Bringing Energy Solutions to You

# Insights

A monthly newsletter for all GPA Customers • Issue No. 77 • August 2023

## High-Voltage Transmission Crew from Washington State Instrumental in 115kV System Repairs



On June 8, twelve (12) days after Typhoon Mawar devastated Guam, Guam Power Authority (GPA) welcomed a 15-person visiting crew from the Snohomish PUD (SnoPUD) from Washington State to support post-Typhoon Mawar recovery efforts to restore islandwide power. SnoPUD, an American Public Power Association (APPA) member utility, of which GPA is also a member, quickly answered Guam's call to send 15 line workers, equipment operators and mechanics to help repair the island's 115kV transmission line that sustained widespread damage from the Category 4 storm. GPA will reimburse the SnoPUD for its work. According to PUD CEO and General Manager, John Haarlow, "Helping other utilities in their time of need through mutual aid agreements is an important part of being a public power utility."

The functionality of Guam's 115kV transmission line was vital to stabilizing the islandwide power system (IWPS), and it needed major repairs. The 115kV line runs through Harmon, Hagatna, Piti and then to the Apra Heights substations with every pole and line in need of assessment and repair.

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## Typhoon Mawar Recap and the Path Forward

In the aftermath of the devastation of Typhoon Mawar and with the very real potential of more severe weather events in our region, GPA recognizes the importance of investing in storm mitigation and resiliency efforts to address Guam's vulnerability to catastrophic wind strengths and rains. The process of developing a comprehensive energy plan constantly evolves and includes specific strategies for calculating future risks, enhancing critical infrastructure and quantifying needed improvements.

GPA's continued efforts involve preparation for electrical grid infrastructure hardening, which would improve its survival and recovery time after super typhoons. Efforts also include upgrading and stocking a sufficient inventory of vulnerable components and strengthening existing structures.

### PRIOR MITIGATION EFFORTS PROVED SUCCESSFUL

GPA's restoration from Typhoon Mawar is the fastest recovery period from super-typhoon strength winds of 150+ mph the Island Wide Power System (IWPS) has ever experienced. It is also the first time that the IWPS did not experience a "system blackout," or a total shutdown of the power grid. Avoiding a system blackout allowed for quick recovery for customers served by substations feeding through underground transmission lines already in place for the Guam Memorial Hospital, Tumon Bay, and Andersen Air Force Base. In stark contrast, all 115kV and most 34.5kV transmission lines sustained serious damage and took weeks, special equipment, and assistance from partner power companies to repair.

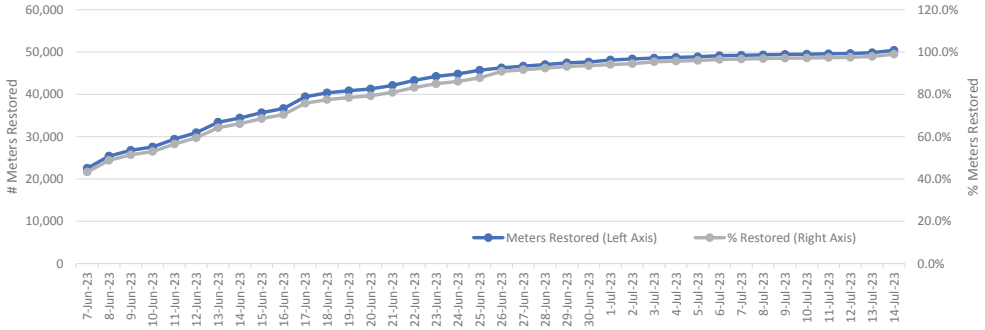
Baseload generators suffered some damage but returned to service and supported customers who were being restored during the recovery period. The Yigo 20 MW Combustion Turbine has not returned to service due to turbine and generator issues. The result is that GPA does not have adequate generation capacity to retire Cabras any earlier than after the commissioning of Ukudu and will be looking at alternatives for generation capacity in order to deliver energy to homes and businesses reliably as it continues with the construction of the new 198MW Ukudu Combined Cycle plant.

Despite the damage done by flying debris to lines, crossarms and other hardware, the concrete pole system that ratepayers invested in over the past few decades has served the entire island community well with 99% having survived Typhoon Mawar's 150+ mph winds. Comparatively, recoveries from prior typhoons took months longer, with much of the response effort directed toward pole replacement in the past. The expansion of concrete poles was also made possible by FEMA mitigation funds received and investments made by the U.S. Air Force to place transmission systems underground.

### INFRASTRUCTURE RESILIENCY PLAN

As conversations advance the importance of moving more of Guam's power grid underground, it is very important that the federal government and the local community work together to mitigate Guam's vulnerability to natural disasters and military conflicts. The national defense environment today has changed substantially over the past two decades and it is important to prepare Guam's electrical grid infrastructure for potential threats, natural and otherwise. A full underground system, excluding 115kV transmission, could cost about $7B, an unaffordable price for ratepayers to bear on their own while trying to maintain affordable power rates for residents. For context, the preliminary damage assessment from Typhoon Mawar is just between $25-$35 million. GPA's ability to obtain funding for the billions in investments needed is doubtful. GPA will reach out to FEMA, US Military branches and other federal entities to invest in Guam's future energy resiliency. Federal government investments are needed today to make Guam a highly resilient community and strategic military base for the nation. A substantial investment by the federal government into Guam's infrastructure could provide returns over the decades to come.

### TYPHOON MAWAR RESTORATION PROGRESS




### TYPHOON MAWAR MATERIALS & SUPPLY

- GPA maintained material inventory adequate for recovery.
- Current GPA inventory of poles, transformers, wires and other hardwaresupported the post-typhoon restoration efforts.
- $3.7M of materials have been issued toward post-typhoon recovery efforts.
- GPA continues to replenish its material inventory.

| ITEM | UOM | ISSUED | BALANCE ON HAND |
|---|---|---|---|
| Concrete Poles | EA | 265 | 272 |
| Transformers | EA | 333 | 231 |
| Crossarms | EA | 498 | 2,178 |
| Insulators | EA | 5,921 | 7,330 |
| Fuse Links/Cutouts | EA | 5,433 | 3,171 |
| Wires (All) | FT | 348,679 | 829,659 |
| Connectors | EA | 33,403 | 22,436 |

### COST ESTIMATE: INFRASTRUCTURE RESILIENCY PLAN

GPA's preliminary estimate follows.

Detailed project descriptions will be presented to the CCU at its August 2023 meeting.

| DESCRIPTION | ESTIMATED COST *(in Millions)* |
|---|---|
| ITEM 1: Underground Transmission Lines & Indoor Substations | $ 833 |
| ITEM 2: Critical Distribution System Mitigation | $ 813 |
| ITEM 3: Other Critical Infrastructure Resiliency Projects | $ 730 |
| **SUBTOTAL** - *Immediate Critical Infrastructure Resiliency Projects (Items 1-3):* | **$ 2,376** |
| ITEM 4: Underground Remaining Distribution System | $ 4,025 |
| **TOTAL** - *All Resiliency Projects:* | **$ 6,401M** |

**Preliminary Estimate*

# Back to School, Power-wise and Eco-friendly!

As the hot summer months come to an end, parents may find themselves faced with a new set of challenges as their children return to school. One of these challenges is how to save energy in the home while maintaining a comfortable environment for learning.

**Why saving energy is important for the family**
By adopting energy-saving habits, families can significantly lower their power bills and allocate those savings towards other expenses or investments. Additionally, reducing overall power consumption contributes to a more sustainable future by decreasing carbon emissions and conserving precious natural resources.

**How parents can save energy**
Parents play a crucial role in setting an example for their children when it comes to saving energy at home. Simple changes in daily routines and habits can make a significant difference. For instance, turning off lights when not needed, unplugging electronics when not in use, and utilizing natural lighting during daytime are all effective ways to lower power usage.

Furthermore, optimizing heating and cooling systems by properly insulating windows and doors or using programmable thermostats can help regulate indoor temperature efficiently. Encouraging shorter showers instead of baths and washing clothes at lower temperatures are additional strategies that contribute to reducing overall power consumption.

**What children can do to participate in the energy-saving plan**
Children are eager learners who readily absorb information about sustainable practices when presented with opportunities for education and engagement. Parents should involve children in discussions about why saving energy is important and how it benefits both them personally as well as the our island community.

Simple actions such as reminding kids to turn off lights when leaving a room or closing windows when the air conditioning is on can instill responsible energy-saving habits. Additionally, children can actively participate in conserving energy by practicing shorter showers, unplugging electronics after use, and being mindful of wasteful behaviors like running water unnecessarily.

By adopting simple habits and involving children in the process, parents can create an eco-conscious household that fosters responsibility and encourages active participation in energy conservation.

ENERGY sense

Scan the QR code for more Energy-Saving Tips!

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By the time the 15-person crew landed, GPA was able to restore power to neighborhoods that didn't sustain complex damage. The extensive repairs to the transmission lines were increasingly critical to getting power to substations. SnoPUD arranged for two high-reach bucket trucks and a mechanic van to be transported by FEMA while COMNAVMAR and NAVFAC Guam, along with private partners and FEMA, donated bucket trucks to aid the collective effort. In total, there were about 30 bucket trucks deployed around the island with crews working overlapping shifts around the clock.

For GPA and the SnoPUD crew to make repairs on the 115kV transmission lines, certain distribution feeder lines needed to be secured throughout the process. The lines feed power to customers in multiple villages. GPA announced scheduled outages and road closures ahead of time to prepare customers and allow the crews to safely make their assessments and repairs. Similarly, emergency outages were also necessary to avoid overloading transmission lines already in service.

**HARDENING THE SYSTEM**
Restoring the transmission lines was key in generating reliability to the grid and bringing Guam closer to pre-storm conditions. Transmission line restoration and redundancies are integral to a successful typhoon recovery as a whole. The transmission line repairs would substantially strengthen the grid and support the 71% system load to help GPA get to 100% restoration. GPA's goal was to improve the quality and stability of the power system as it made repairs. Many issues caused by Typhoon Mawar were not readily visible. In addition to damaged transformers, loose connections, and disconnected lines, the teams



addressed power quality issues caused by the storm, such as partial power, low or fluctuating voltage, and flickering at homes and businesses.

GPA General Manager John M. Benavente, P.E. said, "GPA thanks our APPA partners, the Snohomish PUD Washington, and the SnoPUD line workers and their families who made the long trip to support our restoration efforts for the people of Guam. Their specialized work in high-voltage transmission line repairs allowed our GPA crews, along with the visiting crews from Commonwealth Utility Corporation in the CNMI and the Pohnpei Utilities Corporation, to focus on restoring power in the villages. We thank them for quickly responding to our call for assistance after Typhoon Mawar so we can work as swiftly as possible to get Guam's islandwide power system back online." All crews worked 16-hour days, 7-days a week for several weeks and we are grateful for their commitment and hard work, added Benavente.

The major work on the 115kV transmission line returned to pre-storm condition by the second week of July, with the Snohomish PUD crew traveling home to Washington state shortly thereafter.







# Ways to Pay Your Bill

*NOTICE: For those who make utility payments at the bank, be sure to check with your bank for their updated policies.*

## Online
Visit PayGPA.com or Download the Pay GPWA App

PayGPWA mobile app

*You can also pay your GWA water bill on the app.*

## Pay By Phone
(671) 647-5787
Mon-Fri 7:30am to 5pm
**Afterhours**
1 (855) 977-2002 Toll Free

## Mail-In
**Mail CHECK payments to:**
Guam Power Authority
P.O. Box 21868,
Barrigada, GU 96921

## Drop Box
**Drop CHECK payments to:**
Gloria B. Nelson Public Svc. Bldg.
688 Route 15, Fadian
*along back road to Andersen*

## Drive-Thru
**Cash, Check & Credit Card payments** are accepted at:
**GPA Fadian TEMPORARILY CLOSED**
Mon-Fri 7:30am to 3:30pm
**GPWA Upper Tumon Office**
Mon-Fri 7:30am to 3:30pm
Sat 8am to 12pm

## In Person
**Customer Service Center & Main Office, GPA Fadian**
Mon-Fri 7am to 5pm
**Hagåtña Satellite Office**
Julale Shopping Center
Mon-Fri 8am to 5pm
**GPWA Upper Tumon Office**
Mon-Fri 7:30am to 6pm
Sat 8am to 12pm

## Other
**Your Bank**
Subject to individual bank policies
**All Treasurer of Guam Locations**

*At GPA, you can also pay your GWA water and GSWA trash bills.*

## GPA GOVERNANCE & LEADERSHIP

Your elected Consolidated Commission on Utilities (CCU) holds two (2) working sessions and one (1) regular meeting monthly. Meeting location is the CCU Conference Room, Gloria B. Nelson Public Service Building in Fadian, Mangilao. For more information and agencies, call the CCU Board Secretary at (671) 648-3002 or visit www.guamccu.org.

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