BEFORE THE GUAM PUBLIC UTILITIES COMMISSION

	)	**GPA DOCKET NO. 15-17**
REVIEW OF COMPLAINT BY	)	
1st GREEN SOLUTIONS GUAM, LLC	)	**ORDER**
	)	
	)	

INTRODUCTION

This matter comes before the Guam Public Utilities Commission (the "PUC") pursuant to the April 20, 2015 Letter (the "Complaint") addressed to the PUC from 1st Green Solutions Guam, LLC ("1st Green"), which generally contends that the Guam Power Authority ("GPA") has inaccurate and inconsistent billing practices for customers having power factor ratings that exceed the established power factor rate of .85 as set forth in GPA's tariff. The PUC has considered the instant filing as a formal Complaint.

BACKGROUND

On April 20, 2016, 1st Green lodged a formal complaint against GPA with the PUC, alleging that GPA was inaccurately and inconsistently billing customers "having power factor ratings that exceed the established power factor rate of .85" within the approved tariff.[1] Specifically, 1st Green contended that "GPA is billing for more kWH usage now than they were before the implementation of USES which, per our own recordings, is providing significant reductions in actual power usage plus improvements in

[1] 1st Green Complaint, p. 1 (Apr. 20, 2015).

power efficiency."[2] "Our client's investments in the USES Technology are not reducing the kWH in GPA billings. This is the opposite of what is occurring throughout the rest of the world."[3]

Thereafter, the Administrative Law Judge of the PUC assigned to the matter (the "ALJ") remanded the matter to GPA for resolution at the agency level. However, the parties were unable to arrive at a resolution.

On June 17, 2015, 1st Green issued a follow-up letter to the PUC, again requesting review of its Complaint against GPA. Thereafter, the ALJ forwarded the matter to the PUC's energy consultants, Lummus Consultants ("Lummus"), for its technical review and investigation. Lummus and the ALJ engaged in telephone conferences with 1st Green, and Lummus issued requests for information to both GPA and 1st Green. On October 26, 2015, Lummus filed its report detailing its findings and recommendations related to its review of the instant matter (the "Lummus Report").

On December 2, 2015, 1st Green lodged a response to the Lummus Report with the ALJ. On January 22, 2016, GPA provided its response to 1st Green's Complaint.

DETERMINATIONS

1st Green is a distributer of a "power conditioning and energy saving technology" known as the "Universal Shunt Efficiency System (USES) Power Conditioning System."[4] According to 1st Green, this technology "has been very successful in reducing energy costs and providing full power protection against spikes and surges

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2 1st Green Complaint, p. 2 (Apr. 20, 2015).
3 1st Green Complaint, p. 2.
4 Lummus Report, p. 2.

through the world for over 20 years in thousands of facilities and homes."[5] 1st Green added that "[o]ne of the many benefits of the USES system is improvement of the power factor to .99 for most of our clients which results in a higher efficiency in their power consumption."[6]

In its Complaint, 1st Green maintained that GPA has engaged in "inaccurate and inconsistent billing of customers having power factor ratings that exceed the established power factor rate of .85 . . . ."[7] Particularly, under the old analog meters, 1st Green was noticing a 10% average kWh reduction after the USES installation, but that after GPA's "change-over to the smart meters . . . the kWh savings are not being realized."[8]

1st Green, therefore, argued that "GPA is billing for more kWh usage now than they were before the implementation of USES which, per our own recordings, is providing significant reductions in actual power usage plus improvements in power efficiency."[9] 1st Green maintained that its "client's investments in the USES Technology are not reducing the kWh in GPA billings," which 1st Green argues "is the opposite of what is occurring throughout the rest of the world."[10] "So instead of saving money from the reduction of energy use and increase in power efficiency, customers are being billed with higher kWh on their energy bills since having the smart meter installed."[11]

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5 1st Green Solutions, Letter to the PUC, p. 1 (Apr. 20, 2015).
6 1st Green Solutions, Letter to the PUC, p. 1.
7 1st Green Solutions, Letter to the PUC, p. 1.
8 1st Green Solutions, Letter to the PUC, p. 1.
9 1st Green Solutions, Letter to the PUC, p. 2.
10 1st Green Solutions, Letter to the PUC, p. 2.
11 1st Green Solutions, Letter to the PUC, p. 1 (June 17, 2015).

Based on literature published by AC/DC Dynamics, power factor can be explained as follows.[12]

UNDERSTANDING POWER FACTOR

To understand power factor, we'll first start with the definition of some basic terms:

- KW is Working Power (also called Actual Power or Active Power or Real Power).

It is the power that actually powers the equipment and performs useful work.

- KVAR is Reactive Power.

It is the power that magnetic equipment (transformer, motor and relay) needs to produce the magnetizing flux.

- KVA is Apparent Power.

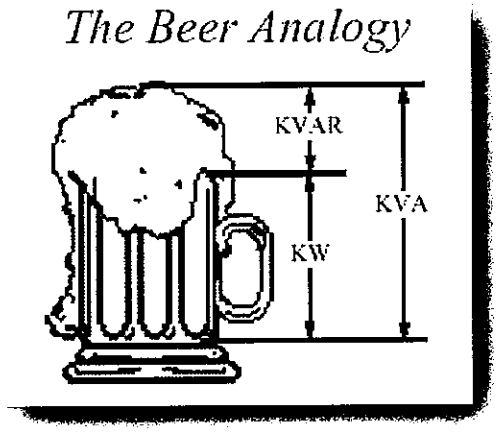
It is the "vectorial summation" of KVAR and KW.

[12] http://www.acdc.co.za/downloads/Understanding%20Power%20Factor.pdf.

Let's say you are at the ballpark and it is a really hot day. You order up a mug of your favourite brew.

The thirst-quenching portion of your beer is represented by KW (Figure 1).
Unfortunately, life isn't perfect. Along with your ale comes a little bit of foam. (And let's face it...that foam just doesn't quench your thirst.) This foam is represented by KVAR.
The total contents of your mug, KVA, are this summation of KW (the beer) and KVAR (the foam).

Fig 1



Power Factor (P.F.) is the ratio of Working Power to Apparent Power.

$$P.F. = \frac{KW}{KVA}$$

Looking at our beer mug analogy above, power factor would be the ratio of beer (KW) to beer plus foam (KVA).

$$P.F. = \frac{KW}{KW + KVAR}$$

$$= \frac{Beer}{Beer + Foam}$$

Thus, for a given KVA:

• The more foam you have (the higher the percentage of KVAR), the lower your ratio of KW (beer) to KVA (beer plus foam).

Thus, the lower your power factor.

• The less foam you have (the lower the percentage of KVAR), the higher your ratio of KW (beer) to KVA (beer plus foam). In fact, as your foam (or KVAR) approaches zero, your power factor approaches 1.0.

Another example, published by conEdison, further explains power factor as follows.[13]

[13] http://www.coned.com/reactivepower/understanding_power_factor.pdf.

In Figure 1, a horse is pulling a railroad car down a railroad track. The railroad ties are uneven, so the horse must pull the car from the side of the track. The horse is pulling the railroad car at an angle to the direction of the car's travel.

$$\text{Power Factor} = \frac{\text{Real Power}}{\text{Apparent Power}}$$

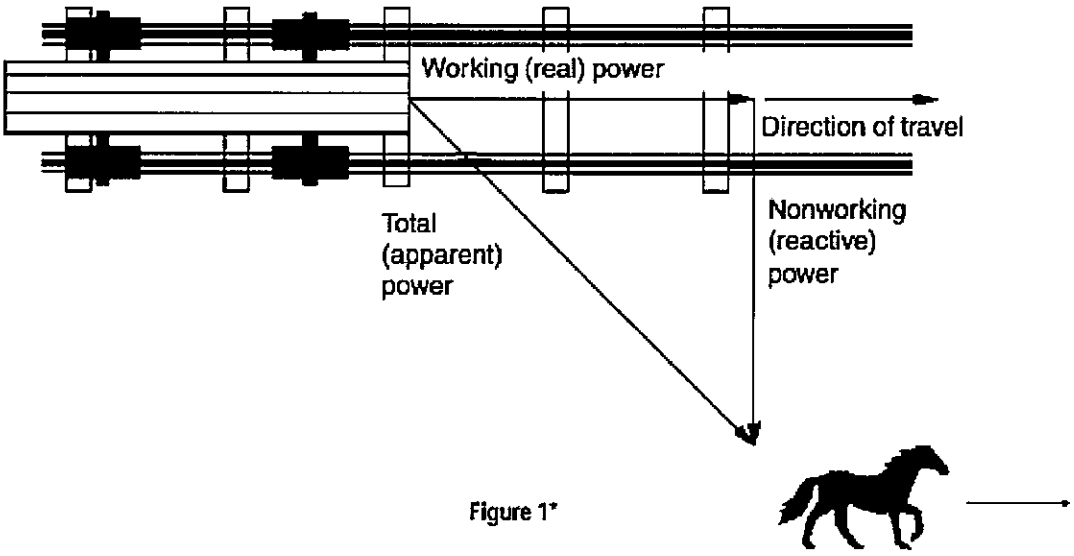


Figure 1*

The power required to move the car down the track is the working or real power (kW). The effort of the horse is the total or apparent power (kVA). Due to the angle of the horse's pull, not all of its effort is used to move the car down the track. The car will not move sideways, therefore, the sideways pull of the horse is wasted effort — the nonworking or reactive power (kVAr).

The angle of the horse's pull is related to power factor, which is defined as the ratio of real power to apparent (total) power. If the horse is led closer to the center of the track, the angle of side pull decreases and the real power approaches the value of the apparent power. Therefore, the ratio of real power to apparent power (the power factor) approaches one. As the power factor approaches one, the reactive (nonworking) power approaches zero.

In the ideal horse-pulling-the-railcar analogy, if the reactive power (kVAr) is near zero, then real power (kW) and apparent power (kVA) would almost be equal, which means the horse would not waste as much energy pulling the car. The angle formed between real and apparent power would approach zero. The cosine of the angle would then approach one, resulting in a power factor that approaches one.

The closer a system's power factor is to one, the more efficient the system is.

Based on GPA's tariff for "Large Power Service" (customers with demand of 200 kW or more), specifically "Schedule P," the calculation of "power factor" is described as follows.

> The above demand and energy charges are based upon an average monthly power factor of 85%. For each 1% the average power factor is above 87% or below 83%, the monthly bill is computed under energy charges shall be decreased or increased, respectively, by .15%. The power factor will be computed to the nearest whole percent.

On October 26, 2015, Lummus submitted its findings in its Report. Based on its review, Lummus identified three (3) issues raised in 1st Green's Complaint. First, that GPA's billing calculations do not comply with its tariff.[14] Second, that GPA is incorrectly charging customers when their power factor is over .85.[15] And third, that GPA's new smart meters have altered how consumption is measured and billed.[16] Based on its review of the Complaint, as well as data provided by both 1st Green and GPA, Lummus arrived at the following findings.

Regarding its review of GPA's billing calculations to determine whether GPA is in compliance with its tariff, Lummus reviewed GPA's tariff, billing procedures,

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[14] Lummus Report, p. 3.
[15] Lummus Report, p. 3.
[16] Lummus Report, p. 3.

and a sampling of bills referenced in 1st Green's Complaint.[17] Based on its review of a sampling of twenty-five (25) bills, Lummus found that "all bill items, except the power factor bill item, are being billed in alignment with the applicable Rate Schedule P"; that "this bill item does not appear as though it is being billed in alignment with the applicable Rate Schedule P."[18]

Lummus found that for one particular customer, there was "at least ten months worth of overcharging" "as evidenced by the ten power factor adjustment files and the two 'power factor adjustment' refund line items" on two of the customer's bills.[19]

Lummus, however, found that GPA's practice of applying the power factor adjustment to energy-related bill items—such as (1) the energy bill for up to 55,000 kWh, (2) the energy bill for over 55,000 kWh, (3) the fuel recovery charge billing, and (4) the emergency water well and wastewater charge—appeared in line with Schedule P.[20] Lummus found that since this practice is not clearly specified in the tariff, it recommended that GPA document how the power factor adjustment is being applied, as well as clarify the language in its rate schedules, such that the application of the power factor adjustment is articulated clearly.[21]

Moreover, Lummus found that it could not confirm whether GPA was "developing power factor adjustment rates that are in alignment with its Schedule P."[22] Lummus concludes that "[i]n no month is the Power Factor Rate consistent, therefore

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17 Lummus Report, p. 4.
18 Lummus Report, p. 5.
19 Lummus Report, p. 5.
20 Lummus Report, p. 5.
21 Lummus Report, p. 5.
22 Lummus Report, p. 5.

Lummus Consultants need[] further information from GPA in order to understand more fully how these rates are being derived."[23]

Regarding whether GPA is incorrectly charging customers in instances where the power factor is over .85, based on its review, Lummus determined that there were "discrepancies in the form of overcharges in the months following September 2014 as well as in the months following."[24] Lummus has not been able to consult with GPA regarding these apparent overcharges.[25]

Regarding whether the new smart meters have altered how consumption is measure and billed, based on its review, Lummus determined that the meters at Onward Agana Beach Resort should be tested by an independent third party.[26] Lummus further noted, however, that "[t]he main purpose of a utility's power factor provision is to provide an incentive to improve power factor, usually as a penalty if power factor is below a prescribed level and, less frequently in practice, as a credit if power factor is greater than a specified reference level."[27]

Based on its investigation, and in line with its findings above, Lummus recommended the following. Regarding whether GPA's billing calculations are not in compliance with the terms of its tariff, Lummus noted that GPA's bills "could be made more clear with respect to the specific bill items that are subject to the power factor

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[23] Lummus Report, p. 6.
[24] Lummus Report, p. 8.
[25] Lummus Report, p. 8.
[26] Lummus Report, p. 10.
[27] Lummus Report, p. 9.

provision."[28] In addition, Lummus added that "demand charges" should not be subject to the power factor adjustment; and that energy and demand charges vary as the customer's power factor rises or falls below 85%.[29] Lummus concluded that it was unable to confirm whether GPA is developing monthly power factor adjustments that are consistent with Schedule P.[30]

With respect to whether GPA is incorrectly charging customers when the power factor is over 85%, based on its review, Lummus found that GPA "has overcharged for power factor" at least in September, 2014, and that "there may also have been overcharges in January and February 2015," which were months where the power customer's power factor appeared to be at or near 100%.[31] Accordingly, Lummus advised that GPA "adhere to the power factor provisions of its own tariff."[32]

With respect to whether GPA's new smart meters have changed how consumption is measured and billed, particularly whether or not GPA's smart meters accurately measure kWh, Lummus recommended that the meters serving Onward Agana Beach Resort "be tested by an independent party."[33] Lummus further recommended that 1st Green and GPA submit three contractors "that could perform the tests and have the Commission select one in common from each list and allow each party to be present during

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[28] Lummus Report, p. 11.
[29] Lummus Report, p. 11.
[30] Lummus Report, p. 11.
[31] Lummus Report, p. 11.
[32] Lummus Report, p. 11.
[33] Lummus Report, p. 11.

the testing"; and that the contractor "should first submit its approach to testing the meter so that each party understands and accepts the approach before the test is completed."[34]

On January 22, 2016, GPA filed its response to 1st Green's Complaint. In its response, GPA generally maintains that "[t]he data responses provided to Lummus in its investigation" indicate that 1st Green's allegations "are not supported by any factual basis."[35]

In particular, GPA submitted that the current smart meters take readings for kWH, kVAH, and kW; and that the data is then billed using the CC&B software that generates energy charges, demand charges, and power factor charges.[36] GWA further submitted that its previous "legacy meters" "were not as accurate as the current smart meters."[37] In addition, GPA maintained that "[t]he power factor is the tariff provides for either a penalty or credit if the power factor is either above 87% or below 83%" and that GPA correctly applies the tariff.[38]

GPA contended that "1st Green wants to apply a tariff from some power company in the states, and states that GPA is incorrectly applying the existing Rate Schedule P."[39] GWA submitted that this is "incorrect" based on the bills, and since the smart meters "directly read KWH, KVAH, and KW, and do not require manual calculations to comp up with power factor, as 1st Green Solutions is suggesting."[40]

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34 Lummus Report, pp. 11-12.
35 GPA Response, p. 1 (Jan. 22, 2016).
36 GPA Response, p. 1.
37 GPA Response, p. 2.
38 GPA Response, pp. 1-2.
39 GPA Response, p. 2.
40 GPA Response, p. 2.

On January 24, 2016, the ALJ issued an ALJ Report detailing his review of the instant matter. In the ALJ Report, the ALJ found that, regarding whether GPA is in compliance with its tariff, based on its investigation, it appeared unclear to Lummus how GPA calculated its power factor adjustment, and therefore could not confirm whether GPA was "developing power factor adjustment rates that are in alignment with its Schedule P."[41] Lummus stated that it needed more information from GPA in order to understand how the rates were being derived.[42] Accordingly, GPA should be required to provide the PUC with documentation detailing how it arrives at power factor adjustment for its customers.

The ALJ further found that, regarding whether GPA is incorrectly charging the customer in instances where the power factor is over .85, as a result of Lummus' investigation, there is evidence to suggest that there were instances of "discrepancies in the form of overcharges."[43] The ALJ recommended that the meters serving Onward Beach Resort "be tested by an independent party,"[44] as recommended by Lummus. As recommended by Lummus, both 1st Green and GPA submit three contractors "that could perform the tests and have the Commission select one in common from each list and allow each party to be present during the testing"; and that the contractor "should first submit its approach to testing the meter so that each party understands and accepts the approach before the test is completed."[45] The cost of such testing should be split evenly between the

[41] Lummus Report, p. 5.
[42] Lummus Report, p. 6.
[43] Lummus Report, p. 8.
[44] Lummus Report, p. 11.
[45] Lummus Report, pp. 11-12.

parties. Both parties should further be required to cooperate fully and provide any and all needed access for the independent metering to be performed.

The Commission hereby adopts the findings made in the January 24, 2016 ALJ Report and the October 26, 2015 Report prepared by Lummus and therefore issues the following:

ORDERING PROVISIONS

Upon careful consideration of the record herein, and for good cause shown, on motion duly made, seconded and carried by the affirmative vote of the undersigned Commissioners, the Commission hereby ORDERS the following:

1. That GPA shall provide the PUC with documentation detailing how it arrives at power factor adjustment for its customers within thirty (30) days of this Order.

2. That GPA shall provide the PUC with documentation detailing how kWh was computed under the former analog meters, as well as how kWh is computed under the new Smart Meters within thirty (30) days of this Order.

3. That both parties are required to cooperate fully and provide any and all needed access for the independent metering to be performed.

4. GPA is ordered to pay the PUC's regulatory fees and expenses, including and without limitation, consulting and counsel fees, and the fees and expenses associated with this docket. Assessment of the PUC's regulatory fees and expenses is authorized pursuant to 12 G.C.A. §§ 12002(b) and 12024(b) (renumbered as 12 G.C.A. §§ 12103(b) and 12125(b)), and Rule 40 of the Rules of Practice and Procedure before the PUC.

SO ORDERED this 25th day of January, 2016.

JEFFREY C. JOHNSON
Chairman

ROWENA E. PEREZ
Commissioner

JOSEPH M. MCDONALD
Commissioner

FILOMENA M. CANTORIA
Commissioner

MICHAEL A. PANGELINAN
Commissioner

PETER MONTINOLA
Commissioner

ANDREW L. NIVEN
Commissioner

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