

BEFORE THE GUAM PUBLIC UTILITIES COMMISSION

IN THE MATTER OF:) GPA Docket 13-13
)
Reliability of the GPA Power System)
) **ORDER**
)
)
_____)

INTRODUCTION

This matter originated from concerns of the Chairman and the PUC Staff that over the past year there have been an increasing number of outages, that these outages were not all being reported, and that the public wasn't aware during the outages as to cause, location, customers affected, and time to restore power. The continuing frequency of these outages and the apparent lack of improvement raised the issue of overall system reliability such that the Commission initiated this preliminary investigation into GPA's reliability metrics, practices, and reporting.

BACKGROUND

The Commission believes that the need to maintain a reliable system is one of the most important and fundamental responsibilities that a utility has. It is in this context that the Commission directed Lummus Consultants to prepare a report relative to recent outages, including outage cause, GPA's efforts to reduce outages, how outages are currently being tracked and reported and recommendations for enhanced outage reporting protocols.

In preparing its report, Lummus Consultants relied on GPA responses to data requests, teleconferences, and detailed analyses of recent outage information and reliability statistics, as well as reporting of other utility systems. The Lummus Consultants final report was submitted for review to the Commission on March 24, 2014. The main findings, conclusions, and recommendations developed by Lummus Consultants in that report is summarized in Sections I through V below.

I. GPA Reliability Statistics

A. GPA benchmarks its reliability indices against the American Public Power Association (APPA)¹ reliability indices². GPA has three systems: generation, transmission and distribution. However, APPA reporting is for distribution reliability only.

- a. In terms of the SAIDI³ measure of reliability for the twelve months ended November 2013, GPA's distribution component (213.62 outage minutes per average customer) was significantly greater⁴ than the fourth quartile of APPA responding utilities in 2011 (176.13).
- b. GPA's distribution SAIFI⁵ for the same period was 2.58 interruptions per average customer served which falls between the third and fourth quartile of APPA utilities.
- c. GPA's distribution CAIDI⁶ was 82.7 minutes per interrupted customer for the period, which is comparable to the third quartile of APPA utilities.
- d. APPA distribution reliability indices were comparable with those of North American utilities.

B. GPA compiles 12-month rolling SAIDI, SAIFI, and CAIDI indices. Over the period September 2009 to November 2013, there have been fluctuations in each of these indices, but there has not been a clear trend towards improvement in these indices. For the twelve months ended November 2013, each of these indices was near their high point since September 2009 for the total system, with SAIDI at 687.58

¹ The American Public Power Association (APPA), based in Washington, D.C., is the service organization for the nation's more than 2,000 community-owned electric utilities. Collectively, these utilities serve more than 47 million Americans. It includes a number of island utilities including Guam.

² The data from this survey offer only a component of the conceptual benchmark/ point for comparison and understanding of public power utility distribution system operations and reliability metrics. Source: APPA's 2013 Distribution System Reliability & Operations Survey.

³ System Average Duration Index is a measure that Indicates the total duration of interruption for the average customer during a predefined period of time. It is commonly measured in minutes or hours of interruption.

⁴ Lower is better.

⁵ System Average Interruption Frequency indicates how often the average customer experiences a sustained interruption over a predefined period of time; typically measured annually.

⁶ Customer Average Interruption Duration Index represents the average time required to restore service to customers.

minutes per average customer; SAIFI at 10.14 interruptions per average customer; and CAIDI at 67.8 outage minutes per customer interrupted.

C. When GPA system reliability was compared with other Pacific Power Association utilities⁷, the SAIDI measure for GPA was in the range of, but somewhat higher than the average of 11 other responding utilities and SAIFI was equal to the average of 12 other responding utilities.

D. When GPA was compared with the four Hawaiian utilities, HECO, HELCO, MECO and KIUC, GPA's reliability fared significantly worse than the average of the four and was the least reliable in each measure. The results were: SAIDI – GPA: 688 outage minutes per average customer; Hawaii average: 159; SAIFI – GPA: 10.1 interruptions per average customer; Hawaii average: 2.9; CAIDI – GPA: 67.8 minutes per interrupted customer; Hawaii average: 55.1.

II. Outage Causes

A. An analysis of 914 outage incidents for the 12-months ended November 2013 shows that equipment failures are by far the most frequent cause of outages, accounting for approximately 68 percent of the outages during this period and contributing to more than 70 percent of the SAIDI and SAIFI values.

B. In terms of outages attributed to each system component:

- a. Generation accounted for 550 of the outages (60.0%), of which 500 were equipment-related;
- b. Of the 500 equipment-related generation outages: 64.4% were related to auxiliary systems; 27.4% generator; and 8.2% mechanical system fuel leaks.
- c. Transmission accounted for 77 of the outages (8.4%), of which 17 were equipment-related; and
- d. Distribution accounted for 286 of the outages (31.3%), of which 104 were equipment-related.

C. Under-frequency load shedding has been a frequent occurrence on the GPA system. During the 12-month period ended November 2013, there have been 467 such occurrences – virtually all related to the loss of generation.

III. GPA Efforts to Improve Reliability

⁷ PPA is an inter-governmental agency and member of the Council of Regional Organizations in the Pacific (CROP) to promote the direct cooperation of the Pacific island power utilities in technical training, exchange of information, sharing of senior management and engineering expertise and other activities of benefit to the members. Pacific Power Benchmarking Report 2012, prepared by the Pacific Power Association.

A. GPA considers reliability to be one of its prime concerns and continues its best efforts, but feels hampered by budgetary constraints. In addition, per discussions with GPA, meeting EPA regulations is expected to require considerable capital expenditures by GPA that is higher priority and will reduce funding needed for system reliability and efficiency improvements.

B. GPA continues to do vegetation management, albeit on a somewhat smaller scale. Trouble circuits are addressed as they become known. A T&D Maintenance Action Plan was developed to replace old and deteriorated overhead line hardware which includes rotted wood poles. The company has a long-range master plan to invest in its T&D system and based on funding, tries to adhere to the plan as much as possible.

C. GPA understands that generation outages always have priority over peaking if there are choices that need to be made. After generation, substations and transmission are the next priority for funding. However, not being able to invest in baseload units at appropriate levels, combined with improvements needed for peaking and emergency generators that may need to be deferred, will directly impact GPA's ability to reduce customer outage duration and frequency.

D. GPA is nearing completion of its Smart Grid system with the expectation that it will allow outage areas to be identified more quickly for crews to respond; help to quickly report outages; automate the computation of reliability statistics; and help reliability overall.

IV. Outage Reporting

A. When a scheduled outage occurs, GPA issues notices to the various mayors' offices and reaches out to media outlets before the scheduled outage will occur. When an unscheduled outage occurs, GPA dispatchers try to correct the situation and immediately contact GPA's information officer, who then tries to get the message out to the media, radio, television and newspapers regarding what happened.

B. GPA has a mobile app for use by customers that currently reports scheduled outages but is not updated regularly. In the future, GPA envisions building in real-time outage information in its mobile app as well reporting this information on Facebook and Twitter.

C. For local outages there is capability for an automatic trouble call recording telling customers that call from a particular area that GPA knows there is an outage and will state the estimated duration of the outage. In Lummus Consultants' discussion of this capability with GPA, they were unsure if it was currently operative.

D. Reliability reports are provided once a month for the CCU meetings and include one year rolling statistics relative to SAIDI and SAIFI for the reporting month as

well as the previous month, graphs depicting the monthly cumulative SAIDI and SAIFI, and the total yearly cause breakdown by frequency and duration. Additionally, a quarterly report is provided to include SAIDI, SAIFI, CAIDI, Storm CAIDI, and CEMI⁸. There is currently no formal reporting relative to outages and reliability to the Commission.

V. Lummus Consultants' Conclusions and Recommendations

- A. Notwithstanding the large amount of reserve capacity on the GPA system, generation, by far, accounts for the leading cause of outages.
- B. GPA should strive towards achieving comparable reliability to that of the four Hawaiian electric utilities, but should first focus on demonstrating continuing improvement relative to its own history.
- C. GPA has procedures in place to disseminate scheduled and unscheduled outage information to mayors' offices and to radio and television stations. However, this same type of information is not readily at hand on a real-time basis when a customer experiencing an outage needs it most, especially when that customer does not have power for the radio or television.
- D. GPA should incorporate real-time information on its mobile app to communicate with those areas and number of customers affected along with estimated time to restoration, as well as to provide such information to media and the PUC regularly at the onset of and periodically during the outage.
- E. Although there is some formal reporting to the CCU, there is currently no formal period for specific reporting to the Commission.
- F. Lummus Consultants recommended a set of monthly, quarterly and annual reporting protocols that should be provided to the Commission.

DETERMINATIONS

1. System reliability should be one of the most important objectives of a utility and it is disheartening that after the very significant GPA expenditures over the past few years through bonds and revenue funds on generation, transmission, and distribution that there has not been any measurable effect on improved reliability.
2. With approximately 60% of the outages being generation related, it is disconcerting as to why, with such significant reserve capacity on the GPA system that this figure should not be able to be dramatically reduced.

⁸ CEMI is Customers Experiencing Multiple Interruptions. CEMI-X is a measure of the percentage of customers who experienced X interruptions.

3. Smart Grid was held out by GPA as a way to improve reliability, but a measurable impact in overall reliability has, so far, not been observed.
4. GPA should be more proactive and focused on the reliability of its electrical system, particularly with respect to generation outages. It should undertake a concerted and prioritized program to determine those measures necessary to realize a significant improvement in reliability. This may involve redirecting some of the efforts, perhaps even against the advice of its consultants, towards improving reliability as its first order of business.
5. There needs to be greater openness and transparency with respect to the timeliness and distribution of unscheduled outage information to the public. The reporting protocols to the PUC that were recommended by Lummus Consultants should be adopted. Additionally, greater efforts need to be made by GPA relative to immediate reporting of unscheduled outages.

ORDERING PROVISIONS

After careful review and consideration of the Report of Lummus Consultants and consideration of the above determinations, the Guam Public Utilities Commission HEREBY ORDERS that:

1. GPA shall provide regular reporting to the PUC as follows:

1. Monthly Reporting

Monthly reporting should contain the same metrics that it reports to the CCU and to include, if not already in the CCU report:

One year number of outage occurrences, SAIDI, SAIFI, CAIDI and ASAI⁹ for the reporting month as well as the previous month

1. Breakdown among generation, transmission and distribution;
2. Number of occurrences, SAIDI, SAIFI and CAIDI that resulted in under frequency load shedding;
3. Information linking the outages to distribution circuits to track potential problem circuits;

Graphs depicting the monthly cumulative SAIDI, SAIFI, CAIDI and ASAI;

Reporting of all generator related offline trip events, their causes and duration (whether or not customers lost service);

⁹ ASAI, the Average Service Availability Index, calculated as $1 - \text{SAIDI} / 8760$, is a measure of total customer hours actually served as a percentage of the total customer hours possible during the year.

Unit specific outage reporting related to Equivalent Availability Factors (EAF) and Equivalent Forced Outage Rate (EFOR) consistent with GADS reporting;

Graphic representation of historic EAF and EFOR for multiple years; and

The total yearly outage cause breakdown by frequency and duration.

2. Quarterly Reporting

For each third month, corresponding with GPA's quarterly reporting to the CCU, the same information contained in the monthly reporting, above, and with the addition of storm CAIDI, CEMI and other metrics contained in GPA's quarterly report.

3. Annual Reporting

A more comprehensive and detailed report to include the quarterly information in order to facilitate reporting and eliminate duplication of information and be provided at the end of the calendar year in order to facilitate comparison with other utilities. Additional information should include:

Monthly reliability statistics for each, SAIDI, SAIFI, CAIDI and ASAI, in tabular and graphical form over the most recent five-year period, normalized and not normalized, with identification of any normalization adjustments, including storms, momentary outages, etc., that have been made to the current year data;

Benchmarking of GPA reliability statistics against its own historical performance and discussion of such trends;

Benchmarking of GPA reliability statistics against other systems such as those included in APPA, PPA, and Hawaiian systems;

Discussion and analysis of significant events during the year that assist in providing insight into the reliability indices of each, generation, transmission and distribution;

Discussion and rationale relative to trends in increased, decreased or same level of reliability. If indices show that system, and specifically generation reliability is not improving, GPA should include in its reporting a frank discussion as to why and identify the specific roadblocks impeding the path to significantly improved reliability;

Discussion relative to reliability-related maintenance and capital spending during the year; Smart Grid; special studies; or other initiatives undertaken during the year that have influenced or are expected to influence reliability;

Discussion relative to actions needed and progress towards mitigating the particularly frequent generation outages;

Discussion of proposed maintenance and capital improvements projects, including budgets, for the next fiscal year and beyond and the anticipated effect on reliability;

Discussion relative to reporting of scheduled and unscheduled outages to customers

and the Commission, including status of real-time reporting of outage information on GPA's mobile app and/or other means.

2. GPA should develop a standardized communications protocol or procedure to contact and provide outage notification to appropriate public entities and the public as identified in this recommendation. As soon as each scheduled and unscheduled outage becomes known, GPA shall immediately report the outage, at a minimum, to the following entities:
 - a. The Mayor's Office in the affected Village(s);
 - b. Media outlets including:
 - b.i. Newspapers [Pacific Daily News, Marianas Variety, and Pacific Voice (Umatuna)]
 - b.ii. Radio and television stations [Adventist Broadcast, Guam Broadcast KIJL, Joy FM, K-Stereo/KISH, KGTF, KHMG, KTKB, Moy Com (Hit Radio 100), Pacific Telestations (KUAM, i94, Isla 61), Fox 6/ABC 7, KPRG]
 - c. Organizations [Office of the Governor, Office of Civil Defense, Homeland Security, Speaker of the Guam Legislature, Director of the Department of Public Works, Guam Waterworks Authority]
 - d. The PUC, including the Chairman, Legal Counsel, and the Administrator
 - e. Outage communication to the above entities shall be accomplished by the most effective combination of telephone, email, text message and other means, as defined in GPA's communication protocol noted above. PUC understands that GPA now has the ability to send automated messages on AMI capability. The outage information to be communicated shall include:
 - a. Outage location;
 - b. Number of customers affected;
 - c. Estimated time to restoration;
 - d. Root cause of the outage.
3. GPA shall display a prominent link titled "System Status" or "Outage Information" on the home page of its website to link to the most current scheduled and unscheduled outage information with the most recent information displayed first. The information to be reported shall be as above and shall be updated immediately upon knowledge of each scheduled and unscheduled outage. GPA will maintain a 90 day history of outage information on the website.
4. GPA shall make its best efforts to update its mobile app to readily allow a user to link to the same required outage reporting that is on its website. GPA shall also endeavor to

provide the same timely scheduled and unscheduled outage information on other social media such as Facebook, Twitter and others that may gain in popularity in the future.

5. GPA shall report back to the PUC on or before August 22, 2014, as to what steps it has taken to comply with this Order and what new protocols it has implemented.
6. GPA is ordered to pay the Commission's regulatory fees and expenses, including, without limitation, consulting and counsel fees and the fees and expenses of conducting the hearing proceedings. Assessment of PUC's regulatory fees and expenses is authorized pursuant to 12 GCA §§12002(b) and 12024(b), and Rule 40 of the Rules of Practice and Procedure before the Public Utilities Commission.

Dated this 24th day of April, 2014.

Jeffrey C. Johnson
Chairman

Joseph M. McDonald
Commissioner

Rowena E. Perez
Commissioner

Peter Montinola
Commissioner

Michael A. Pangelinan
Commissioner

Andrew L. Niven
Commissioner

Filomena M. Cantoria
Commissioner

|