day, SRP team members reviewed the incident action plans and process improvements they relied on when Glendale hosted the Super Bowl in 2015. Preparations also included inspections, upgrades and proactive maintenance of the power system, along with regular meetings with NFL officials, neighboring municipalities, other utilities and government agencies.

Fortunately, the SRP electric system that serves the stadium is robust with several substations and distribution lines in the area that can provide primary and backup service. For redundancy and operational flexibility, the stadium is served by four dedicated distribution power lines from three substations. In the unlikely event of a loss to SRP's primary circuits, automatic transfer switches inside the stadium are able to redirect power within two seconds to backup feeds from two other substations.

Five days before the game, SRP team members held tabletop exercises to ensure the system was ready to meet the additional load requirements of the big event. This included walking through game day logistics, roles and responsibilities, situational awareness and a simulated outage.

On Super Bowl Sunday, SRP's incident command team monitored the stadium's power supply from the Emergency Operations Center, and personnel and line crews were on standby at the stadium ready to respond in the event of a disruption. Fortunately, their services were not needed.

After the last play unfolded and fans cleared the stadium, Super Bowl LVII became the most-watched U.S.-based telecast of all time with a peak power usage of 7.67 MW. Thanks to diligent preparation, SRP was able to deliver the power required to pull off this accomplishment without any disruptions.

SRP's successful operations at Super Bowl LVII underscore its commitment to excellence in customer service and reliability, something SRP takes pride in offering to customers large and small every day of the year.


REDZONE
State Farm
STADIUM

STATE-OF-THE-ART BRONTO TRUCK HELPS REDUCE OUTAGES AND BOOST SAFETY

SRP prides itself on reliability, which is especially important during the extreme heat of the summer months when customers are counting on power to keep their homes and businesses cooled to safe temperatures, their manufacturing running on time, and their electronics humming.

Thanks to SRP's newly acquired Bronto truck, crews can work safely on energized high-voltage lines to avoid having to take an outage that may affect thousands of customers.

The five-axle Bronto features rear steering and short jack capabilities, which enable crews to maneuver in smaller spaces than standard bucket trucks can. This is especially beneficial in areas of high density where a larger and less nimble truck wouldn't be able to operate.

The new Bronto truck can also reach 196 feet into the air, which is 17 feet more than its predecessor. This allows crews to safely handle jobs on the highest lines in the SRP power system. In addition, when the Bronto's outriggers are deployed, the truck will automatically level itself, reducing setup time.

The Bronto also has many built-in features to safeguard crews doing barehand work, which places them in contact with high-voltage transmission lines while they are still in service. The fiberglass upper boom of the truck has a current leakage monitoring system that will sound an alarm if current flows into the boom at an amount that exceeds a threshold set by the operator. This alerts crews of any danger so they can take action to get out of harm's way should current leak through the fiberglass at dangerous levels.

In order to keep the Bronto in compliance with industry standards, SRP will send it to a lab every three years for dielectric testing to ensure the fiberglass boom is in good condition and the current leakage monitoring system is in good working order.

By continuing to add state-of-the-art equipment like the Bronto truck to its fleet, SRP is ensuring it's ready to respond to whatever scenarios may arise while minimizing outages. This proactive approach helps SRP maintain the reliability customers count on while keeping the safety of crews at the forefront.

15 KV BREAKER REFURBISHMENT PROGRAM BOOSTS RELIABILITY

The 15 kV breaker plays an integral role in providing reliable power to SRP customers. In the event of abnormal conditions, such as a fault or voltage issue, breakers stop the flow of electricity to prevent damage to the distribution system. To counteract the effects of aging and problematic breakers, SRP is proactively tracking and refurbishing older or wear-worn 15 kV breakers.

The 15 kV breaker refurbishment program prioritizes breakers based on several criteria. Problematic breakers that can be salvaged are added to a schedule based on their age and the number and type of repairs the breaker has needed recently. Breakers that can't be fixed, such as those from manufacturers that have proven to be unreliable, obsolete breakers and overly worn breakers, are scheduled for replacement.

SRP carefully designed the breaker refurbishment process so it won't be disruptive to customers. To begin, power is rerouted before problem breakers are removed so impacted customers will not experience a loss of power. Breakers being refurbished are then sent to one of three approved breaker shops to be dismantled and rebuilt to original equipment manufacturer specifications.

Refurbishment takes two to four months, depending on how quickly necessary parts can be acquired. Once completed, breakers are returned to the field for use.

Since 2019, SRP has refurbished between 10 and 24 15 kV breakers and replaced five to 10 additional breakers each year. In fiscal year 2023, team members were able to refurbish nine 15 kV breakers despite ongoing supply chain challenges.

The 15 kV breaker refurbishment program offers many benefits to SRP and its customers. The most important is the reduction in outages. Refurbishment is also more cost-effective and provides a quicker turnaround than purchasing all new breakers. Breaker refurbishment also reduces the number of times technicians will need to be called out to make repairs.

In addition, the wait time for new breakers has increased significantly as supply chain issues persist, making refurbishment the more attractive and timely solution whenever possible.

The 15 kV breaker refurbishment program is making a positive impact on SRP's reliability ratings by reducing the risk of an extended outage that could affect a large number of customers.

The ongoing 15 kV breaker refurbishment program is just another way SRP is working proactively to ensure customers have access to reliable electricity today and for many years to come.

SRP'S SUPPLY CHAIN EXPERTISE HELPS ENSURE RELIABILITY

Supply chain woes have dominated the headlines since 2020 and are not expected to stabilize to pre-pandemic levels for years to come. An imbalance in supply and demand caused by raw material shortages, a tight labor market and record demand is contributing to shortages of key items used by utilities.

Much of the material SRP stores in inventory and relies on to keep the power on and water running has become constrained, with lead times up to 10 times as long as they were in 2019. If you visit one of SRP's warehouses and equipment yards, though, you'd never know it. Shelving is filled with inventory, and the yards are stocked with rows of transformers, hardware and other packaged materials ready to go when SRP needs them.

Since the onset of the pandemic, SRP has successfully maintained its inventory which means crews have been able to continue maintenance and operation activities as well as respond to top-priority issues such as power outages with the materials on hand at the warehouses.

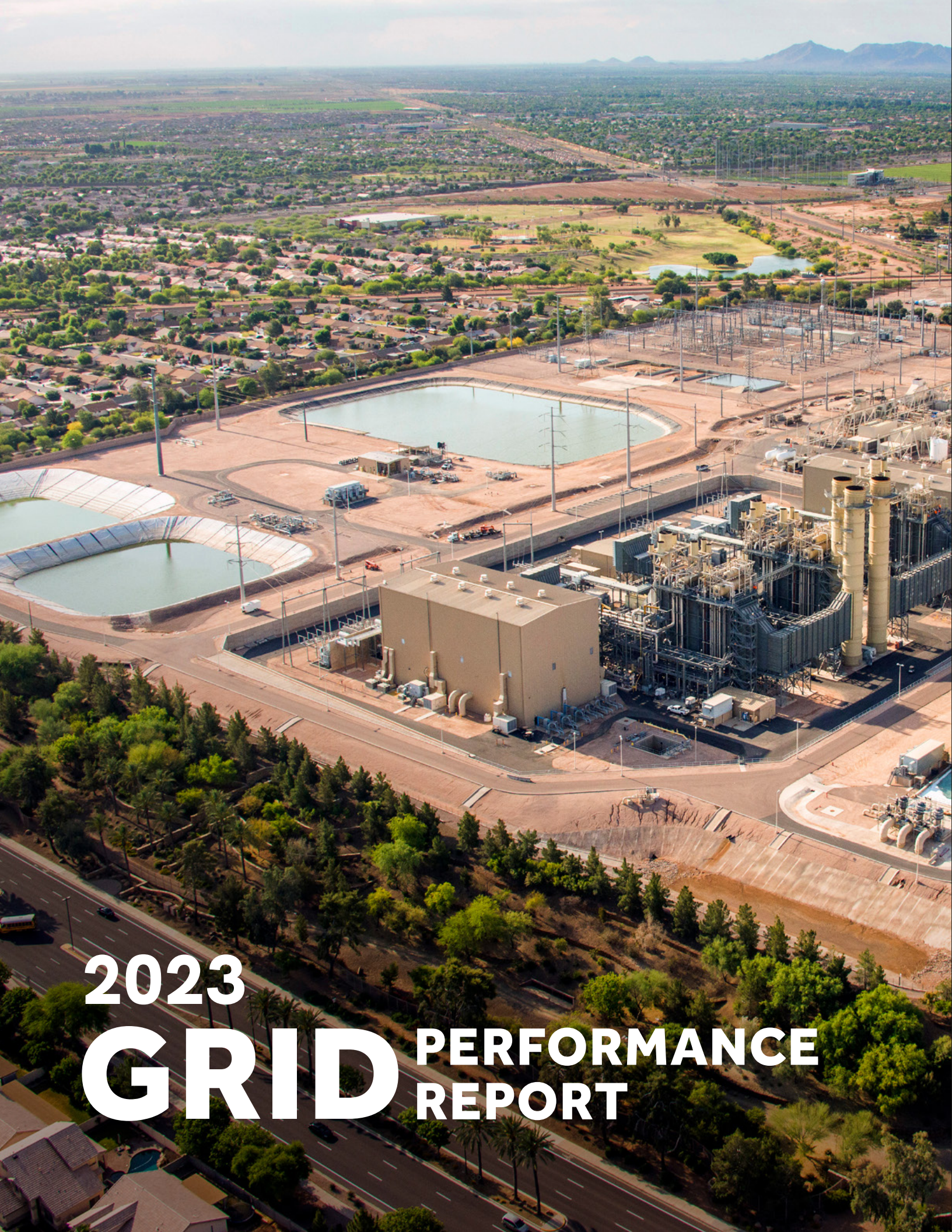
In fact, SRP has even been able to provide supplies to other utilities as part of ongoing regional efforts for power providers to help each other with equipment when the need arises. Before SRP sends items to another utility, team members carefully scrutinize supply stock levels to ensure the gesture won't impact SRP's ability to maintain power for its customers. On a number of different occasions, for example, SRP provided distribution transformers to neighboring utilities that could not get them in time to make repairs after storm damage.

Maintaining sufficient levels of supplies during unprecedented global supply chain issues is no easy task for SRP's procurement team. By maintaining a high level of communication with the internal departments that rely on critical materials, the procurement team is able to determine what supplies will be needed as far in advance as possible. The internal departments using materials rely on this regular communication to help prioritize projects based on current and anticipated lead times.

SRP engineering groups review specifications and identify potential alternatives so the procurement team can source different options from more suppliers. For example, the procurement team recently coordinated with an engineering team to review and approve product specifications from new and alternative manufacturers to enhance SRP's ability to ensure continuity of supply. Wire and cable manufacturers' finite manufacturing capacity has struggled to keep up with industrywide demand. The addition of new options enables SRP to supplement its contracted sources of supply with new manufacturers to ensure wire and cable is available for SRP's growing needs.

In addition, and whenever possible, parts and equipment are recovered from the field and repaired and refurbished to help fill any gaps left by external suppliers. SRP also fabricates a number of parts that are used for repairs and refurbishments to ensure inventory is available when it is needed.

Thanks to these collaborative and proactive efforts, SRP is able to maintain ample stocks of inventory and continue to reliably deliver power to customers despite the challenging state of the global supply chain.



2023 GRID PERFORMANCE REPORT

ACKNOWLEDGMENTS

The Grid Performance Report is produced by a cross-functional team with many other contributors. The formal work team by department includes:

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Distribution Operations Applications | **Peggy Riordan-Norman**

Distribution Performance | **Wendy Weathers & Caden Carpenter**

Large Business Account Management | **Jeff Klefstad**

Midsize Business Account Management | **Christy Eubanks & James Barron**

Policy, Procedures & Standards | **Catherine O'Brien**

Project Management | **Cynthia Saavedra**

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Transmission Line Asset Management | **Daryl Chipman**

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