

BEFORE THE GUAM PUBLIC UTILITIES COMMISSION

IN THE MATTER OF:

The Petition of the Guam Power
Authority for Creation of new Energy
Storage Rate Schedule.

GPA DOCKET 20-09

ALJ REPORT



INTRODUCTION

This matter comes before the Guam Public Utilities Commission [“PUC”] upon the Petition of the Guam Power Authority [“GPA”] for review and approval by the Public Utilities Commission of Guam [“PUC”] of GPA’s recommendation to create a new Energy Storage Rate Schedule.¹

GPA’s proposal would be applicable to all new Net Energy Metering [“NEM”] customers who install a solar PV or wind turbine system after the Energy Storage Rate is approved by the PUC. It would not affect existing NEM customers. New NEM customers would elect to either: (1) use frequency control capability or an Energy Storage System [“ESS”] with the installation of a new solar PV or wind turbine system; or (2) pay to GPA a monthly charge of \$2.43 per KW pursuant to the Energy Storage Rate Schedule.²

BACKGROUND

GPA indicates that, in July 2018, the “Joint Renewable Integration Study (JRIS) conducted with the Navy determined that new PV installation should have Frequency Control Capability for Energy Storage System (ESS).”³ The PUC requested a copy of such Study in its Requests for Information. However, GPA, upon the advice of the

¹ GPA Petition for Creation of New Energy Storage Rate Schedule, GPA Docket 20-09, dated March 10, 2020, at p. 1.

² Id., at p. 2.

³ GPA Petition for Creation of New Energy Storage Rate, GPA Docket 20-09, filed March 10, 2020, at p. 1.

United States Department of the Navy, indicated that it could not make such study available to PUC “as doing so may provide bad actors information on the vulnerabilities of the GPA system.”⁴ GPA’s Petition does not include the JRIS or any extracts from that study.⁵

On January 9, 2020, GPA conducted a “Stakeholder Outreach” concerning changes to GPA’s current Net Metering Program. One of the proposed changes was to require all future solar PV & wind turbine systems to have frequency control capability or energy storage systems (batteries) to be tied into GPA’s grid.⁶ Seven witnesses, including members of the public, NEM customers, and solar industry representatives, testified against the proposal.⁷

On February 21, 2020, the Guam Consolidated Commission on Utilities approved Resolution No. 2020-01 “Authorizing Management to Require All Futured Utility-Scale and Net Energy Metering Solar Photovoltaics (PV) and Wind Turbine Systems to Have Frequency Controlled Capability or Energy Storage System (ESS) in order to be Tied into Island Power Grid, adopted and approved on February 21, 2020. CCU approved GPA’s recommendation that future NEM customers either have Frequency Control Capability/Energy Storage System after June 1, 2020 or pay an “initial Energy Storage Rate Schedule at \$2.43 per kW per month.”⁸

The Petition herein was filed on March 10, 2020. However, due to the COVID pandemic, the PUC was unable to hold public hearings in the villages until April 2021.

⁴ GPA Responses to PUC Request for Information, GPA Docket 20-09, filed April 4, 2021, GPA’s Response to RFI 2, at p. 13.

⁵ Comments of Micronesia Renewable Energy Inc., GPA Docket 20-09, filed on April 13, 2021, at p. 4; Micronesia Renewable Energy states that “There is therefore no support in the record for the Utility’s assertion that the JRIS supports the equipment requirements/charges proposed in the GPA Petition.”

⁶ GPA Submission of Stakeholder Outreach Jan. 9, 2020, Summary of Testimonies, provided to PUC by GPA Counsel Graham Botha on April 10, 2021.

⁷ Id.

⁸ GPA Petition for Creation of New Energy Storage Rate, GPA Docket 20-09, filed March 10, 2020, at p. 1.

Since the public hearings have now been conducted, this matter is properly before the PUC for decision.

PUBLIC HEARINGS

The PUC caused a Notice for Public Hearings on GPA's Petition to be published in the Guam Daily Post on March 23, March 30, April 6, and April 11, 2021. The Notice for Public Hearings and various documents relevant to this Docket were posted on PUC's website under "upcoming events."

The PUC conducted three public hearings on GPA's Petition for a new Energy Storage Rate: on April 13, 2021, at 6:30p.m., at the third floor, GCIC Building, Hagatna; on April 14, 2021, at 6:30p.m., at the Asan Community Center; and on April 15, 2021, at 6:30p.m., at the Dededo Senior Citizen Center. Over the course of the three evenings, a total of seven (7) witnesses testified, and five (5) witnesses submitted written testimony. Copies of all written testimonies provided at the hearings have been provided to the Commissioners. See WRITTEN TESTIMONY FROM PUC APRIL 13 PUBLIC HEARING, dated April 17, 2021.

Each of the three public hearings commenced with a presentation by General Manager John Benavente of the Guam Power Authority. A copy of the GPA presentation is attached hereto as Exhibit "1".⁹

At the Hagatna hearing, in support of GPA's Petition, Mr. Benavente testified that current customer owned PV (NEM) has grown to 26MW. Without frequency control capability, the addition of roof top solar would continue to degrade system reliability and cause intermittency. As an option to providing Frequency Control Capability or an Energy Storage System on new solar PV or wind turbine systems, new Net Energy

⁹ GPA'S PROPOSED OPTIONAL ENERGY STORAGE SYSTEM (ESS) RATE, PUC Docket 20-09, filed April 13, 2021.

Metering (NEM) customers could pay to GPA a monthly charge of \$2.43 per KW pursuant to the Energy Storage Rate Schedule.

Stanley Wilson, a NEM customer, testified against the GPA proposal. He felt that, instead of discouraging solar roof top customers, GPA should be encouraging people to use solar; he did not agree that roof top solar systems were causing intermittency in the island wide power system. The cause of intermittency was that GPA had built the Dandan solar plant without solar batteries. GPA should include more funds for batteries in its budget. This proposal will basically kill the solar industry.

Jeffrey Voacollo, Chief Operation Officer of Micronesia Renewable Energy, Inc., stated that GPA had not proven “causation”: that solar energy produced by net metering customers was the “cause” of intermittency in the power system. The Petition was not supported by competent data. GPA did not mention other factors that would address intermittency such as grid reliability and improvement of the transmission system. NEM energy is distributed throughout the island, but the Dandan 25MW plant, with a high concentration of solar energy, is “an added stressor to their feeder on their grid.” The addition of battery storage would mitigate intermittencies to this feeder. GPA has also disregarded the Value of Solar study conducted by Clean Power Research, which indicates that NEM solar energy resources should be valued at \$.29kWh; if coupled with battery storage, NEM energy should be valued at \$.368 cents per kWh. If customers add battery storage to their systems, they should be compensated at a higher rate, not the NEM retail rate.

Micronesia Renewable Energy Inc. retained an expert witness for this proceeding Karl R. Rabago from Rabago Energy LLC. Mr. Rabago has an extensive background in energy and regulatory matters; his resume is set forth in the materials submitted as Written Testimony at the April 13 Public Hearing. Mr. Rabago testified both orally and in writing.

Mr. Rabago concluded that the GPA petition was “materially deficient, unsupported with competent evidence, and discriminatory against NEM customers...” He requested that the PUC deny the Petition.¹⁰ He indicated that GPA’s “energy storage rate” would “render self-generation uneconomic for many potential NEM customers.”¹¹ The \$2.43 per kilowatt of generation capacity each month for the life of the system could cost the owner of a 10MW system \$7,290 in nominal dollars over a 25-year system life.¹² A copy of Mr. Rabago’s testimony is attached hereto as Exhibit “2”. His testimony will be covered more extensively in the “ANALYSIS” Section of this Report.

Wanjoo Kim, the General Manager of “Go Solar Guam” testified against GPA’s Petition for creation of a New Energy Storage Rate. He argued that GPA had not conducted the required third-party independent study ordered by the PUC in GPA Docket 19-04. GPA had not fulfilled its obligation to provide a study which determined the cost of the grid and other services used by NEM customers, and which identified, in detail, the specific value of those services provided to NEM customers. GPA has also not provided a full, balanced benefit-cost analysis that analyzes all the impacts that distributed generation has on the distribution system especially specific to the location of the distributed generation on the system.

Although GPA cited alleged subsidization of NEM customers by non-NEM customers, none of the factors pointed to by GPA have been evaluated in a comprehensive independent study. Intermittencies in the system, rather than being caused by NEM customers, were more likely attributed to the fact that GPA only recently provided an energy storage system for the Dandan solar plant. GPA has also not provided a rebate program for battery storage to NEM customers, as also ordered in GPA Docket 19-04. GPA, the CCU, and PUC should focus on upgrading the grid and providing the storage

¹⁰ Comments of Micronesia Renewable Energy Inc., GPA Docket 20-09, submitted to the PUC on April 13, 2021.

¹¹ Id., at p. 4.

¹² Id..

necessary to the optimal management of all available distributed energy resources, and to incentivize private residential and commercial roof top solar.

William Hagen, owner of Pacific Solar & Photovoltaics, stated that the purpose of his testimony was to protect Guam's Net Metering Program in accordance with the 2004 legislation and the rules and regulations implemented by the PUC in 2008. GPA continues to rely upon the discredited notion that non-NEM customers are being required to subsidize owners of distributive generation systems, who invested tens of thousands of dollars in renewable energy.

Before the Dandan solar farm was contracted and installed, Mr. Hagen met with the utility's senior management and stressed the danger of not having some sort of back up or protection against shading. His appeal was ignored. Sharp drops in production and loss of the power have started with the Dandan plant, not the hundreds of wide-spread small distributed solar installations. Dandan solar causes under-frequency load shedding events; distributed generation, because it is not concentrated in one location, does not "create" or "produce" rapid large production spikes "or dips as the system ramps up or throttle down."

To ensure that small, distributed generation systems do not have any effect on the grid, all GPA needs to do is to ask "for an advanced inverter function commonly called "the volt-watt function" to be installed. This allows the inverter to "mimic the grid even during an anomaly." Mr. Hagen submits that individual storage units, or utility controlled off-site storage, is not necessary. "Underfrequency load shedding" is a "trojan Horse presented by the utility to try and undermine and eliminate Guam's successful distributive generation program."

There was no testimony presented at the Public Hearing at the Asan Community Center on April 14, 2021.

One witness testified at the Public Hearing at the Dededo Senior Citizens Center on April 15, 2021. Dr. William Weare, a NEM customer, testified against the GPA Energy Storage Rate proposal. He indicated that, because of rapidly rising GPA power rates, he investigated solar alternatives and put in a 10.82KW solar system in his home. He does not feel that the battery storage proposal of GPA makes “financial sense.” These batteries are “a luxury item.” Although GM Benavente had indicated a cost of \$7,000 for a solar battery storage system, Dr. Weare believes that the cost would be closer to \$14,000.

GPA should encourage roof top solar. Instead of being a power producing/distribution company, GPA should shift towards “storage” company. Solar power can also be produced at half the price of fossil fuel. GPA should encourage multiple roof tops with batteries.

GPA should also encourage electric cars/trucks. They could place charging stations around workplaces and work with private companies such as Cars Plus/AK to develop these resources. GPA needs to take steps to implement the renewable power standards now in law. GPA’s proposal should be tabled at the present time and a “fresh look” taken towards these issues.

ANALYSIS

A. INTRODUCTION

Even before the “merits” of GPA’s plan are analyzed, there are serious questions concerning whether the plan is presently ready for adoption or implementation. GPA’s

Petition requests that the PUC approve GPA's "Energy Storage Rate Schedule."¹³ When PUC requested the GPA Energy Storage Rate Schedule in the Requests for Information, GPA stated that "GPA is currently undertaking a study with Utility Financial Services LLC to determine the Energy Storage Rate Schedule."¹⁴ Consideration of the proposal may not be appropriate until the Schedule is finalized.

GPA's proposal, if adopted, would likely not result in the adoption by NEM customers of a significant amount of frequency control capability or Energy Storage. Many witnesses testified that the cost of such equipment would be economically prohibitive. The cost of such equipment, as well as the energy storage rate, could work as a disincentive for new potential NEM customers to purchase PV systems.

There is also a concern that GPA's review and approval process of NEM customer equipment will be cumbersome and delay customer ability to set up new PV systems. Multiple physical reviews by GPA will be required in the approval process. GPA would require testing as part of commissioning the system. GPA would approve the Interconnection Agreement for installation. "It will require a second approval to determine if the system actually performs to GPA requirements."¹⁵

GPA's intent does not actually appear to be to require new NEM customers to install frequency control capability or Energy Storage. As will be further discussed, its plan intends to raise the sum of over \$690,000 per year from new NEM customers to pay for future battery storage or additions to existing batter systems. In its calculations, GPA assumes that all NEM customers will pay the Energy Storage rate of \$2.43 per kW in their systems, rather than providing their own frequency control capability or Energy Storage. GPA is seeking to raise future revenue for new battery systems.

¹³ GPA Petition for Creation of New Energy Storage Rate, GPA Docket 20-09, filed March 10, 2020, at p. 1.

¹⁴ GPA Responses to PUC Requests for Information, GPA Docket 20-09, filed April 2, 2021, GPA Response for RFI 4, at p 14.

¹⁵ Id., GPA Response to RFI 1S, at p. 11.

For several reasons, the energy storage rate is not well designed.

B. GPA HAS NOT PROVIDED SUFFICIENT EVIDENCE TO ESTABLISH THAT SOLAR ENERGY PRODUCED BY NET METERING (NEM) CUSTOMERS IS THE “CAUSE” OF INTERMITTENCY OR UNRELIABILITY IN THE POWER SYSTEM.

GPA has made numerous allegations that NEM solar energy is a cause of intermittency in the power system. However, no hard data has been produced to establish the level or extent of intermittency allegedly caused by NEM customers. The GPA allegations have not been backed with sufficient evidence to justify charging new NEM customers with a per kilowatt energy storage fee.

Any rate charged by a utility must be “just and reasonable.”¹⁶ In accordance with Bonbright’s Principles of Public Utility Rates, rates must fairly apportion the total cost of service among different customers.¹⁷ GPA has not justified imposing energy storage requirements or an energy storage fee only upon new NEM customers. The Guam Public Utilities Commission should not approve rates without a strong and compelling justification for such rates.

GPA claims that there is a “correlation” between outputs of the NEM system and the Glide Path facility (25kW Dandan plant).¹⁸ Although a chart presented in GPA’s presentation (Ensuring System Reliability) shows comparable growth between NEM MW output and feeder trips (underfrequency outages),¹⁹ no specific information or evidence has been presented to establish that NEM energy output is responsible for underfrequency outages at the Dandan plant.

¹⁶ 12 GCA §12116

¹⁷ James C. Bonbright, Principles of Public Utility Rates, Columbia University Press, New York N.Y., 1961, at p. 291.

¹⁸ GPA Responses to PUC Requests for Information, GPA Docket 20-09, filed April 2, 2021, GPA Response for RFI 1-A, at p. 2.

¹⁹ GPA’S PROPOSED OPTIONAL ENERGY STORAGE SYSTEM (ESS) RATE, PUC Docket 20-09, filed April 13, 2021, at p. 6.

GPA itself indicates that its data concerning the output of NEM systems may not be exact: “GPA does not have telemetry on NEM Systems. GPA must rely on irradiance data to estimate the output of NEM systems. GPA does not have a sensor network for real-time solar irradiance so GPA must rely on average data published by NREL or other sources. GPA does not have a real-time information on the NEM user loads served by NEM systems.”²⁰

GPA has repeatedly referenced the intermittency and outages that have occurred at the 25MW Dandan solar farm. It is questionable whether that plant has any relevance to GPA’s proposal. In fact, GPA admits that the Dandan PV farm does not have relevance to an energy storage rate that NEM customers should pay. GPA recently commissioned a new 16 MW ESS in Talofoto which is specifically designed to remedy the intermittency issues at the Dandan plant. GPA states that “The Talofoto BESS remediates the intermittency of the Dandan 25.6MW solar PV facility. The costs for the Talofoto 16MW battery storage system are already “embedded in the rate base.”²¹

Any issues of intermittency of the Dandan plant are, by GPA’s admission, are not relevant to ESS requirements or energy storage rates for new NEM customers. In addition, GPA is in the process of bringing nearly 200 megawatts of solar energy into the power system with battery energy storage systems that can address frequency regulation and droop response. Given the large amount of solar energy which GPA plans to inject into the system, it has not indicated what particular or unique issues 26MW of NEM solar energy causes for the power system. GPA is already requiring that Phase III and Phase IV Renewable Acquisition projects will have BESS and that these **“will also help remediate the problems NEM customers in aggregate pose to grid stability.”**²²

²⁰ Id., GPA Response to RFI 1-B. at p. 4,

²¹ Id., GPA Response to RFI 13, at pgs. 20-21.

²² Id., GPA Response to RFI 11, at p. 18.

Specifically, RFI 14 asked “What evidence does GPA have that the 24 megawatts of solar energy produced by NEM customers has directly caused intermittency to the island’s power grid? Please provide all data, analysis, memorandum, and studies demonstrating the root cause analyses for the conclusion stated in the resolution.” In response, GPA offered certain findings of its consultant Utility Financial Solutions, LLC. (Guam RFI 14 UFS summary 03-22-2021). Said summary includes general “observations” concerning outages and underfrequency load shedding, and UFLS generation events at the Dandan solar plant. However, there is no strong or compelling evidence provided in such Report to demonstrate that NEM customers are responsible for intermittency or underfrequency outages.

GPA indicated that “as of October 31, 2019, GPA customers had experienced 27 feeder trips or outages due to solar PV systems without ESS or Frequency Control Capabilities.”²³ GPA states that the trips “would have collectively been triggered by NEM and the Dandan solar PV facility together.” However, GPA was unable to answer the question of which trips or outages were caused by NEM systems as opposed to those caused by the Dandan farm. GPA further indicates: “With no telemetry of NEM systems, GPA relies on PV dropouts experienced at the Dandan solar PV facility. If Dandan is experiencing a large PV dropout due to cloud cover, NEM systems throughout Guam are likely experiencing similar dropouts in production.”²⁴ However, GPA provides no specific evidence as to any particular trips or outages that were caused by NEM systems.

C. THE ESS RATE CHARGES TO NEW NEM CUSTOMERS SHOULD NOT BE IMPLEMENTED AT THE PRESENT TIME; GPA SHOULD BE REQUIRED TO PROVIDE THE INFORMATION ORDERED BY THE PUC IN GPA DOCKET 19-04 BEFORE THE PUC FURTHER CONSIDERS SUCH ESS RATES.

²³ Id., GPA Response to RFI 15, at p. 21.

²⁴ Id.

In GPA Docket 19-04, the PUC denied GPA's request to modify the current Net Metering Rider from providing the retail rate for net metering credits to avoided cost for net metering credits. PUC did indicate that it would again review net metering compensation when net metering customer reached an aggregate kW cap set at 10% of a system peak demand of 261MW. GPA has claimed in this proceeding that such cap has been reached; however, GPA has not yet filed for further proceedings in GPA Docket 19-04.²⁵

In that docket, GPA was "ordered to complete the planned distribution system impact study and include in that study a balanced locational and full benefit-cost analysis of how distributed generation impacts the distribution system."²⁶ GPA has indicated that the study may be completed soon. For the purposes of GPA's current proposal in this docket, it would be extremely helpful to have a distribution benefit-cost analysis that analyzes all the impacts of locational distributed generation on the distribution system. It may be premature for PUC to consider GPA's current request until such study is completed. At present GPA is not even certain as to which storage solutions it believes NEM customer should adopt as to equipment configurations. It is conducting studies with Utility Financial Services LLC and Landis and Gyr related to these applications. GPA indicates that it will "add or modify its requirements when it completes these studies."²⁷

The PUC should not consider GPA's proposal until these studies are all completed. As to implementing a rebate program for battery storage in the DSM program, PUC is aware that GPA has implemented some new commercial DSM rebate programs before further considering rebate program for battery storage. However, PUC has ordered that GPA must proceed with at least a pilot program for such battery storage; this

²⁵ PUC Order, GPA Docket 19-04(Guam Power Authority Request for Modification of Current Net Metering Rider [NEM]) dated May 30, 2019.

²⁶ Id., at Ordering Provision No. 7, p. 7.

²⁷ GPA Responses to PUC Requests for Information, GPA Docket 20-09, filed April 2, 2021, GPA Response to RFI 1-B.

should be commenced soon. Such a program may provide at least a part of the solution to intermittency allegedly caused by NEM customers. For the foregoing reasons, the ALJ recommends that PUC not consider GPA's proposal further at the present time.

D. THE TESTIMONY OF KARL RABAGO RAISES SIGNIFICANT ISSUES WHICH SUGGEST THAT THE GPA PROPOSAL SHOULD NOT BE ADOPTED.

In examining all the documentation provided by GPA, Mr. Rabago states that GPA fails to establish "causation" by net metering customers for intermittency or unreliability in the power system. GPA's responses to RFI 2 indicate that the focus of its Transmission System study "was on large-scale renewable energy integration and did not identify NEM facilities as the source of grid stability issues or in any way conclude that the new NEM PV installations should have Frequency Control Capability or Energy Storage Systems, or be required to pay an energy storage charge."²⁸ According to Mr. Rabago none of the exhibits to the CCU Resolution No. 2020-01 demonstrate substantive support for the GPA petition.

GPA does not provide credible evidence that "the variability in net usage and occasional exports from customer generators creates an incremental cost related to frequency regulation that is incurred on an ongoing basis after the time when such facility is interconnected. Such evidence should include the extent and duration of frequency deviations, the level of frequency regulation required to address those deviations, credible evidence of causation by the customers upon who the equipment costs or charges would be imposed, and the manner which the proposed costs or charges are tailored to fairly apportioned costs or charges."²⁹

GPA has not shown that "the reactive power supply requirements of NEM customers are specifically greater or different in any way traced to caused costs identified for

²⁸ Id., at p. 5.

²⁹ Id., at p. 7.

recovery through the proposed equipment requirements/charges.”³⁰ GPA has not provided credible evidence that “the variability in net usage and occasional exports from customer generators creates an incremental cost for voltage regulation that is incurred on an ongoing basis after the time when such a facility is interconnected. Such evidence should include the extent and duration of voltage fluctuations, the level of voltage regulation required to address those fluctuations, credible evidence of causation by the customers upon who the equipment cost or charges would be imposed, and the manner in which the proposed costs or charges are tailored to fairly apportioned costs or charges.”³¹

According to Mr. Rabago, GPA has not demonstrated that net metering customers are responsible for underfrequency outages. GPA does not isolate underfrequency outages associated with the 25MW Dandan facility and those that might have been caused by NEM facilities. GPA produces no evidence of underfrequency outages caused by NEM facilities.³² GPA has not conducted a small-scale or distribution level analysis of renewable energy integration issues.

Furthermore, the Transmission System Study indicate that matters other than net-metering, such as nonresponsive and non-flexible generation, no automatic generation control, slow 34.5kV and 115kV volt clearing, are responsible for grid problems. The Transmission Study does not specifically reference net metered facilities as the cause of problems or the part of the system requiring solutions.

Mr. Rabago states that GPA has not developed the Energy Storage Rate Schedule for which it seeks approval; it has not identified what type of Frequency Control Capability or Energy Storage Systems that NEM customer should install; it has not completed the “planned distribution system impact study” required by GPA Docket 19-04, which

³⁰ Id., at p. 7.

³¹ Id. at pgs. 7-8.

³² Id., at p. 9.

would include “a balanced locational and full benefit-cost analysis of how distributed generation impacts the distribution system.”³³ GPA has not created and offered a battery storage rebate program, as also ordered by the PUC in GPA Docket 19-04.³⁴

Finally, RFIs 11 through 16 and 19 indicate that GPA has failed to explain how it has analytically isolated impacts of NEM facilities from impacts of large-scale utility generation in its proposed equipment requirements/charges. According to him, it is GPA’s responsibility, not that of NEM customers, to establish and maintain a grid that can support clean renewable energy. Mr. Rabago concludes that the GPA petition fails to meet the standards of Guam law for rates that are “just and reasonable.” There is no evidence of cost causation that the proposed rate would fairly and equitably address. His testimony concludes that the Commission should deny the GPA petition in full.

E. GPA’S PROPOSAL FOR ESS REQUIREMENTS AND AN ENERGY STORAGE RATE DOES NOT ACTUALLY ADDRESS OR PROVIDE ANY REMEDY FOR EXISTING INTERMITTENCY AND OUTAGES ALLEGEDLY CAUSED BY CURRENT NEM CUSTOMERS.

GPA’s proposal to charge new NEM customers is attached hereto as Exhibit “3”. Since GPA’s proposal does not charge existing NEM customers for intermittency allegedly caused to the system, it has no impact whatsoever on the current power system. The proposal only seeks to charge an energy storage rate to individuals or businesses who are not presently NEM customers. The GPA proposal seeks to charge future customers for future NEM solar energy that is not yet a part of the power system. The future impact of new NEM customers on the system simply cannot be accurately estimated at present. Since current NEM customers are not included in GPA’s proposal, whether they have caused such instability or outages is irrelevant to such proposal.

³³ Id., at p. 11.

³⁴ Id., at p. 11.

GPA's ESS Cost Sharing Analysis addresses the GPA annual operating cost for the Talofoto ESS (16MW) and the Hagatna ESS (24MW). To begin with, GPA does not seek to charge either existing or new metering customers with the cost of the Talofoto ESS or any intermittency or outages caused to the 25MW Dandan plant.

GPA determines the proposed cost of \$2.43 to new NEM customers based upon calculations of the share of existing NEM customers (2,068) for the amount of \$691,820 for one half of the annual operating costs of the Hagatna ESS. However, GPA is not charging either existing or new customers for reimbursement of the costs of the Hagatna plant. During the public hearings, GM Benavente clarified that the estimated annual revenues of \$691,820 (one-half of the operating costs for the Hagatna ESS) would be collected from new NEM customers and be used to purchase future energy storage batteries or additions to existing battery systems for the next 23MW solar energy produced by new NEM customers. There are logical disconnects in GPA's proposal. Why should the ESS charge/rate for new NEM customers be based upon the calculated share of existing NEM customers for the costs of the Hagatna ESS? Why should new customers be charged for future energy not yet produced based upon the costs of the Hagatna ESS?

For the anticipated future batteries of an estimated 23MW, GPA seeks to charge new NEM customers "50%" of the cost. GPA determined the new NEM ratepayer cost of \$2.43 per kW per month would be based upon one half of the annual cost of operating the Hagatna 24MW solar ESS. GPA reasoned that one half of the annual cost of operating the Hagatna ESS should be the amount charged to new NEM customers for future batteries. The ALJ does not find a supportable basis upon which GPA determined a 50% share for new NEM customers. At present, there is no way of knowing how many new future NEM customers there will be. During the public hearings, GM Benavente stated that he determined "for simplicity, to split the cost." There is not an objective, clear rationale for charging new NEM customers 50% of

battery costs for an anticipated 23MW ESS in the future. It is not fair or equitable to charge new customers 50% without a more substantial basis as to how that percentage was arrived at. At present, the PUC should find that the 50% ESS charge amount requested by GPA is not justified without a more detailed and supportable rationale.

GPA's proposal is not based upon any current impact that net metering customers have had upon the power system. It is an attempt to charge future NEM customers based upon levels of solar energy production that have not yet occurred and cannot yet be accurately estimated.

GPA has stated that the new ESS systems to be put in place with Phases II through IV will address the issues concerning NEM intermittency. For the installation of nearly 200 MW of utility scale solar, GPA states that it has already included battery storage solutions in plant specifications. Issues concerning future NEM solar production of 23 MW would seem to pale in comparison.

Attached hereto as Exhibit "4" is a summary of NEM installation since 2009. What the summary shows is that from a high of 47 and 44 installations a month of new NEM customers in 2015 and 2016, the number of monthly installations of NEM in 2021 has dropped to 5. How many new NEM customers will there be in future? What will be the solar energy production of the new NEM customers? These are questions that cannot presently be answered.

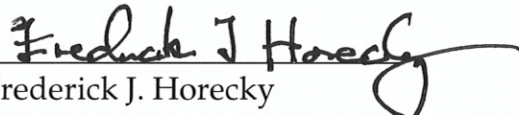
CONCLUSION

It is not appropriate to impose a per kilowatt ESS rate upon new customers when the size of their systems, the number of such customers, and their energy production cannot even be accurately estimated. GPA has not demonstrated with clear and convincing evidence that NEM customers have caused intermittency, outages, or degradation in

the present power system. This proposed rate and schedule arguably discriminate against new NEM customers. No requirements or charges are placed upon existing customers, but the burden of any intermittency or outages caused by current NEM customers and future NEM customers is only imposed upon the future customers.

Based upon the record before this Commission, and the review conducted herein, the Administrative Law Judge recommends that the PUC deny GPA's Petition for the Creation of a new Energy Storage Rate. A proposed Order is submitted herewith for the consideration of the Commissioners.

Dated this 16th day of April 2021.


Frederick J. Horecky
Chief Administrative Law Judge

GPA'S PROPOSED OPTIONAL ENERGY STORAGE SYSTEM (ESS) RATE

PUC DOCKET 20-09

John M. Benavente, P.E.
General Manager

April 13, 14, & 15, 2021



AGENDA

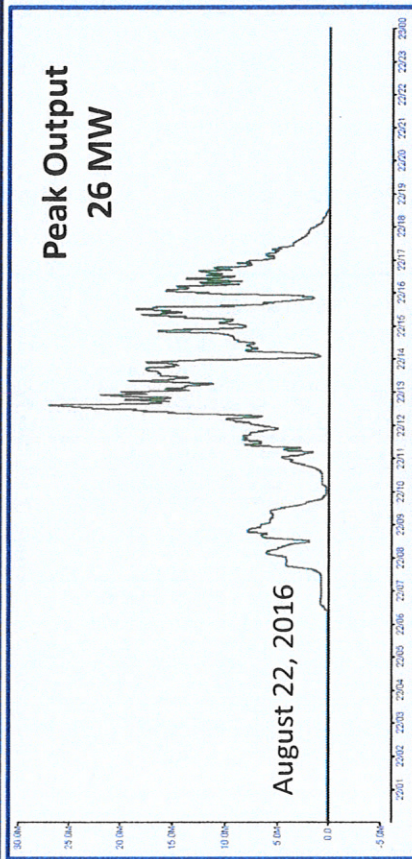
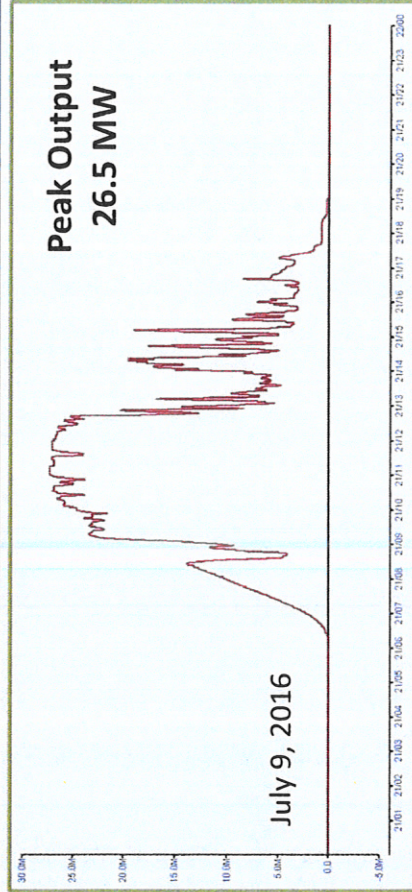
2

1. Frequency controls are essential for solar PV Systems
2. Mitigating frequency issues due to supply intermittency or disruption
3. Results from GPA's recently commissioned Energy Storage System
4. GPA requirements
5. Petition for an optional rate for a GPA-provided frequency controlling system

INTERMITTENCY IMPACT - Utility-Scale PV

3

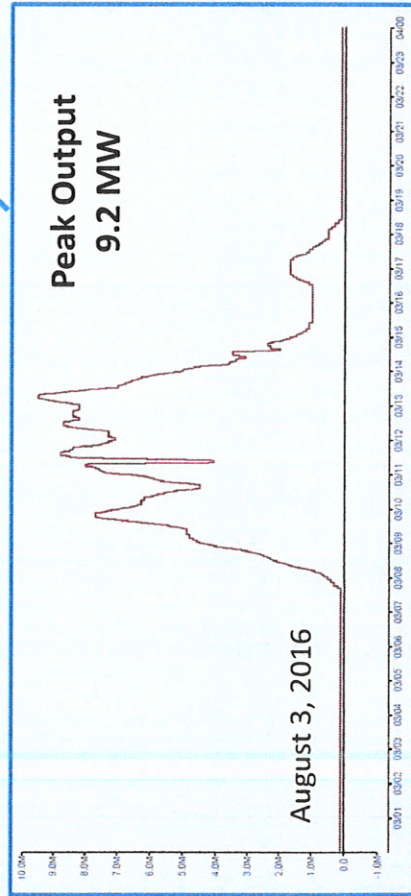
Utility-Scale PV Output



July 9, 2016

August 3, 2016

August 22, 2016

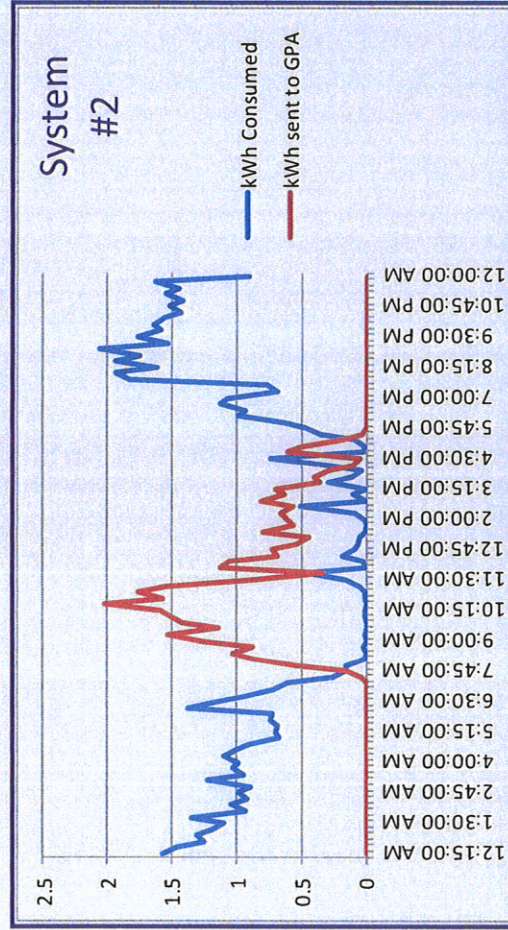
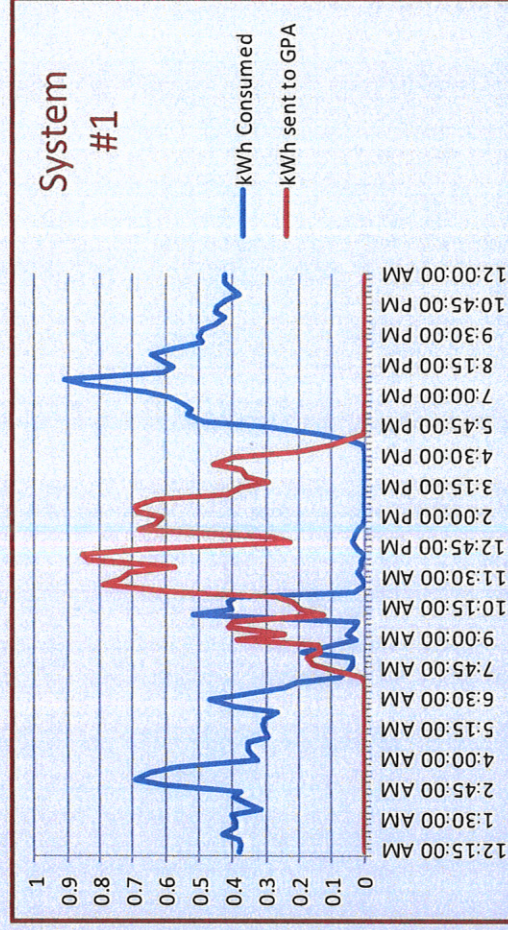


Intermittency Degrades Reliability

INTERMITTENCY IMPACT - Customer-Owned PV

4

14-JUN-2016	System #1	System #2	NOTE
PV System Size (kW)	5.0	12.4	
12 a.m. – 7 a.m. (kWh)	11.05	28.9	GPA → NEM Customer
7 a.m. – 6 p.m. (kWh)	3.66	6.1	GPA → NEM Customer
6 p.m. – 12 a.m. (kWh)	12.92	34.6	GPA → NEM Customer
7 a.m. – 6 p.m. (kWh)	16.14	32.5	GPA ← NEM Customer
Net GPA (kWh)	11.49	37.1	

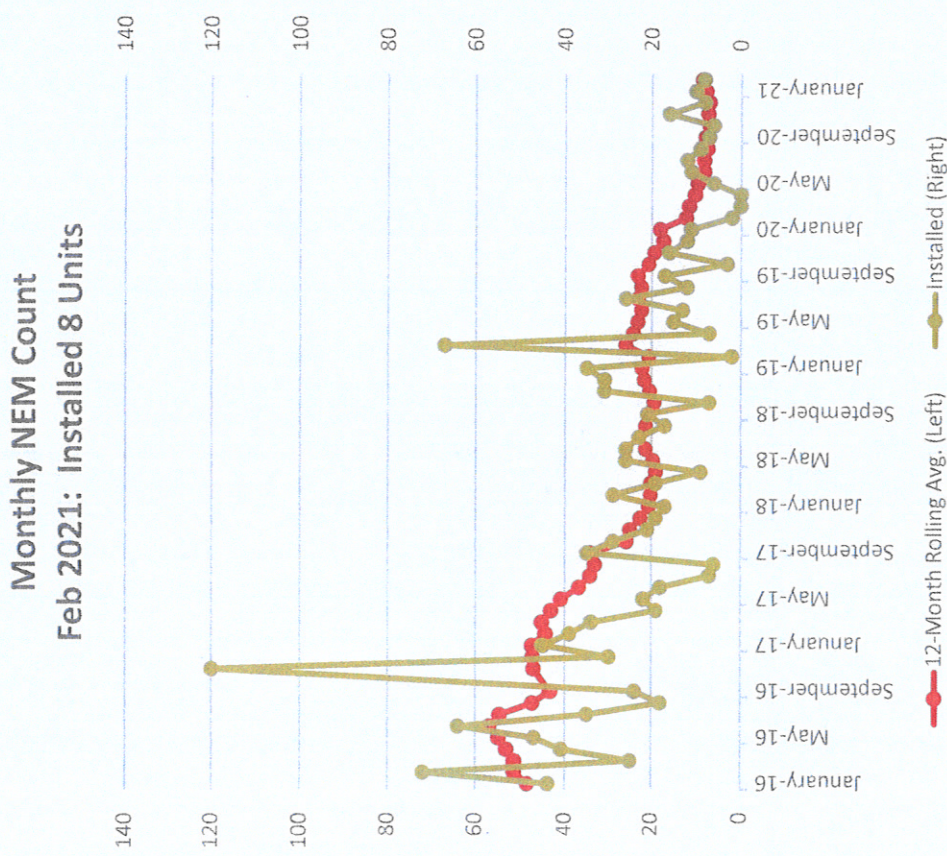
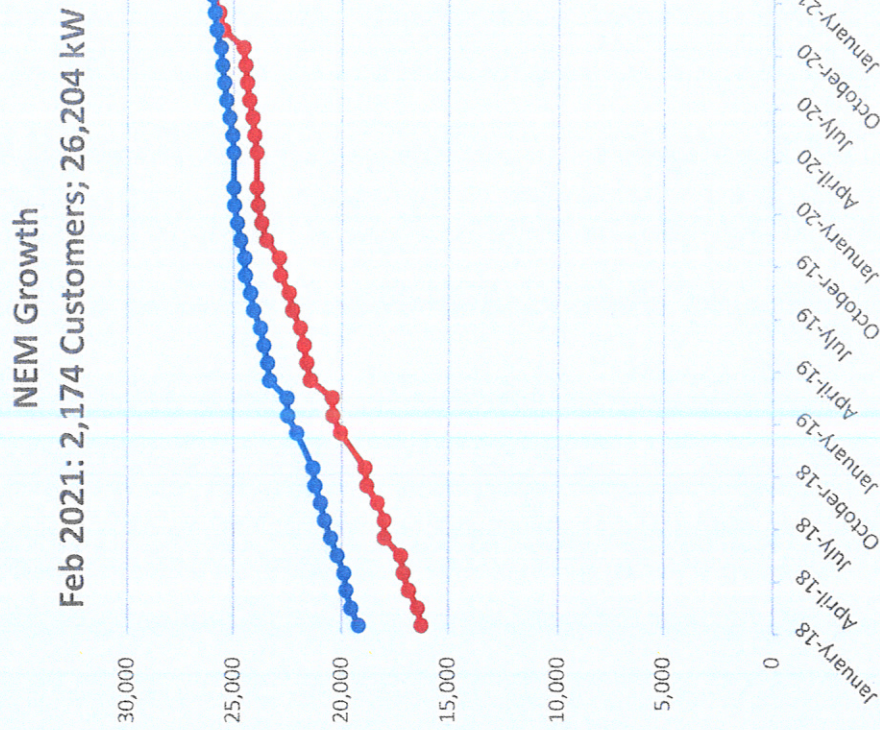


Intermittency Degrades Reliability



NET ENERGY METERING (NEM) GROWTH

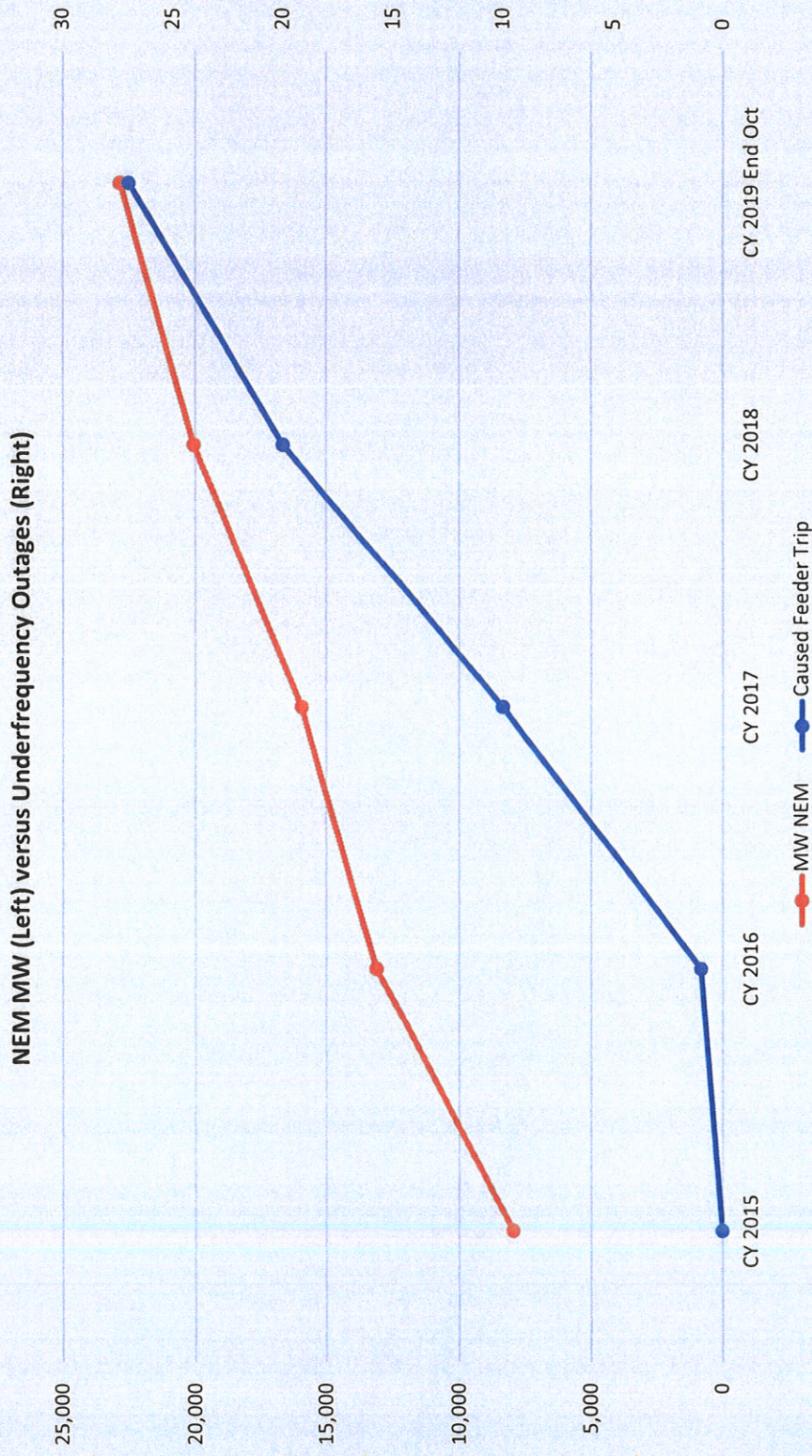
Through February 2021



ENSURING SYSTEM RELIABILITY

6

Continued NEM Growth Without Batteries Will Significantly Degrade Reliability



Solution: Future NEM Customers Install Batteries

MITIGATING INTERMITTENCY

7

ENERGY STORAGE SYSTEM (ESS)

Commissioned 2 ea ESS totaling 40 MW to address system reliability issues

- Conventional generators trip offline
- Intermittency of solar PV supply

POLICY - FUTURE SYSTEMS

- All future utility-scale solar PV systems must be constructed with ESS, such as batteries.
 - GPA Renewable Energy Projects Phases II (120 MW) & III (40 MW) solar PV projects include batteries.
- All new solar PV installations require an acceptable frequency control or ESS.

The current customer-owned PV (NEM) has grown to 26 MW.

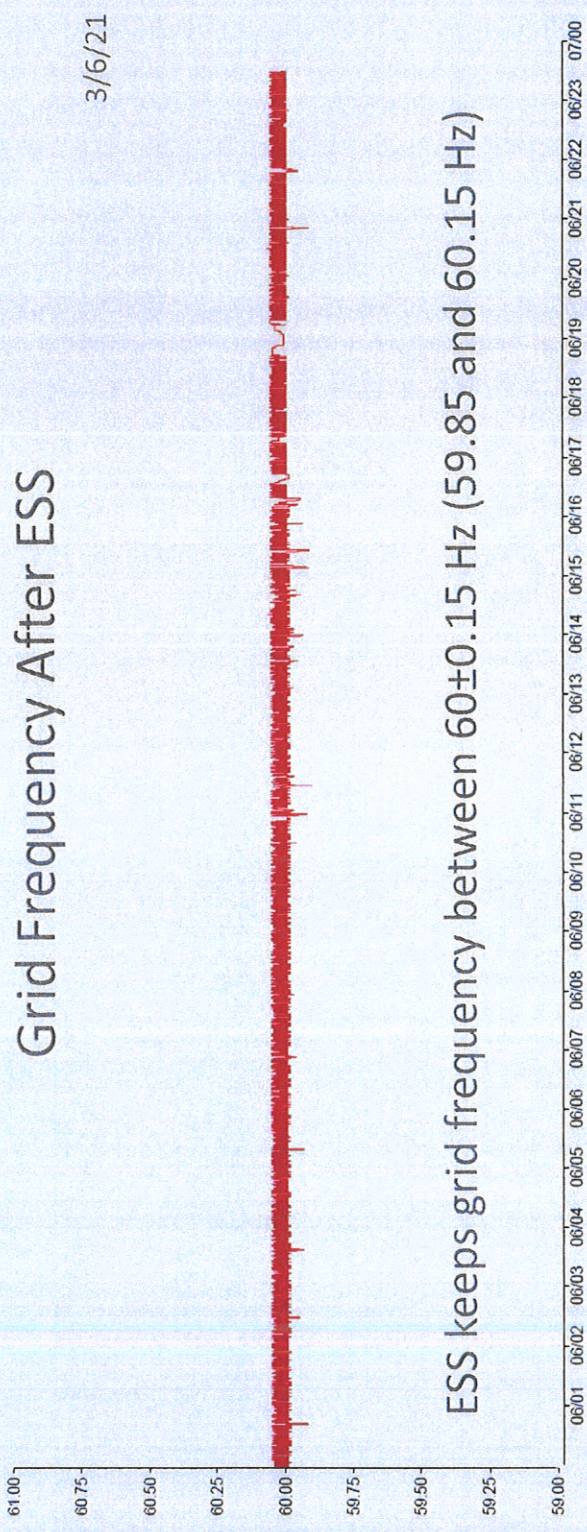
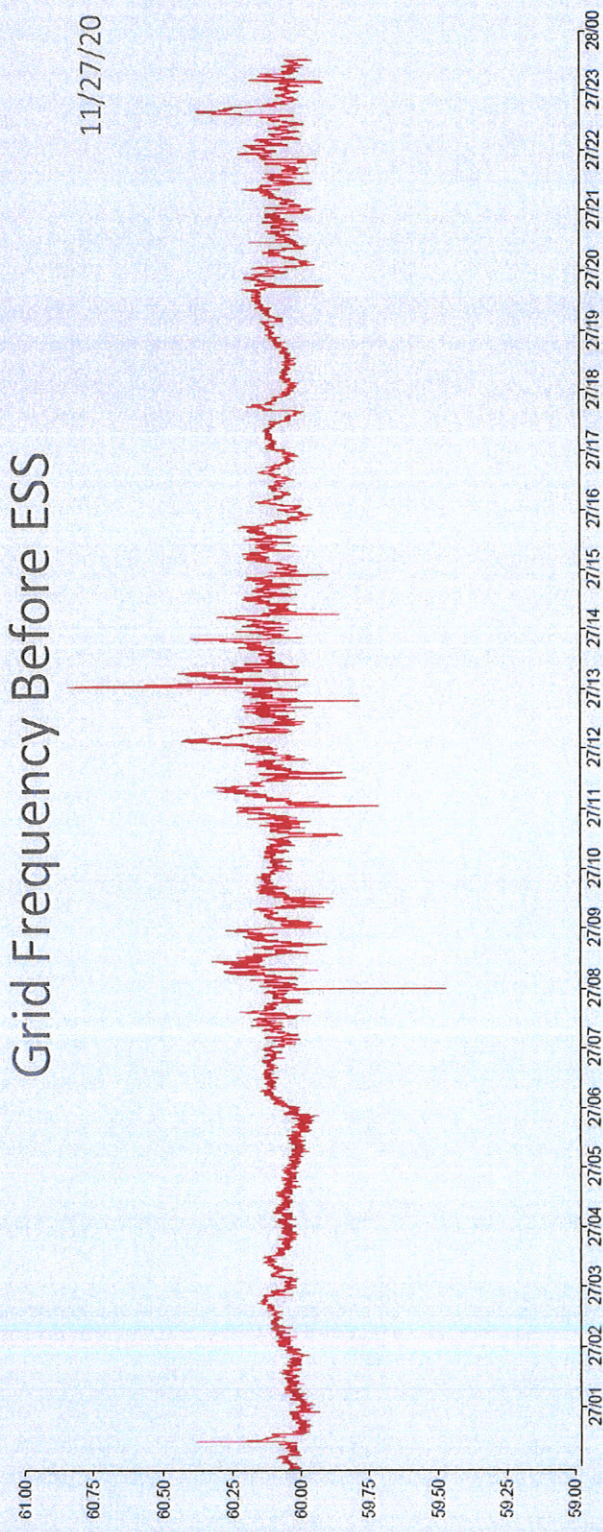
Without frequency control capability, addition of roof top solar will continue to degrade system reliability.

DOCKET
20-09

GPA filed a petition with PUC for an **energy storage rate** as an option for new NEM customers in lieu of providing their own ESS or frequency control capability.

Energy Storage - Frequency Regulation (Agana)

8

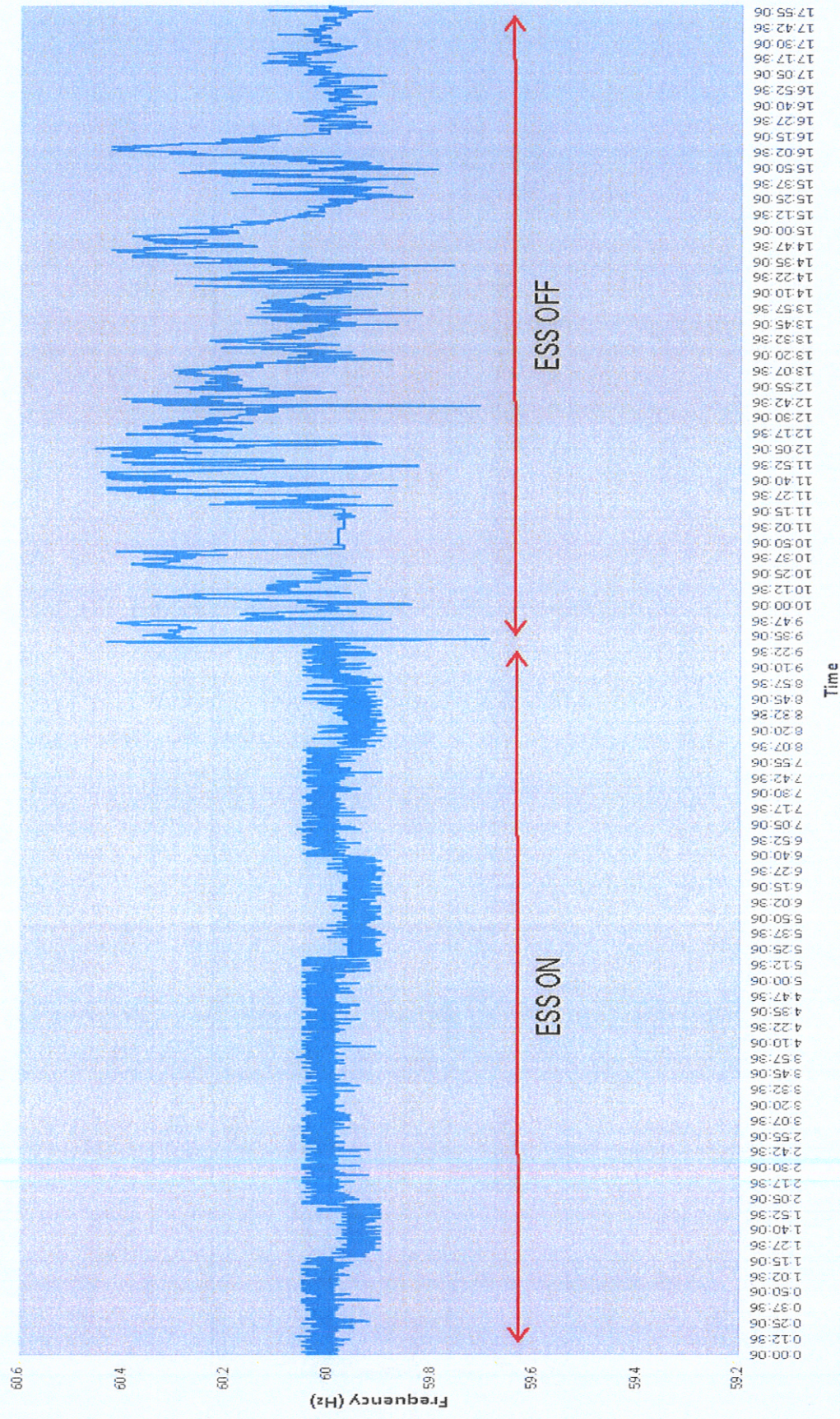


ESS keeps grid frequency between 60 ± 0.15 Hz (59.85 and 60.15 Hz)

ESS Frequency Regulation Performance

9

Agana ESS Frequency Regulation (12/31/20)



Energy Storage - Spinning Reserve (Agana ESS)

10

ESS provides significant reduction in customer outages for
Piti 8&9 trips

Date	Unit(s) Tripped	Agana ESS Status	Feeders Tripped
2021 Mar 01	Piti 8&9	Online	5
2021 Jan 16	Piti 8	Offline	14
2021 Jan 15	Piti 8&9	Offline	11
2020 Jan 11	Piti 8	Offline	21
2020 Nov 09	Piti 8	Offline	14
2020 Oct 24	Piti 8	Offline	20

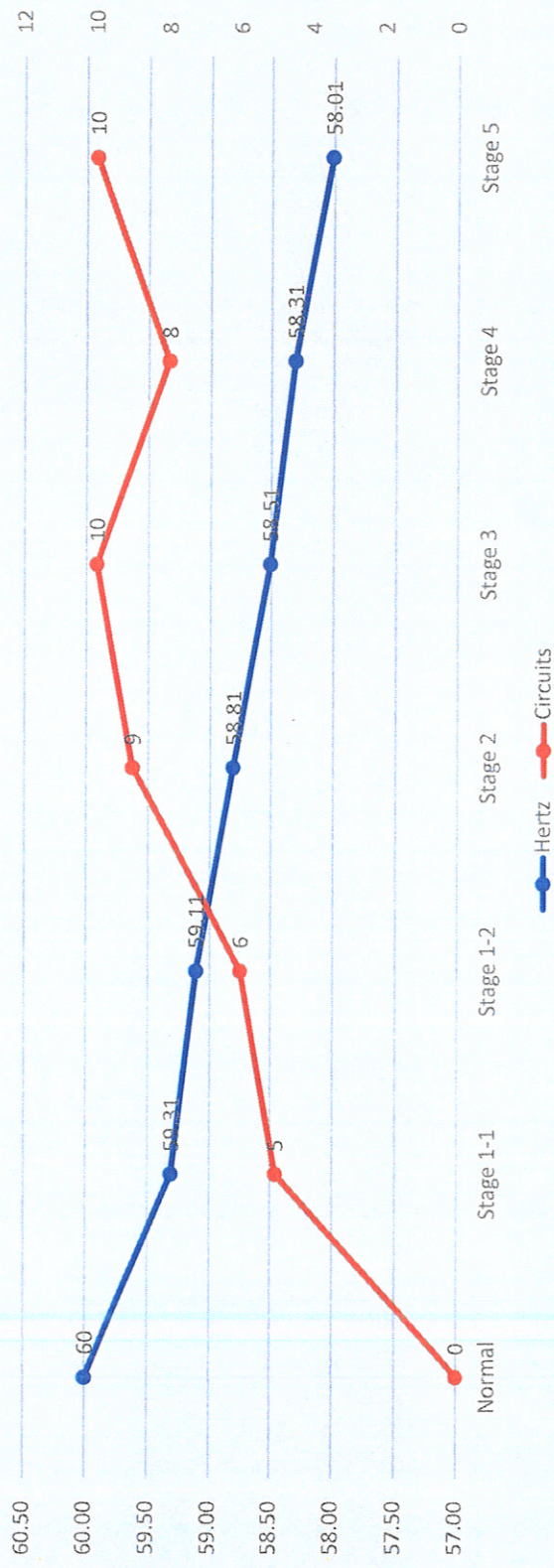
Underfrequency Load Shedding (UFLS)

11

UFLS is used to avoid island-wide blackout & protect the grid

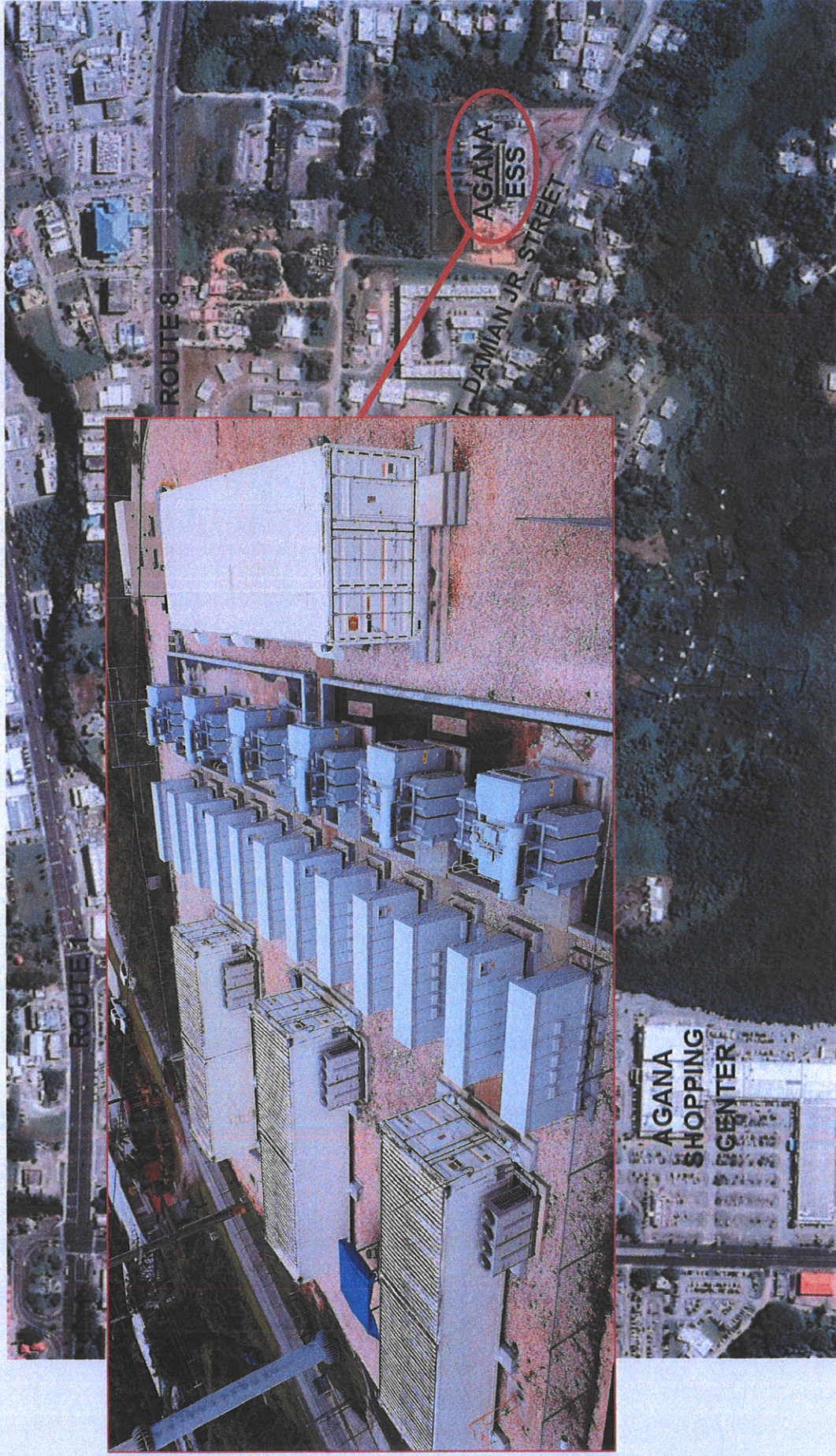
Frequency	Hertz	Circuits	Min MW	Max MW	Min Cumulative MW	Max Cumulative MW	% of Peak MW
Normal	60	0	0		0	0	0.0%
Stage 1-1	59.31	5	8.17	11.48	8.17	11.48	4.5%
Stage 1-2	59.11	6	8.75	25.08	16.92	36.56	14.3%
Stage 2	58.81	9	17.28	23.78	34.2	60.34	23.6%
Stage 3	58.51	10	18.83	23.07	53.03	83.41	32.6%
Stage 4	58.31	8	16.09	23	69.12	106.41	41.6%
Stage 5	58.01	10	16.36	23.65	85.48	130.06	50.8%

System Underfrequency Load Shedding



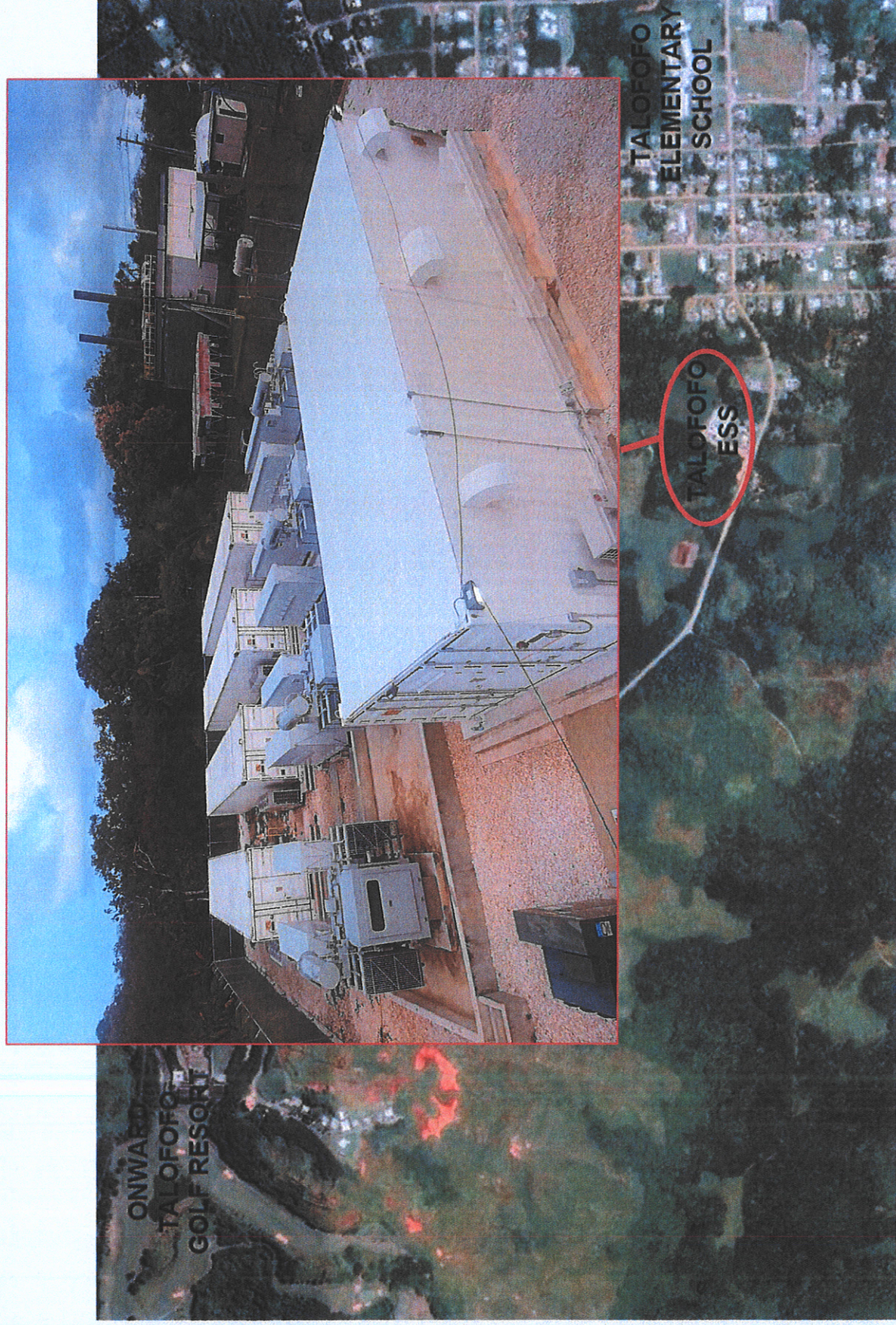
Energy Storage - 24 MW ESS Agana

12



Energy Storage - 16 MW ESS Talofofo

13



Proposed Optional ESS Rate

Frequency Control Energy Storage System (ESS)

Benefits Location Battery Size (kW)	<u>Full ESS Project</u>		<u>GPA Solar ESS Only</u>	<u>GPA Generators/NEM Rooftop</u>
			Non-NEM Talofofo GlidePath 16,000	NEM/Non-NEM Hagatna NEM / System 24,000
Investment		\$35,000,000	\$14,000,000	\$21,000,000
Annual Debt Service 5%, 20 years		\$2,006,065	\$802,426	\$1,203,639
Annual O&M		\$300,000	\$120,000	\$180,000
Total Annual Cost		\$2,306,065	\$922,426	\$1,383,639
Total NEM Customers (Dec 2019)				2,068
Total NEM kW (Dec 2019)				23,702
Annual Cost NEM/Non-NEM				\$1,383,639
NEM 50% Share				\$691,820
Cost/NEM Customer/Month				\$27.88
NEM Annual Energy				37,373,314
\$/kWh ESS for NEM Customers				\$0.019
Cost/kW/Month				\$2.43
Average NEM kW Capacity				11.46
\$/Month/NEM Avg. kW Capacity				\$27.88

COST BURDEN ANALYSIS

15

System FY 2018 Cost
kWh Sales: 1,567,052,144

Description:	Amount	\$/KWH
Debt	\$ 30,167,800	\$ 0.019
Capital Improvement	\$ 16,599,038	\$ 0.011
Transmission and Distribution Grid	\$ 12,338,142	\$ 0.008
Customer Accounting	\$ 6,354,272	\$ 0.004
Admin/General	\$ 33,971,438	\$ 0.022
Production - Non Fuel	\$ 61,331,145	\$ 0.039
Total Base Rate (Fixed Cost)-Non Fuel	\$ 160,761,835	\$ 0.103

Fuel Cost	\$ 217,567,039	\$ 0.139
Total Cost	\$ 378,328,874	\$ 0.241

Solar PV Production Does Not Avoid Base Rate of \$0.103/kWh
Solar PV Production Does Avoid Fuel Cost

Full Burden of Fixed Cost Shifted to Non-NEM Ratepayer

NEM Customers Not Paying for System
CY 2021 Subsidy about \$4.7M



Questions?



BEFORE THE GUAM PUBLIC UTILITIES COMMISSION

IN THE MATTER OF:

**THE PETITION OF THE GUAM POWER
AUTHORITY FOR CREATION OF A
NEW ENERGY STORAGE RATE.**

GPA DOCKET 20-09

COMMENTS OF MICRONESIA RENEWABLE ENERGY, INC.

Prepared by:

Karl R. Rábago

Rábago Energy LLC

1 **COMMENTS OF MICRONESIA RENEWABLE ENERGY, INC.**

2 **Guam PUC Docket No. 20-09**

3 **Introduction:** Micronesia Renewable Energy, Inc. ("MRE") appreciates the opportunity to
4 present these comments in the Guam Public Utilities Commission's ("PUC" or "Commission")
5 public hearing on Guam Power Authority's ("GPA" or "Utility") petition ("GPA Petition") to
6 establish a new energy storage rate and charge applicable to net energy metering ("NEM")
7 customers.

8 As described by the Commission in its Notice of Public Hearing in this proceeding:

9 GPA's proposal would be applicable to all new Net Energy Metering (NEM) customers
10 who install a solar PV or wind turbine system after the Energy Storage Rate is approved
11 by the PUC. NEM customers would elect to either: (1) use Frequency Control Capability
12 or an Energy Storage System (ESS) with the installation of a new solar PV or wind
13 turbine system; or (2) pay to GPA a monthly charge of \$2.43 per KW pursuant to the
14 Energy Storage Rate Schedule.

15 MRE and its consultant advisor, Mr. Karl R. Rábago, reviewed the GPA petition as well
16 as other documents. These documents included:

- 18 • Consolidated Commission on Utilities ("CCU"), *Guam Power Authority Work*
19 *Session* (Jan. 23, 2020). Available at: [https://guamccu.org/wp-](https://guamccu.org/wp-content/uploads/2020/01/GPAWS-1.23.20.pdf)
20 [content/uploads/2020/01/GPAWS-1.23.20.pdf](https://guamccu.org/wp-content/uploads/2020/01/GPAWS-1.23.20.pdf).
- 21 • GPA, Consolidated Responses to Staff Requests for Information (96 pages),
22 Commission website (Apr. 2, 2021). Available at: [https://guampuc.com/wp-](https://guampuc.com/wp-content/uploads/2021/02/2021-04-02-GPA-RESPONSES-TO-PUC-REQUESTS-FOR-INFORMATION.pdf)
23 [content/uploads/2021/02/2021-04-02-GPA-RESPONSES-TO-PUC-REQUESTS-](https://guampuc.com/wp-content/uploads/2021/02/2021-04-02-GPA-RESPONSES-TO-PUC-REQUESTS-FOR-INFORMATION.pdf)
24 [FOR-INFORMATION.pdf](https://guampuc.com/wp-content/uploads/2021/02/2021-04-02-GPA-RESPONSES-TO-PUC-REQUESTS-FOR-INFORMATION.pdf).
- 25 • R. Robichaud, *Does an Island Approach to Higher Penetration Renewables Make*
26 *Sense for the Mainland*, National Renewable Energy Laboratory ("NREL")

1 NREL/PR-5000-72213 (Aug. 7, 2018). Available at:

2 <https://www.nrel.gov/docs/fy19osti/72213.pdf>.

- 3 • B. Norris, *Value of Solar+Storage in Guam*, Clean Power Research (“CPR”)
4 (Mar. 28, 2018). Available at: [https://www.cleanpower.com/wp-](https://www.cleanpower.com/wp-content/uploads/Guam-VOS-Final-Report-3-28-2018.pdf)
5 [content/uploads/Guam-VOS-Final-Report-3-28-2018.pdf](https://www.cleanpower.com/wp-content/uploads/Guam-VOS-Final-Report-3-28-2018.pdf).

- 6 • J. Johnson, et al., *Photovoltaic Frequency-Watt Curve Design for Frequency*
7 *Regulation and Fast Contingency Reserves*, Sandia National Laboratories
8 (“Sandia”) SAND2016-7271J (2016). Available at:
9 <https://www.osti.gov/servlets/purl/1338316>.

10 MRE concludes that the GPA Petition is materially deficient, unsupported with
11 competent evidence, unjustly discriminatory against NEM customers, and therefore should be
12 denied in full.

13 **Recommendation:** MRE recommends that the Commission deny the GPA Petition as
14 unsubstantiated, unjustly discriminatory, and contrary to the public interest. MRE further
15 recommends that the Commission direct GPA to refrain from the future submission of such rate
16 proposals unless and until the Utility has developed a comprehensive and transparent benefit-cost
17 assessment framework for use in screening and evaluating future rate and program proposals
18 relating to NEM customers and NEM facilities integration.

19 **GPA Petition:** GPA’s petition to establish what it calls an “energy storage rate” would present
20 all new NEM customers with the choice of incurring many thousands of dollars of equipment
21 costs to install frequency control with their solar generation systems, to install battery energy
22 storage, or to pay \$2.43 per installed kilowatt of generation capacity each month for the life of
23 the system. For a 10 kW NEM system the charge would amount to payments of an additional

1 \$24.30 to GPA each month, or \$7,290 in nominal dollars over a 25-year system life. The
2 proposed equipment requirements/charges would render self-generation uneconomic for many
3 potential NEM customers. Because the proposal lacks justification, it reflects an attempt by the
4 GPA to use the its monopoly status and market power to weaken the economic opportunity of
5 non-utility service providers like MRE, and for this reason is unjust and unreasonable.

6 GPA's sole justification for the specific equipment/charge proposal is contained in one
7 sentence stating that "The Joint Renewable Integration Study (JRIS) conducted with the Navy in
8 July 2018 has determined that new PV installations should have Frequency Control Capability or
9 Energy Storage System (ESS)."¹ As is often the case with GPA proposals, the Utility also re-
10 raises unsubstantiated assertions about improper subsidies that flow to NEM customers. The
11 subsidy assertions are addressed later in these comments, remain unsupported by any benefit-
12 cost analysis, and are specifically refuted by the Value of Solar+Storage Study sponsored by
13 GPA in 2018.²

14 The GPA Petition did not include the JRIS or any extracts from that study. There is
15 therefore no support in the record for the Utility's assertion that the JRIS supports the equipment
16 requirements / charges proposed in the GPA Petition.

17 The GPA did retain AGMETS to conduct perform a transmission-level renewable
18 integration study ("Transmission System Study"), summaries of which were included in response
19 to Staff RFI 2.³ The Transmission System Study was also the subject of a presentation by a

¹ GPA Petition at 1, lines 20-22.

² B. Norris, *Value of Solar+Storage in Guam*, Clean Power Research ("CPR") (Mar. 28, 2018). Available at: <https://www.cleanpower.com/wp-content/uploads/Guam-VOS-Final-Report-3-28-2018.pdf>.

³ GPA, Consolidated Responses to Staff Requests for Information (96 pages), Commission website (Apr. 2, 2021). Available at: <https://guampuc.com/wp-content/uploads/2021/02/2021-04-02-GPA-RESPONSES-TO-PUC-REQUESTS-FOR-INFORMATION.pdf>.

1 former senior engineer at NREL to the American Solar Energy Society annual meeting in 2018.
2 Both the GPA response to Staff RFI 2 and the NREL presentation confirm that the focus of the
3 Transmission System Study was on large-scale renewable energy integration and did not identify
4 NEM facilities as the source of grid stability issues or in any way conclude that new NEM PV
5 installations should have Frequency Control Capability or Energy Storage Systems or be
6 required to pay an Energy Storage charge.

7 The GPA Petition includes as an attachment a copy of CCU Resolution No. 2020-01
8 (“CCU Resolution”) with three exhibits.⁴ The CCU resolution rests on a number of
9 unsubstantiated conclusions that suggests that the CCU did not require the GPA to demonstrate
10 that its proposed GPA Petition was grounded in sound principles of rate making, including
11 demonstrating cost causation and reasonable allocation of costs to cost-causers, fairness in
12 apportionment and allocation of costs, and avoidance of unjust discrimination against customer-
13 generators seeking to take service under the net metering rate. Flaws in the CCU Resolution are
14 discussed later in these comments.

15 ***Flaws in the CCU Resolution:*** The CCU Resolution in support of the GPA Petition is
16 significantly flawed and provides no substantive support for the GPA Petition. These flaws are of
17 two major kinds. First, the CCU Resolution recites a number of unsupported assertions about
18 subsidies that are alleged to flow from the grid to NEM customers. Second, the CCU Resolution
19 references three exhibits that provide absolutely no technical or economic support for the
20 sweeping equipment requirements / charges in the GPA Petition.

21 ***Unsupported Subsidy Assertions:*** The CCU Resolution asserts that NEM customers are
22 subsidized by the grid in several ways. These assertions have been demonstrated to be false,

⁴ *Id.* at 3-7.

1 including in a study commissioned by the GPA, and now are so discredited as to be evidence of
2 an attempt at unjust discrimination against customer generators. The CCU Resolution asserts:
3 *NEM customers use the grid to sell power.* Contrary to this assertion, NEM customers export
4 excess energy solely as an incident to generation for use. NEM customers do not “sell for
5 resale,” which is the definition of a wholesale generator that sells for profit. The credit earned is
6 the retail rate, which is less than the value that this excess energy provides to the Utility.
7 NEM customers use the grid for storage. This assertion conflicts with the assertion that NEM
8 customers are selling power. Moreover, there is no physical or technical way to support an
9 assertion that NEM customers are using grid storage services for exports. Exports flow to the
10 nearest unserved load as a matter of physics, and, passing through a meter, give rise to full retail
11 revenues to the Utility along the way.

- 12 • NEM customers obtain frequency regulation services. The Utility must maintain
13 frequency regulation even though customer usage levels are diverse and
14 constantly varying, whether through self-generation, conservation, ordinary
15 behavioral changes, operational changes, transient cloudiness, or the weather.
16 Load and usage diversity actually provides a grid benefit and results in a
17 smoothing of the perceived load. A properly built grid absorbs usage variations as
18 a matter of design. The Utility provided no credible evidence that the variability
19 in net usage and occasional exports from customer generators creates an
20 incremental cost related to frequency regulation that is incurred on an ongoing
21 basis after the time when such a facility is interconnected. Such evidence should
22 include the extent and duration of frequency deviations, the level of frequency
23 regulation required to address those deviations, credible evidence of causation by

1 the customers upon who the equipment costs or charges would be imposed, and
2 the manner in which the proposed costs or charges are tailored to fairly apportion
3 costs or charges.⁵

- 4 • NEM customer require reactive power supply. All customers with motor or
5 similar loads require reactive power supply. The Utility has made no showing that
6 the reactive power supply requirements of NEM customers are specifically greater
7 or different in any way traced to caused costs identified for recovery through the
8 proposed equipment requirements / charges.
- 9 • NEM customers require voltage regulation services. Voltage regulation is a
10 function the Utility must perform as part of its obligation to maintain reliable grid
11 operations. As with frequency regulation, diverse and constantly varying
12 customer usage levels create a need for voltage regulation. This variation may
13 also be due to self-generation, conservation, ordinary behavioral changes,
14 operational changes, transient cloudiness, or the weather. Load and usage
15 diversity actually provides a grid benefit and results in a smoothing of the
16 perceived load and net voltage regulation requirements. A properly built grid
17 absorbs usage variations as a matter of design. The Utility provided no credible
18 evidence that the variability in net usage and occasional exports from customer
19 generators creates an incremental cost for voltage regulation that is incurred on an
20 ongoing basis after the time when such a facility is interconnected. Such evidence
21 should include the extent and duration of voltage fluctuations, the level of voltage

⁵ See, e.g., J. Johnson, et al., *Photovoltaic Frequency-Watt Curve Design for Frequency Regulation and Fast Contingency Reserves*, Sandia National Laboratories ("Sandia") SAND2016-7271J (2016).

1 regulation required to address those fluctuations, credible evidence of causation
2 by the customers upon who the equipment costs or charges would be imposed,
3 and the manner in which the proposed costs or charges are tailored to fairly
4 apportion costs or charges.

- 5 • NEM customers require stand-by power service. The CCU Resolution suggests
6 that the Energy Storage Rate Schedule is justified as a charge for “stand-by
7 service” on overcast days and the NEM facility cannot produce “sufficient power
8 generation,” presumably to serve native customer load. Of course, a NEM
9 customer that is not generating electricity is just a typical customer. Moreover,
10 there are accepted rate making standards for developing stand-by service rates
11 that were completely ignored in the GPA Petition. See Appendix A for a
12 discussion of such rate making principles.

13 *Misleading and Un-useful Figures in the CCU Resolution:* The appendices to the CCU
14 Resolution include charts and tables that the Utility cites as supportive of its petition. As
15 recognized by the Staff and never fully addressed by the Utility in response to several RFIs, the
16 exhibits provide no substantive support for the GPA Petition at all.

17 Exhibit A to the CCU Resolution is a chart showing variability for a single, large solar
18 facility of 24.7 kW in capacity. While the graphs and table are misleadingly labeled “NEM
19 (Solar PV) Customer Profile Intermittency,” they reflect only a narrow time-slice of data for a
20 single facility, and do not characterize the entire fleet of NEM generation. Nor does the data in
21 any way support the proposed equipment requirements / charges for all future NEM generation
22 facilities.

1 Exhibit B is an even less helpful and less meaningful chart of solar production for a 25
2 MW solar facility.

3 Exhibit C is a blatant attempt by GPA to confuse correlation and causation. As confirmed
4 by the Utility's response to Staff RFI 15, the chart shows Underfrequency Outages over several
5 years plotted against erroneously labeled values for "NEM MW." However, as the Utility
6 confirms in response to Staff RFI 15, it made no attempt to isolate underfrequency outages
7 associated with the 25 MW Dandan facility and those that might have been caused by NEM
8 facilities. In fact, the Utility provides no evidence at all of underfrequency outages caused by
9 NEM facilities.

10 ***Issues Identified in Transmission System Study:*** As previously stated, any reference to the Joint
11 Renewable Integration Study conducted by the GPA and the Navy is irrelevant to this
12 proceeding, as no data or evidence was presented from that study.

13 In addition, as stated in the summaries of the Transmission System Study and confirmed
14 by the presentation on that study written by a senior engineer at NREL, the Utility has not
15 conducted a small-scale or distribution-level analysis of renewable energy integration issues.

16 Problems cited in the Transmission System Study and the NREL presentation included
17 non-responsive and non-flexible generation, low short-circuit currents, no automatic generation
18 control, slow 34.5 kV and 115 kV fault clearing, and fault-induced delayed voltage recovery.
19 The proposed improvements include: 115 kV relay upgrades and communications, 34.5 kV relay
20 upgrades, flexible generation plant, 115 kV transmission, and energy storage transient grid
21 support. It is large scale, Phase II and Phase III renewables that trigger the need for transient grid
22 support, synchronous condenser at a flexible generation plant, synchronous condenser upgrades,
23 and load-shifting and grid-supporting energy storage. These are all problems and solutions

1 associated with the transmission system and large generators, not likely to be a problem caused
2 by small NEM generation that only exports incidentally to generation for use.

3 In fact, the specific recommendations from the Transmission System Study included
4 synchronous condensers, a 40 MW/22MWh battery system, contingency batteries, energy-
5 shifting batteries, batteries capable of contributing to system contingency response, flexible and
6 highly-efficient new generation, retirement of Cabras 1 & 2, upgraded system protection for all
7 transmission lines, batteries to control utility-scale generation ramps (Phase II), 160 MWh of
8 energy-shifting batteries to match with Phase III solar (40 MW), and automatic generation
9 control to manage batteries and conventional generation. None of the recommendations
10 specifically reference net metered facilities as the cause of problems or the part of the system
11 requiring solutions.

12 ***Other Issues Identified as a Result of Staff RFIs***

13 A review of GPA responses to Staff RFIs reveals several additional fatal deficiencies in
14 and underlying the GPA Petition. These flaws include:

- 15 • RFI 1, 1-B through 1-I: A failure to specific detail how NEM customers are
16 supposed to be able to comply with the option of "Frequency Control Capability."
17 Notably, the Utility's responses do not reference established standards for
18 advanced inverter functionality, frequency of response requirements, or other key
19 parameters. As a result, NEM customers will be placed in the unacceptable
20 position of not knowing whether their investment in their generation systems will
21 pass the unspecified tests that GPA will create in order to allow interconnected
22 operations. In addition, the Utility indicates that it may well modify requirements
23 even after systems are installed an operating.

- 1 • RFI 1-K through 1-W: As with Frequency Control Capability, GPA refused to
2 provide technical specifications for the Energy Storage System option. Again, this
3 puts an unacceptable burden and costs on NEM system developers and customers.
4 It is an unacceptable position for a public utility to take.
- 5 • RFI 3: GPA has not developed the Energy Storage Rate Schedule for which it
6 seeks approval.
- 7 • RFI 6: GPA has yet to complete the “planned distribution system impact study,”
8 including “a balanced locational and full benefit-cost analysis of how distributed
9 generation impacts the distribution system” as required in the Commission order
10 in Docket No. 19-04. As a result, the petition in this proceeding is not timely or
11 appropriate and explains the lack of data and analysis to support the petition in
12 this proceeding.
- 13 • RFI 7: In direct contrast to the proposal to charge customers or require them to
14 install energy storage equipment, the Commission ordered, in Docket No. 19-04,
15 the GPA to create and offer a battery storage rebate program. The Utility is
16 delinquent in creating and offering the program. As a result, the GPA lacks the
17 operational and economic data about distributed storage necessary to credibly
18 propose the Energy Storage Rate in this proceeding. Ironically, the GPA states
19 that it is not clear on whether more storage resulting from the rebate program
20 would help address grid instability, while it is perfectly ready to propose the new
21 equipment requirements / charges in this case.
- 22 • RFI 8: Notwithstanding a specific request from Staff that the GPA provide
23 documentation to support the proposed \$2.43 per kW per month charge in the

1 GPA Petition, MRE has not been able to find any such analysis or documentation.

2 The proposal remains unsupported.

3 • RFI 11 through 16, 19: The GPA has failed to explain how it has analytically
4 isolated impacts of NEM facilities from impacts of large-scale utility generation
5 in its proposed equipment requirements / charges. Instead, the GPA asserts
6 without justification that system improvements clearly identified as necessary in
7 the Transmission System Study would somehow allow NEM customers to be free
8 riders on system-wide costs. The responsibility of establishing and maintaining a
9 grid that can support clean renewable energy is on the Utility, not private investor
10 customers and solar companies.

11 • RFI 20: The Utility states that it has not completed a study of the alleged cost to
12 non-NEM customers from NEM systems. The GPA ignores the Value of
13 Solar+Storage Study that it commissioned in 2018 which showed that energy
14 from NEM facilities has value equal to or higher than the retail rate, and if
15 coupled with storage would justify a payment for capacity value by the GPA to
16 solar+storage customers at an even higher rate.

17 **Conclusions and Recommendations:** As a result of MRE's review of the GPA Petition and
18 associated and related documents and information, only one conclusion can be reached. The
19 GPA Petition fails to meet the standards of Guam law for rates that are just and reasonable. The
20 GPA has failed to substantiate its assertions regarding any need to impose the Energy Storage
21 Rate on new NEM facilities—there is no evidence of cost causation that the proposed rate would
22 fairly and equitably address. The Utility has even admitted in response to Staff RFIs that several

1 key studies have yet to be completely and that it has failed to comply with Commission orders
2 regarding benefit-cost assessment and an energy storage program.

3 As a result of these conclusions, the only appropriate remedy is for the Commission to
4 deny the GPA Petition in full.

5 In addition, the GPA Petition is only the latest effort by the GPA to use its monopoly
6 status to limit the growth of the NEM market in Guam. The GPA has demonstrated a lack of
7 professionalism in failing to substantiate its proposal that suggests an intentional and unjust
8 discriminatory intent against non-utility generation. The GPA has failed to establish a transparent
9 and comprehensive benefit-cost assessment ("BCA") framework that will ensure a fair,
10 objective, and robust platform for evaluation of such proposals and of other programs relating to
11 distributed energy resources ("DER") of all kinds in the future. The consequence of this lack of
12 an analytical framework for BCA evaluation of future rate proposals from the GPA will be
13 administrative efficiency and waste, inconsistency in approach, and a lack of confidence in
14 market integrity among customers and competitive non-utility service providers.

15 MRE therefore recommends that the Commission expressly order the GPA to refrain
16 from submitting any new proposals for rates, charges, or programs until the Utility has developed
17 a BCA Framework for evaluation of such proposals. MRE provides information about how such
18 a BCA Framework should be developed in Appendix B to these comments, based on the best
19 practices guidance contained in the recently-published National Standard Practice Manual for
20 Benefit-Cost Analysis of Distributed Energy Resources.⁶

21

⁶ T. Woolf, et al, *National Standard Practice Manual for Benefit-Cost Analysis of Distributed Energy Resources*, National Energy Screening Project (Aug. 2020). Available at: <https://www.nationalenergyscreeningproject.org/national-standard-practice-manual/>.

Appendix A – Analysis of GPA Petition as a Proposal for Stand-by Service

The CCU Resolution suggests that the GPA Petition can be viewed a proposal for a stand-by service rate. Stand-by service is typically back-up service (for unscheduled outages) or supplementary power service (for periods when the generator typically does not generate electricity). However, rather than measure when unscheduled or planned outages or output reductions actually occur, and the Company must provide back-up or supplementary service, the Utility proposes equipment / function requirements (frequency regulation or energy storage) or the payment of a charge of \$2.43 per kW per month. No analysis is provided to support the proposed equipment requirements or the alternative charge.

The Energy Storage Rate Schedule appears intended to reduce the savings a customer would realize, for themselves and for the utility and other customers, by installing solar. The resulting costs and charges have nothing to do with the actual level of energy use by customer-generators, the level and timing of exports, or any documented relationship between costs incurred by the Utility and causation by the incremental NEM customer.

Guam law requires that “all rates, charges, assessments, and costs made or charged by any public utility shall be just and reasonable” and that the Commission may prohibit discrimination.”¹

While not directly applicable U.S. federal law and regulation is also instructive on matters relating to rates for non-utility renewable generators. Federal Public Utility Regulatory Policies Act² requires utilities to interconnect “small power production facilities” as defined by FERC eligibility requirements for qualifying facilities (“QFs”).³ QF status automatically applies

¹ 12 G.C.A. § 12116 (a).

² 16 U.S.C. Ch. 46.

³ 18 C.F.R. § 292.303(c).

to on-site solar generators up to 1 MW.⁴ FERC's regulations implementing PURPA require that rates for electricity sales to QFs "shall be just and reasonable and in the public interest" and "[s]hall not discriminate against any qualifying facility in comparison to rates for sales to other customers served by the electric utility."⁵ Under FERC's regulations, rates for QFs that differ from the rates otherwise applicable to non-QF customers are considered to be non-discriminatory only when they are "based on accurate data and consistent system-wide costing principles" and only "to the extent that such rates apply to the utility's other customers with similar load or other cost-related characteristics."⁶

In MRE's view, application of these standard to the GPA's proposed Energy Storage Rate Schedule requires addressing several related questions:

- Are the charges reasonable and just to both the public and the Utility?
- Are the charges necessary to enable the Utility to fully perform its duties to the public under honest, efficient, and economical management?
- Are the charges necessary to enable the Utility to have a fair net return on the reasonable value of its property devoted to public service?
- Is the charge for a specific and reasonably defined service that the Utility is actually providing to the customer?
- Is the charge for the service reasonably calibrated to the cost of providing that service?

⁴ Facilities with net power production of less than 1 MW are exempt from the QF certification process. *Id.* § 292.203(d).

⁵ *Id.* § 292.305(a)(1)(ii).

⁶ *Id.* § 292.305(a)(2).

- Do the charges rely upon objective, metered determinants that are indicative or reflective of the cost of service for a particular customer or level of usage of the service?
- Does the service charge unjustly or unreasonably single out a particular customer or group of customers for disparate and unjustly discriminatory treatment?

GPA's proposed Energy Storage Rate Schedule does not comport with these standards.

The Utility provides absolutely no quantitative evidence to support its proposed Energy Storage Rate Schedule.

The CCU takes the position that GPA is providing stand-by services to customer generators. The Company did not measure the cost of providing stand-by power service to customer-generators. The charges that it imposes and seeks to increase on distributed generation customers are not calibrated as any other type of electric service would be calculated. That is, the charges are not differentiated by the volume, time, peak coincidence, or number of customers to whom they are provided. There are no identified costs to classify, functionalize, allocate, or recover in rates. The charges are not based on any measured levels or changes in usage, demand for capacity, or the need for new infrastructure. The stand-by power service charge aspect of the proposed Energy Storage Rate Schedule is unrelated to any demonstrated provision of service by the Utility to customer-generators.⁷

⁷ See 18 C.F.R. § 292.305(a), providing that "(1) Rates for sales: (i) Shall be just and reasonable and in the public interest; and (ii) Shall not discriminate against any qualifying facility in comparison to rates for sales to other customers served by the electric utility. (2) Rates for sales which are based on accurate data and consistent systemwide costing principles shall not be considered to discriminate against any qualifying facility to the extent that such rates apply to the utility's other customers with similar load or other cost-related characteristics."

In sum, the primary problem with the proposed Energy Storage Rate Schedule is that it is unrelated to the actual costs of serving customer-generators with stand-by service. The Utility and the CCU make no factual or data-based showing that a NEM customer creates costs that the Utility must bear in order to provide services rendered to such customers.

The Utility appears to intend to use the Energy Storage Rate Schedule to target small customers seeking cost-effective, self-help alternatives to the Utility's high electric service costs. The Utility asserts that small solar customer-generators are relying on the Utility for stand-by power service and its approach eliminates a significant portion of the savings that NEM customers could achieve through private investment in solar equipment.

The Utility has made no showing of the equipment or the amount of capacity or energy required to provide stand-by power service for NEM distributed generation customers, nor has it demonstrated any reasonable basis for charging for stand-by service in advance. The Utility has not demonstrated any threat to its financial integrity resulting from providing stand-by power service and any consequences of regulatory lag (i.e., a delay in recovering actual costs due to regulatory reviews and approvals). The Utility has not demonstrated any inequitable cost shift on an intra-class or inter-class basis. The Utility has not demonstrated the rate and frequency of stand-by service requirements for future NEM customer at all.

Karl R. Rábago, Rábago Energy LLC

Karl R. Rábago operates an energy consultancy as Rábago Energy LLC, based in Denver, Colorado, USA. Karl has more than 30 years of experience in energy and climate policy and markets and is recognized as an innovator in utility regulatory issues relating to clean and distributed energy services and technologies.

Rábago is a frequent author on electricity industry issues and has provided testimony as an expert witness in more than 120 electric and gas utility regulatory proceedings.

Karl serves as Chair of the Board of the Center for Resource Solutions, a San Francisco-based non-governmental organization that manages the Green-e Certification program for green power products, and on the Board of Solar United Neighbors.

Rábago has been a Commissioner on the Texas Public Utility Commission; a Deputy Assistant Secretary at the US Department of Energy; Vice President of Distributed Energy Services at Austin Energy; Director of Regulatory Affairs for the AES Corporation and AES Wind; and Managing Director & Principal of the Rocky Mountain Institute.

While on active duty in the US Army, Karl served as an Armored Cavalry officer in the 2d Squadron, 9th Armored Cavalry, as a trial counsel and defense counsel with the 5th Infantry Division (Mechanized), and as an assistant professor of law at the US Military Academy at West Point, NY.

Karl is a graduate of Texas A&M University with a Bachelor of Business Administration degree in Business Management and has a Juris Doctorate (Honors) from the University of Texas and Master of Laws degrees, in environmental and military law, from Pace Law School and the US Army Judge Advocate General's School.

Karl and his wife have been married for more than forty years, and have three grown children, and three amazing grandchildren.

Karl R. Rábago, karl@rabagoenergy.com, +1.512.968.7543, @rabagoenergy

Karl R. Rábago
Rábago Energy LLC
2025 E. 24th Avenue, Denver, CO 80205
c/SMS: +1.512.968.7543 | e: karl@rabagoenergy.com

Nationally recognized leader and innovator in electricity and energy law, policy, and regulation. Experienced as a regulatory expert, utility executive, research and development manager, sustainability leader, senior government official, educator, and advocate. Successful track record of working with U.S. Congress, state legislatures, governors, regulators, city councils, business leaders, researchers, academia, and community groups. Nationally recognized speaker on energy, environment, and sustainable development matters. Managed staff as large as 250; responsible for operations of research facilities with staff in excess of 600. Developed and managed budgets in excess of \$300 million. Law teaching experience at Pace University Elisabeth Haub School of Law, University of Houston Law Center, and U.S. Military Academy at West Point. Military veteran.

Employment

RÁBAGO ENERGY LLC

Principal: July 2012—Present. Consulting practice dedicated to providing business sustainability, expert witness, and regulatory advice and services to organizations in the clean and advanced energy sectors. Prepared and submitted testimony in more than 30 states and 100 electricity and gas regulatory proceedings. Recognized national leader in development and implementation of award-winning “Value of Solar” alternative to traditional net metering. Additional information at www.rabagoenergy.com.

- Chairman of the Board, Center for Resource Solutions (1997-present). CRS is a not-for-profit organization based at the Presidio in California. CRS developed and manages the Green-e Renewable Electricity Brand, a nationally and internationally recognized branding program for green power and green pricing products and programs. Past chair of the Green-e Governance Board.
- Director, Solar United Neighbors (2018-present).

PACE ENERGY AND CLIMATE CENTER, PACE UNIVERSITY ELISABETH HAUB SCHOOL OF LAW

Senior Policy Advisor: September 2019—September 2020. Part-time advisor and staff member. Provide expert witness, project management, and business development support on electric and gas regulatory and policy issues and activities.

Executive Director: May 2014—August 2019. Leader of a team of professional and technical experts and law students in energy and climate law, policy, and regulation. Secured funding for and managed execution of regulatory intervention, research, market development support, and advisory services. Taught Energy Law. Provided learning and development opportunities for law students. Additional activities:

- Former Director, Alliance for Clean Energy – New York (2018-2019).
- Former Director, Interstate Renewable Energy Council (IREC) (2012-2018).
- Former Co-Director and Principal Investigator, Northeast Solar Energy Market Coalition (2015-2017). The NESEMC was a US Department of Energy’s SunShot Initiative Solar Market Pathways project. Funded under a cooperative agreement between the US DOE and Pace University, the NESEMC worked to harmonize solar market policy and advance supportive policy and regulatory practices in the northeast United States.

Karl R. Rábago

AUSTIN ENERGY – THE CITY OF AUSTIN, TEXAS

Vice President, Distributed Energy Services: April 2009—June 2012. Executive in 8th largest public power electric utility serving more than one million people in central Texas. Responsible for management and oversight of energy efficiency, demand response, and conservation programs; low-income weatherization; distributed solar and other renewable energy technologies; green buildings program; key accounts relationships; electric vehicle infrastructure; and market research and product development. Executive sponsor of Austin Energy's participation in an innovative federally-funded smart grid demonstration project led by the Pecan Street Project. Led teams that successfully secured over \$39 million in federal stimulus funds for energy efficiency, smart grid, and advanced electric transportation initiatives. Additional activities included:

- Director, Renewable Energy Markets Association. REMA is a trade association dedicated to maintaining and strengthening renewable energy markets in the United States.
- Membership on Pedernales Electric Cooperative Member Advisory Board. Invited by the Board of Directors to sit on first-ever board to provide formal input and guidance on energy efficiency and renewable energy issues for the nation's largest electric cooperative.

THE AES CORPORATION

Director, Government & Regulatory Affairs: June 2006—December 2008. Director, Global Regulatory Affairs, provided regulatory support and group management to AES's international electric utility operations on five continents. Managing Director, Standards and Practices, for Greenhouse Gas Services, LLC, a GE and AES venture committed to generating and marketing greenhouse gas credits to the U.S. voluntary market. Government and regulatory affairs manager for AES Wind Generation. Managed a portfolio of regulatory and legislative initiatives to support wind energy market development in Texas, across the United States, and in many international markets.

JICARILLA APACHE NATION UTILITY AUTHORITY

Director: 1998—2008. Located in New Mexico, the JANUA was an independent utility developing profitable and autonomous utility services that provide natural gas, water utility services, low income housing, and energy planning for the Nation. Authored "First Steps" renewable energy and energy efficiency strategic plan with support from U.S. Department of Energy.

HOUSTON ADVANCED RESEARCH CENTER

Group Director, Energy and Buildings Solutions: December 2003—May 2006. Leader of energy and building science staff at a mission-driven not-for-profit contract research organization based in The Woodlands, Texas. Responsible for developing, maintaining and expanding upon technology development, application, and commercialization support programmatic activities, including the Center for Fuel Cell Research and Applications; the Gulf Coast Combined Heat and Power Application Center; and the High-Performance Green Buildings Practice. Secured funding for major new initiative in carbon nanotechnology applications in the energy sector.

- President, Texas Renewable Energy Industries Association. As elected president of the statewide business association, led and managed successful efforts to secure and implement significant expansion of the state's renewable portfolio standard as well as other policy, regulatory, and market development activities.
- Director, Southwest Biofuels Initiative. Established the Initiative as an umbrella structure for a number of biofuels related projects.

Karl R. Rábago

- Member, Committee to Study the Environmental Impacts of Windpower, National Academies of Science National Research Council. The Committee was chartered by Congress and the Council on Environmental Quality to assess the impacts of wind power on the environment.
- Advisory Board Member, Environmental & Energy Law & Policy Journal, University of Houston Law Center.

CARGILL DOW LLC (NOW NATUREWORKS, LLC)

Sustainability Alliances Leader: April 2002—December 2003. Integrated sustainability principles into all aspects of a ground-breaking bio-based polymer manufacturing venture. Responsible for maintaining, enhancing and building relationships with stakeholders in the worldwide sustainability community, as well as managing corporate and external sustainability initiatives.

- Successfully completed Minnesota Management Institute at University of Minnesota Carlson School of Management, an alternative to an executive MBA program that surveyed fundamentals and new developments in finance, accounting, operations management, strategic planning, and human resource management.

ROCKY MOUNTAIN INSTITUTE

Managing Director/Principal: October 1999–April 2002. Co-authored “Small Is Profitable,” a comprehensive analysis of the benefits of distributed energy resources. Provided consulting and advisory services to help business and government clients achieve sustainability through application and incorporation of Natural Capitalism principles.

- President of the Board, Texas Ratepayers Organization to Save Energy. Texas R.O.S.E. is a non-profit organization advocating low-income consumer issues and energy efficiency programs.
- Co-Founder and Chair of the Advisory Board, Renewable Energy Policy Project-Center for Renewable Energy and Sustainable Technology. REPP-CREST was a national non-profit research and internet services organization.

CH2M HILL

Vice President, Energy, Environment and Systems Group: July 1998–August 1999. Responsible for providing consulting services to a wide range of energy-related businesses and organizations, and for creating new business opportunities in the energy industry for an established engineering and consulting firm. Completed comprehensive electric utility restructuring studies for the states of Colorado and Alaska.

PLANERGY

Vice President, New Energy Markets: January 1998–July 1998. Responsible for developing and managing new business opportunities for the energy services market. Provided consulting and advisory services to utility and energy service companies.

ENVIRONMENTAL DEFENSE FUND

Energy Program Manager: March 1996–January 1998. Managed renewable energy, energy efficiency, and electric utility restructuring programs. Led regulatory intervention activities in Texas and California. In Texas, played a key role in crafting Deliberative Polling processes. Participated in national environmental and energy advocacy networks, including the Energy Advocates Network, the National Wind Coordinating Committee, the NCSL Advisory Committee on Energy, and the PV-COMPACT Coordinating Council. Frequently appeared before the Texas Legislature, Austin City Council, and regulatory commissions on electric restructuring issues.

Karl R. Rábago

UNITED STATES DEPARTMENT OF ENERGY

Deputy Assistant Secretary, Utility Technologies: January 1995–March 1996. Manager of the Department's programs in renewable energy technologies and systems, electric energy systems, energy efficiency, and integrated resource planning. Supervised technology research, development and deployment activities in photovoltaics, wind energy, geothermal energy, solar thermal energy, biomass energy, high-temperature superconductivity, transmission and distribution, hydrogen, and electric and magnetic fields. Managed, coordinated, and developed international agreements. Supervised development and deployment support activities at national laboratories. Developed, advocated, and managed a Congressional budget appropriation of approximately \$300 million.

STATE OF TEXAS

Commissioner, Public Utility Commission of Texas. May 1992–December 1994. Appointed by Governor Ann W. Richards. Regulated electric and telephone utilities in Texas. Co-chair and organizer of the Texas Sustainable Energy Development Council. Vice-Chair of the National Association of Regulatory Utility Commissioners (NARUC) Committee on Energy Conservation. Member and co-creator of the Photovoltaic Collaborative Market Project to Accelerate Commercial Technology (PV-COMPACT).

LAW TEACHING

Professor for a Designated Service: Pace University Elisabeth Haub School of Law, 2014-2019. Non-tenured member of faculty. Taught Energy Law. Supervised a student intern practice.

Associate Professor of Law: University of Houston Law Center, 1990–1992. Full time, tenure track member of faculty. Courses taught: Criminal Law, Environmental Law, Criminal Procedure, Environmental Crimes Seminar, Wildlife Protection Law.

Assistant Professor: United States Military Academy, West Point, New York, 1988–1990. Member of the faculty in the Department of Law. Honorably discharged in August 1990, as Major in the Regular Army. Courses taught: Constitutional Law, Military Law, and Environmental Law Seminar.

LITIGATION

Trial Defense Attorney and Prosecutor, U.S. Army Judge Advocate General's Corps, Fort Polk, Louisiana, January 1985–July 1987. Assigned to Trial Defense Service and Office of the Staff Judge Advocate.

NON-LEGAL MILITARY SERVICE

Armored Cavalry Officer, 2d Squadron 9th Armored Cavalry, Fort Stewart, Georgia, May 1978–August 1981. Served as Logistics Staff Officer (S-4). Managed budget, supplies, fuel, ammunition, and other support for an Armored Cavalry Squadron. Served as Support Platoon Leader for the Squadron (logistical support), and as line Platoon Leader in an Armored Cavalry Troop. Graduate of Airborne and Ranger Schools. Special training in Air Mobilization Planning and Nuclear, Biological and Chemical Warfare.

Karl R. Rábago

Formal Education

LL.M., Environmental Law, Pace University School of Law, 1990: Curriculum designed to provide breadth and depth in study of theoretical and practical aspects of environmental law. Courses included: International and Comparative Environmental Law, Conservation Law, Land Use Law, Seminar in Electric Utility Regulation, Scientific and Technical Issues Affecting Environmental Law, Environmental Regulation of Real Estate, Hazardous Wastes Law. Individual research with Hudson Riverkeeper Fund, Garrison, New York.

LL.M., Military Law, U.S. Army Judge Advocate General's School, 1988: Curriculum designed to prepare Judge Advocates for senior level staff service. Courses included: Administrative Law, Defensive Federal Litigation, Government Information Practices, Advanced Federal Litigation, Federal Tort Claims Act Seminar, Legal Writing and Communications, Comparative International Law.

J.D. with Honors, University of Texas School of Law, 1984: Attended law school under the U.S. Army Funded Legal Education Program, a fully funded scholarship awarded to 25 or fewer officers each year. Served as Editor-in-Chief (1983-84); Articles Editor (1982-83); Member (1982) of the Review of Litigation. Moot Court, Mock Trial, Board of Advocates. Summer internship at Staff Judge Advocate's offices. Prosecuted first cases prior to entering law school.

B.B.A., Business Management, Texas A&M University, 1977: ROTC Scholarship (3-yr). Member: Corps of Cadets, Parson's Mounted Cavalry, Wings & Sabers Scholarship Society, Rudder's Rangers, Town Hall Society, Freshman Honor Society, Alpha Phi Omega service fraternity.

Karl R. Rábago

Selected Publications

- "Distributed Generation Law," contributing author, American Bar Association Environment, Energy, and Resources Section (August 2020)
- "National Standard Practice Manual for Benefit-Cost Analysis of Distributed Energy Resources," contributing author, National Energy Screening Project (August 2020)
- "Achieving 100% Renewables: Supply-Shaping through Curtailment," with Richard Perez, Marc Perez, and Morgan Putnam, PV Tech Power, Vol. 19 (May 2019).
- "A Radical Idea to Get a High-Renewable Electric Grid: Build Way More Solar and Wind than Needed," with Richard Perez, The Conversation, online at <http://bit.ly/2YjnM15> (May 29, 2019).
- "Reversing Energy System Inequity: Urgency and Opportunity During the Clean Energy Transition," with John Howat, John Colgan, Wendy Gerlitz, and Melanie Santiago-Mosier, National Consumer Law Center, online at www.nclc.org (Feb. 26, 2019).
- "Revisiting Bonbright's Principles of Public Utility Rates in a DER World," with Radina Valova, The Electricity Journal, Vol. 31, Issue 8, pp. 9-13 (Oct. 2018).
- "Achieving very high PV penetration – The need for an effective electricity remuneration framework and a central role for grid operators," Richard Perez (corresponding author), Energy Policy, Vol. 96, pp. 27-35 (2016).
- "The Net Metering Riddle," Electricity Policy.com, April 2016.
- "The Clean Power Plan," Power Engineering Magazine (invited editorial), Vol. 119, Issue 12 (Dec. 2, 2015)
- "The 'Sharing Utility:' Enabling & Rewarding Utility Performance, Service & Value in a Distributed Energy Age," co-author, 51st State Initiative, Solar Electric Power Association (Feb. 27, 2015)
- "Rethinking the Grid: Encouraging Distributed Generation," Building Energy Magazine, Vol. 33, No. 1 Northeast Sustainable Energy Association (Spring 2015)
- "The Value of Solar Tariff: Net Metering 2.0," The ICER Chronicle, Ed. 1, p. 46 [International Confederation of Energy Regulators] (December 2013)
- "A Regulator's Guidebook: Calculating the Benefits and Costs of Distributed Solar Generation," co-author, Interstate Renewable Energy Council (October 2013)
- "The 'Value of Solar' Rate: Designing an Improved Residential Solar Tariff," Solar Industry, Vol. 6, No. 1 (Feb. 2013)
- "Jicarilla Apache Nation Utility Authority Strategic Plan for Energy Efficiency and Renewable Energy Development," lead author & project manager, U.S. Department of Energy First Steps Toward Developing Renewable Energy and Energy Efficiency on Tribal Lands Program (2008)
- "A Review of Barriers to Biofuels Market Development in the United States," 2 Environmental & Energy Law & Policy Journal 179 (2008)
- "A Strategy for Developing Stationary Biodiesel Generation," Cumberland Law Review, Vol. 36, p.461 (2006)
- "Evaluating Fuel Cell Performance through Industry Collaboration," co-author, Fuel Cell Magazine (2005)
- "Applications of Life Cycle Assessment to NatureWorks™ Polylactide (PLA) Production," co-author, Polymer Degradation and Stability 80, 403-19 (2003)

Karl R. Rábago

"An Energy Resource Investment Strategy for the City of San Francisco: Scenario Analysis of Alternative Electric Resource Options," contributing author, Prepared for the San Francisco Public Utilities Commission, Rocky Mountain Institute (2002)

"Small Is Profitable: The Hidden Economic Benefits of Making Electrical Resources the Right Size," co-author, Rocky Mountain Institute (2002)

"Socio-Economic and Legal Issues Related to an Evaluation of the Regulatory Structure of the Retail Electric Industry in the State of Colorado," with Thomas E. Feiler, Colorado Public Utilities Commission and Colorado Electricity Advisory Panel (April 1, 1999)

"Study of Electric Utility Restructuring in Alaska," with Thomas E. Feiler, Legislative Joint Committee on electric Restructuring and the Alaska Public Utilities Commission (April 1, 1999)

"New Markets and New Opportunities: Competition in the Electric Industry Opens the Way for Renewables and Empowers Customers," EEBA Excellence (Journal of the Energy Efficient Building Association) (Summer 1998)

"Building a Better Future: Why Public Support for Renewable Energy Makes Sense," Spectrum: The Journal of State Government (Spring 1998)

"The Green-e Program: An Opportunity for Customers," with Ryan Wiser and Jan Hamrin, Electricity Journal, Vol. 11, No. 1 (January/February 1998)

"Being Virtual: Beyond Restructuring and How We Get There," Proceedings of the First Symposium on the Virtual Utility, Kluwer Press (1997)

"Information Technology," Public Utilities Fortnightly (March 15, 1996)

"Better Decisions with Better Information: The Promise of GIS," with James P. Spiers, Public Utilities Fortnightly (November 1, 1993)

"The Regulatory Environment for Utility Energy Efficiency Programs," Proceedings of the Meeting on the Efficient Use of Electric Energy, Inter-American Development Bank (May 1993)

"An Alternative Framework for Low-Income Electric Ratepayer Services," with Danielle Jaussaud and Stephen Benenson, Proceedings of the Fourth National Conference on Integrated Resource Planning, National Association of Regulatory Utility Commissioners (September 1992)

"What Comes Out Must Go In: The Federal Non-Regulation of Cooling Water Intakes Under Section 316 of the Clean Water Act," Harvard Environmental Law Review, Vol. 16, p. 429 (1992)

"Least Cost Electricity for Texas," State Bar of Texas Environmental Law Journal, Vol. 22, p. 93 (1992)

"Environmental Costs of Electricity," Pace University School of Law, Contributor-Impingement and Entrainment Impacts, Oceana Publications, Inc. (1990)

Guam Public Utilities Commission GPA Docket 20-09

Comments: Micronesia Renewable Energy, Inc.

Karl R. Rábago

Rábago Energy LLC

13 April 2021



Rábago Energy LLC

- 30+ years utility regulation & markets, plus bioplastics and biofuels.
- Expert testimony in 120+ cases & proceedings.
- Attorney.
- Former US Army Cavalry Officer, Judge Advocate, TX PUC Commissioner, U.S. DOE Deputy Asst. Secretary, utility executive, environmental advocate, sustainability manager, carbon credit developer, law professor, R&D manager, etc.

MRE – Conclusion & Recommendations

- GPA Petition is materially deficient, unsupported with competent evidence, unjustly discriminatory.
- Guam PUC should deny the GPA Petition in full.
- Guam PUC should order the GPA to refrain from future NEM rate proposals until GPA has developed and applied a comprehensive, transparent Benefit-Cost Assessment Framework

GPA Petition

- Sole justification in the Petition:

“The Joint Renewable Integration Study (JRIS) conducted with the Navy in July 2018 has determined that new PV installations should have Frequency Control Capability or Energy Storage System (ESS).”

- No evidence of how the JRIS supports this proposal for equipment requirements / charges for small-scale NEM
- Reference to CCU Resolution 2020-01

CCU Resolution 2020-01

- Unsupported and inconsistent assertions regarding “subsidies” that flow to NEM customers
- Ignores GPA’s 2018 Value of Solar+Storage study that shows:
 - Energy from NEM facilities is worth more than retail even without storage
 - Added capacity value of storage means GPA should pay NEM customers to install storage, not charge them for it
- Inconsistent with sound rate making principles relating to stand-by charges
- Misleading and/or meaningless charts and tables about very large solar PV systems

Transmission System Study

- Transmission
- GPA has not yet built a transmission-level grid capable of high levels of renewable energy integration
- Most problems and limitations are related to large-scale utility renewables generation
- No direct evidence of problems caused by NEM
- No support for the Energy Storage Rate

GPA Responses to Staff RFIs

- Staff comprehensively revealed the flaws in the GPA Petition
- Key flaws include:
 - Lack of detail on how customers can comply through “Frequency Control Capability” or “Energy Storage Systems” means unnecessary cost, operational capacity or utilization, high uncertainty, and a chilling effect on NEM market development
 - Critical studies, especially re: distribution system, remain incomplete
 - No GPA action on storage rebate program, and Benefit-Cost Analysis for NEM
 - GPA confuses impacts of large solar and of small NEM solar

MRE – Conclusion & Recommendations

- GPA Petition is materially deficient, unsupported with competent evidence, unjustly discriminatory.
- Guam PUC should deny the GPA Petition in full.
- Guam PUC should order the GPA to refrain from future NEM rate proposals until GPA has developed and applied a comprehensive, transparent Benefit-Cost Assessment Framework
 - Appendix B sets out summary of guidance from National Standard Practice Manual for Benefit-Cost Assessment of Distributed Energy Resources (NSPM-DER)

Thank you!



Karl R. Rábago
Rábago Energy LLC
karl@rabagoenergy.com
512.968.7543
@rabagoenergy

ESS Cost Sharing Analysis:

Frequency Control Energy Storage System:

Benefits:		Non-NEM	NEM/Non-NEM
Location:		Talofoto GlidePath	Hagatna NEM / System
Battery KW Size	40,000	16,000	24,000
Investment	\$35,000,000	\$14,000,000.00	\$21,000,000.00
Annual Debt Service 5%, 20 years	\$2,006,065	\$802,426.00	\$1,203,639.00
Annual O&M	\$300,000	\$120,000.00	\$180,000.00
Total Annual Cost	\$2,306,065	\$922,426.00	\$1,383,639.00
Total NEM Customers - Dec, 2019			2,068
Total NEM KW			23,702
Annual Cost NEM/Non-NEM			\$1,383,639
NEM 50% Share			\$691,820
Cost/NEM Customer/Month			\$27.88
NEM Annual Energy			37,373,314
\$/Kwh ESS for NEM Customers			\$0.019
Cost/KW/Month			\$2.43
Average NEM KW			11.46
\$/Month/NEM Avg. KW			\$27.88

Fred Horecky

From: John M Benavente <jbenavente@gpagwa.com>
Sent: Wednesday, April 14, 2021 10:43 AM
To: BUENA VISTA REALTY LLC
Cc: Graham Botha; Joyce N Sayama; John J.E. Kim
Subject: NEM Installed

Good Morning Fred,

The following is a summary of NEM installed per year. This is further to discussions during conference call yesterday.

NEM CUSTOMER COUNT BY YEAR		
YEAR	TOTAL	AVG/MO
2009	7	
2010	2	
2011	6	
2012	27	
2013	66	5
2014	94	8
2015	562	47
2016	530	44
2017	297	25
2018	292	24
2019	190	16
2020	95	8
*2021	14	5
* Thru March 2021		

Thanks, johnb

This email was scanned by Bitdefender