

January 25, 2015

Fred Horecky, ESQ

Guam Public Utilities Commission
Suite 207, GCIC Building
414 W. Soledad Avenue
Hagatna, Guam, 96910

Dear Mr. Horecky:

Re: Report on the review of CapEx expansion plan rate impact under GPA Docket No. 15-05

Slater, Nakamura & Co, LLC ("Consultants") is pleased to present its report on the review of rate impact from the proposed capital expenditure ("CapEx") expansion plan of the Guam Power Authority. The review was conducted under Guam Public Utilities Commission ("Commission") Docket GPA 15-05.

In documents submitted to the Commission in GPA Docket 14-09, GPA identified the potential need to borrow as much as \$869 million from senior revenue bonds in 2015 and 2017. In response to our requests for information, GPA clarified that it plans to borrow up to \$724 million for an expansion plan based on introduction of Liquefied Natural Gas ("LNG") as a fuel in its generating fleet. The borrowing is comprised of four tranches:

- \$2.70 million in Fiscal Year ("FY") 2015 for unit life extension and environmental compliance costs
- \$445.93 million in FY 2015 for construction of two combined cycle units at Harmon
- \$268.39 million in FY 2017 to construct LNG infrastructure to import LNG for use in its power plants
- \$7.02 million in FY 2017 for conversion of three plants (MEC, TEMES and Cabras units 3 and 4) to run on LNG

We evaluated the rate impact – on an aggregate basis for all customer classes – from the bond financing and the associated operation and maintenance costs. The results of our review are contained in the attached report.

We would like to thank Mr. Weigand and his staff, Mr. Cruz and his staff, Ms. Fejarang and Ms. Muna for their prompt responses to our numerous requests for supporting documentation.

Sincerely,



Roger D. Slater
Managing Partner

**BEFORE THE GUAM PUBLIC UTILITIES
COMMISSION**

GPA Docket 15-05)

In the Matter of GPA Integrated)
Resource Plan)

Report on the Investigation of Rate Impact
from Proposed CapEx Expansion Plan

For Guam Public Utilities Commission
GPA Docket 15-05

January 25, 2015

Revision History

<i>Version</i>	<i>Changed By</i>	<i>Date</i>	<i>Revision Description</i>
Draft	A. Finder	11/14/2014	Completed draft report text
Draft	A. Finder	01/14/2015	Completed draft report
Final	J. Steadley	1/19/2015	Final peer review
Final (revised)	A. Finder	01/25/2015	Revised text for minor typographical errors

Table of Contents

1.0	Executive Summary.....	2
2.0	Background and Analysis	4
	Overview	4
	Modified Approach.....	4
	Details of Proposed Revenue Bonds.....	5
	Analysis of Rate Impact.....	7
	Summary.....	12
3.0	Findings	13
4.0	Recommendations.....	14

List of Tables

Table 1:	Major Assumptions and Components of Senior Debt Issues	6
Table 2:	GPA Actual FY 2014 Data.....	8
Table 3:	Key Assumptions and Rate Impact	10

1.0 EXECUTIVE SUMMARY

Overview

On May 29, 2014, the Guam Power Authority (GPA) petitioned the Guam Public Utilities Commission (Commission) for authorization to issue \$94 million in senior revenue bonds and \$5 million in subordinate revenue bonds.

As part of that filing, GPA submitted to the Commission a document identifying its Resource Implementation Plan. Contained in that document was a table identifying two major bond financings – anticipated in 2015 and 2017 and totaling \$868.7 million – to support combined cycle units, conversion of existing units to run on LNG and LNG infrastructure:

In Summer 2014, GPA identified the need for \$688.7 million of bond financing in FY 2015 and 2017.

- \$542.1 million in Fiscal Year (“FY”) 2015
- \$326.6 million in FY 2017

At the request of Administrative Law Judge (“ALJ”) Horecky, Slater, Nakamura & Co LLC (“Consultants”) undertook an investigation of both proposed bond issuances. In response to requests for information (RFI), GPA updated the details of the proposed bonds, which now total \$724.03 million in the following tranches:

- \$2.70 million in Fiscal Year (“FY”) 2015 for unit life extension and environmental compliance costs
- \$445.93 million in FY 2015 for construction of two combined cycle (“CC”) units at Harmon
- \$268.39 million in FY 2017 to construct LNG infrastructure to import and distribute LNG to its power plants
- \$7.02 million in FY 2017 for conversion of three plants (MEC, TEMES and Cabras units 3 and 4) to run on LNG

Recently GPA reduced the estimated need for bond financing to \$724.03 in FY 2015 and 2017.

Additional GPA responses to our RFIs revealed that the ratemaking approach on Guam uses a multiple of debt service – referred to as the Debt Service Coverage Ratio or DSCR – to estimate the contributions to revenue requirements required to provide a return on capital.

The RFI responses also revealed that GPA uses a financial model of its own to estimate rate impact. The model not only estimates the capital-related components but also evaluates the savings associated with the LNG-based capital expansion plan. The model also readily permits analysis of scenarios using alternative assumptions on:

- Sales (kilowatt hour or kWh) growth
- Fuel prices
- Fuel-handling expenses
- Inflation
- Escalation on non-fuel O&M

After performing a high-level review the model, we concluded that it was suitable for this work.

Findings

Based on the analysis, we conclude:

- GPA's LNG-based capital expansion plan – for two combined cycle units to be constructed starting in 2015 – will require senior revenue bonds to be issued in FY 2015 and FY 2017 totaling \$724.03 million in par value to fund construction expenditures of \$574.63 million.
- If GPA decides to build a third unit, GPA estimates construction costs of \$121.98 million. The estimated amount of senior bond financing would increase to \$871.15 million for the entire expansion plan.
- GPA's base rates do not reflect increases to support debt service for the 2012 and 2014 bond issuances
- To evaluate impact, the analyst can examine net present value, annuity payments or levelized data.
- Levelized data enable the analyst to consider both movements in benefit/cost streams and changes in sales.
- Using a range of assumptions for sales growth and fuel, the rate impact of the capital expansion program could result in levelized rate decreases as material as \$0.140 per kWh or levelized rate increases as large as \$0.0407 per kWh
- Fuel price parity between RFO and LNG could eliminate as much as \$0.0062 per kWh in fuel savings over the entire 31-year horizon.

Recommendations

The scope of this effort is only to estimate rate impact. At this time, we have no recommendations to offer.

2.0 BACKGROUND AND ANALYSIS

In this section is presented information related to the background for the bond finance investigation

OVERVIEW

On May 29, 2014, the Guam Power Authority (GPA) petitioned the Guam Public Utilities Commission (Commission) for authorization to issue \$94 million in senior revenue bonds and \$5 million in subordinate revenue bonds.

As part of that filing, GPA submitted to the Commission a document identifying its Resource Implementation Plan. Contained in that document was a table identifying two major bond financings – anticipated in 2015 and 2017 and totaling \$868.7 million – to support combined cycle units, conversion of existing units to run on LNG and LNG infrastructure:

In Summer 2014, GPA identified the need for \$688.7 million of bond financing in FY 2015 and 2017.

- \$542.1 million in Fiscal Year ("FY") 2015
- \$326.6 million in FY 2017

In response to data requests issued by Slater, Nakamura & Company, LLC ("Consultants"), GPA reduced the intended borrowing to \$724.03 million in senior revenue bonds and provided additional details on these debt issuances as follows:

- \$2.70 million in Fiscal Year ("FY") 2015 for unit life extension and environmental compliance costs
- \$445.93 million in FY 2015 for construction of two combined cycle ("CC") units at Harmon
- \$268.39 million in FY 2017 to construct LNG infrastructure to import and distribute LNG to its power plants
- \$7.02 million in FY 2017 for conversion of three plants (MEC, TEMES and Cabras units 3 and 4) to run on LNG

Recently GPA reduced the estimated need to \$676.7 of bond financing in FY 2015 and 2017.

MODIFIED APPROACH

At this time, GPA has not requested approval for issuance of those bonds. Late in October 2014, GPA briefed the Combined Commission on Utilities ("CCU") current details of its planned expansion plan.¹ Not long after that, GPA filed a request for approval to construct, starting in FY 2015, two 60

¹ **CHANGING GUAM'S ENERGY FUTURE: Recommendations for New Generation Resources, CCU Work Session, October 27, 2014.** Document provided to Slater, Nakamura & Company, LLC in response to its Request for Information items 1-4 and 1-5.

MW combined cycle units at the Harmon site with an option for a third unit to be constructed at an unspecified later date.

Additional GPA responses to our RFIs revealed that the ratemaking approach on Guam uses a multiple of debt service – referred to as the Debt Service Coverage Ratio or DSCR – to estimate the contributions to revenue requirements required to provide a return on capital.

The RFI responses also revealed that GPA uses a financial model of its own to estimate rate impact. The model not only estimates the capital-related components but also evaluates the savings associated with the LNG-based capital expansion plan. The model also readily permits analysis of scenarios using alternative assumptions on:

- Sales (kilowatt hour or kWh) growth
- Fuel prices
- Fuel-handling expenses
- Inflation
- Escalation on non-fuel O&M

After performing a high-level review the model, we concluded that it was suitable for this work.

DETAILS OF PROPOSED REVENUE BONDS

GPA has provided the Commission's Consultants with representative analyses of the principal, interest, flotation and capitalized interest costs associated with issuance and repayment of senior revenue bonds. The key assumptions include the following:

Table 1: Major Assumptions and Components of Senior Debt Issues

Assumption	Life Extension	Two CC Units	LNG Infra-structure	Unit Conversion	All Issues Combined
Construction fund	\$2,238,087	\$369,729,859	\$197,177,009	\$5,486,180	\$574,631,135
Issuance Costs	40,490	6,688,939	4,025,843	105,241	10,860,513
Capitalized interest	248,340	41,025,494	49,383,672	968,216	91,625,722
Debt Service Reserve	172,428	28,484,991	17,802,995	456,424	46,916,838
Par Value (total)	\$2,699,345	\$445,929,283	\$268,389,519	\$7,016,061	\$724,034,208
Interest rate (%)	4.6				
Capitalization period	2 years	2 years	4 years	3 years	
Issue date	1/1/2015 ¹	8/1/2015	8/1/2017	10/1/2017	
<p>Source: Information provided by GPA to Commission’s Consultants in response to RFI 5-10. All data are from Excel file Copy of GPA Financial Model Harmon IPP Rev 12 18 2014jgs.xlsm. Data found in work sheets “Bond 1”, “Bond 3”, “Bond 4” and “Bond 2” respectively.</p> <p>Note:</p> <p>¹Bond not issued on that date.</p>					

As Table 1 indicates in the “Source” section, the data are part of GPA’s larger financial model. The model estimates data for two time horizons containing key profit and loss items such as:

- Debt service – beginning in 2014 and ending in 2047
- Operation and Maintenance (“O&M”) – beginning in 2014 and ending in 2045
- LNG Incremental cost (comprised of first two items) – beginning in 2014 and ending in 2045
- Revenue requirements – beginning in 2014 and ending in 2025
- Tariff revenue – beginning in 2014 and ending in 2025
- Pro-forma financials – beginning in 2014 and ending in 2025

Then we reviewed the model at a high level to assess the extent to which GPA’s data could be used to estimate rate impact. Because the model permits the user to specify alternative assumptions on several variables [including sales volume (kilowatt hours) and fuel price scenarios], it became apparent that GPA’s financial model permitted analysis of sensitivities.²

² Slater, Nakamura & Co., LLC understands that the model has also been provided to Lummus Consultants, Inc. who the Commission has in past years assigned to evaluate GPA’s Integrated Resource Plan that contains the LNG-based capital expansion plan at issue.

ANALYSIS OF RATE IMPACT

Based on the review of GPA's model, then we applied the model's assumptions – and some of their own – to analyze the period 2015 through 2045 – two years before the retirement of the LNG Infrastructure and Unit Conversion debt issuances described in Table 1. Even though it would have been possible to extend all data series to 2047, we concluded that doing so would not materially affect our conclusions given the impact of discounting.³ Given that data were available for actual revenues as of fiscal year end 2014 (or September 30, 2014), Slater, Nakamura analyzed rate impact for the 31-year period starting on October 1, 2015 and ending on September 30, 2045. Prior to discussing the results, it is important to identify some limited details about how the analysis was performed.

To estimate rate impact, it was necessary to:

- Independently estimate (for the years 2015 through 2045) revenue required from base rates – absent the extension plan – to increase base rates to fully recover debt service on GPA bonds approved in Docket 14-09 and the previous senior revenue bond issuance in 2012
- Extend the O&M data series from 2025 to 2045 using GPA's assumptions for non-fuel generation O&M
- Apply debt service coverage requirements for all four debt issuances listed in Table 1 – relying on the debt service coverage ratio ("DSCR") – of 1.3 – provided in GPA's financial model. For flexibility, our estimates can be readily modified to apply the customary rate-making DSCR of 1.75 relied upon by the Commission⁴

GPA's analysis was modified to:
 (1) reflect additional revenue requirements before expansion
 (2) extend data to 2045
 (3) apply a DSCR of 1.3

Independent Rate Estimate. As a starting point for the analysis, we estimated the level of rates required to recover the costs presented in GPA's financial model. The end result of that analysis is presented in Table 2:

³ At that point, the discount factor would account for slightly less than 25% of the annual, undiscounted impact in the last year.

⁴ The source for the "customary" DSCR used by the Commission is in GPA's response to RFI item 3-1.

Table 2: GPA Actual FY 2014 Data

Measure	FY 2014 Data		
	Total \$	MWh	\$/kWh
Base rate components	\$149,305,633.17	1,535,894.9	\$0.1042
LEAC component	\$276,576,082.68		\$0.1801
Base & LEAC Combined	\$425,881,715.85		\$0.2842
Source: Slater Nakamura calculated annual averages per kilowatt hour ("kWh") using data provided by Guam Power Authority ("GPA") in response to its RFI 1-9. GPA data are from GPA file Index # 1-9_ FY 14 Monthly Revenue Breakdown.xlsm			

The average rate in FY 2014 rows –actual revenue in FY 2014 divided by actual sales – reflects a simple calculation using GPA data for all of FY 2014. The LEAC component reflects actual collections from customers in FY 2014 before the reduction in LEAC implemented on October 1, 2014.

Future Rate Scenarios. We analyzed the net present value of the stream of costs associated with the LNG-based expansion plan. The streams consisted of:

- Debt service payments increased to reflect GPA's assumed DSCR of 1.3
- Incremental non-fuel related O&M
- Incremental fuel-related O&M

Five rate impact scenarios were estimated to reflect alternative estimates of sales growth and relative fuel prices.

We analyzed five rate scenarios that varied assumptions involving different forecasts of sales growth and fuel prices (LNG and Residual Fuel Oil ("RFO")):

- GPA's base case ("Base Case") for two units
- GPA's base case sales forecast with two alternative fuel forecasts
 - Parity between LNG and RFO relying on GPA's base case RFO forecast ("Moderately Unfavorable Fuel")
 - GPA's "high case" for RFO and "low case" for LNG (Highly Favorable Fuel)
- Alternative sales forecast reflecting continued erosion in sales (-1.8% per year⁵) with two alternative fuel forecasts
 - Unfavorable fuel prices (GPA's "low case" for RFO and "high case" for LNG ("Pessimistic Demand and Highly Pessimistic Fuel"))

⁵ Actual sales growth rate for FY 2014 according to data request responses in this docket and in the current LEAC docket 15-05.

- Unfavorable fuel prices (GPA's "low case" for RFO and "high case" for LNG ("Pessimistic Demand and Highly Pessimistic Fuel"))
- Parity between LNG and RFO relying on GPA's base case RFO forecast ("Pessimistic Demand and Moderately Pessimistic Fuel")

These cases establish a range including the equivalent of a base and two extreme cases (favorable and unfavorable). The variations on demand and fuel forecasts can be interpreted as follows:

- Alternate sales forecast – reflects a continuation of declining sales caused by a combination of energy efficiency improvement and distributed generation.
- Parity between LNG and RFO – identifies the incremental reduction in fuel savings potentially arising from either energy market uncertainty or the impact of cancelling the unit conversion program and LNG infrastructure
- Highly Favorable Fuel – reflects an acceleration of natural gas production trends in North America and the worldwide market or a return to disciplined crude oil production targets by OPEC and Russia
- Highly Pessimistic Fuel – mimics the impact of collapsing OPEC discipline (perhaps combined with accelerated US shale oil production) on crude oil prices combined with setbacks in shale gas production in North America

Irrespective of underlying motivation for the cases, the variation in results provides a basis for assessing the benefits of the LNG-based capital expansion plan that reflects a range of risks to GPA's rate-payers caused by conditions turning out differently from what was expected at the time decisions were made.

Before displaying results, it is important to introduce the metrics applied in assessing rate impact:

- Net Present Value
- Annuity
- Levelized rate impact

Net Present Value. Whenever timing differences arise between a decision date and when the full set of costs and benefits can be assessed, most utility analysts rely on the net present value of the cost and benefit streams evaluated at the utility's incremental cost of capital. The analysis enables an analyst to assess the impact after considering the time value of money. Net present value represents the sum of annual values each discounted to reflect the number of years in the future represented by each year. Consistent with financial analytic principles, the rate analysis uses the same nominal discount rate as GPA assumed for all bonds – 4.6%.

Annuity. Rate impact could be identified by expressing the relative change between the net present value and revenues at current tariffs alone. However, that result overstates impact. Instead, most analysts compare the value of an annuity that would exactly recover the net present value of the

stream if it were recovered every year. The annuity could then be compared with tariff revenue collected in FY 2014.

Levelized. The simple comparison – between the annuity and most recent annual tariff revenue – would not sufficiently reflect interactions between the discount rate and any changes in sales growth. To account for differences in sales growth, it has become customary to estimate the levelized increment – expressed in dollars per kWh – that if charged for every kWh sold over the horizon would recover the net present value of the streams of costs and benefits. The calculation is performed by dividing the net present value of the cost and benefit streams by the net present value of generation. To express the levelized cost in real terms comparable with current adjusted tariffs, the real discount rate – the nominal rate adjusted to remove inflation – is applied when discounting annual sales estimates back to October 1, 2014.

Table 3: Key Assumptions and Rate Impact

Measure	Pessimistic (Demand & Fuel)		Base Case	Fuel Only	
	Highly	Moderately	GPA	Moderately Unfavorable	Highly Favorable
Key Assumptions					
Sales Growth	-1.72% per year		-0.553% per year (GPA estimates)		
Relative Fuel Prices (GPA price estimates not calibrated to current fuel market)					
RFO	Low case	Base case	Base case	Base case	High case
LNG	High case	Parity: LNG = RFO	Base case	Parity: LNG = RFO	Low case
Rate Impact					
Adjusted FY 2015 total rate (\$/kWh) ¹	\$0.3006	\$0.3006	\$0.3002	\$0.3002	\$0.3002
LNG Levelized Rate Impact [Increase/(Decrease)] – Constant \$/kWh (end of FY 2014)					
Base rate components	\$0.0342	\$0.0342	\$0.0251	\$0.0251	\$0.0251
LEAC component	\$0.0065	(\$0.0276)	(\$0.0327)	(\$0.0265)	(\$0.1655)
Base & LEAC Combined	\$0.0407	\$0.0066	(\$0.0076)	(\$0.0014)	(\$0.1404)
¹ Data for 2015 do not include any effects from the LNG units. LEAC components of rates are based on GPA's fuel prices assumed in the analysis for Docket 15-05 and do not reflect the October 1, 2014 LEAC reduction or impacts from subsequent LEAC filings in FY 2015.					

The row containing "Adjusted FY 2015 total rate" presents an estimate of rates required to support debt service in 2015. It also is an indication that a rate increase is needed to cover debt service on bonds issued after GPA received approval to issue senior revenue bonds in GPA docket 14-09. It is only provided for illustrative purposes.

In the "LNG levelized section" of Table 3, the row containing "Base rate components" displays an estimate of the additional rate increase needed over a 31-year horizon to retire debt and pay incremental non-fuel O&M associated with an LNG-based capital expansion plan consisting of two units. The debt service adopts GPA's assumed DSCR of 1.3.

The row containing "LEAC Component" displays an estimate of the levelized LEAC rate change over the 31-year horizon. The LEAC components would also need to be adjusted to reflect:

- Prices for fuel reflective of current market conditions in January 2015
- Future general inflation – assumed by GPA in its financial model – to occur at the rate of 2.4%
- Any change in real escalation (in excess of inflation) which differ from assumptions made in the analysis.

The results summarized in Table 3 indicate that the LNG-based capital expansion plan could result in either rate increases or rate decreases depending upon:

- Relative fuel costs for RFO and LNG
- Rate of increase in demand
- Real escalation in price of fuel

A simple interpretation of results is as follows:

- Based on a comparison of the LEAC component across GPA's base and moderately unfavorable fuel cases, running units on the current RFO blend instead of converting to LNG risks \$0.0062 per kWh in levelized LEAC savings.
- If sales declines cannot be reduced from the levels experience during FY 2014, the LNG-financed capital expansion is likely to result in rate increases instead of rate decreases over time.

The data supporting the results in Table 3 are extensive and reflect a 31-year long series of projections on more than 20 individual data elements. Work papers supporting these calculations are available on request from the Commission's consultants.

Combined Cycle Units – Alternatives to GPA's Two-Unit Plan. In addition to examining rate impact for a two unit plant, we estimated the base rate impact of two alternatives:

- Building only one unit now – reducing the levelized base rate impact by \$0.00937 per kWh
- Building a third unit in August 2021 – increasing the levelized base rate impact by \$0.00290 per kWh

GPA provided an estimate of the cost for a third combined cycle unit. Based on the average cost per kilowatt, GPA estimates a capital cost of \$121.98 million for a third, 60 MW combined cycle unit. If financed with senior bonds with the parameters as the first two units, we estimate that \$147.12 million would be required. If GPA decided to build a third unit, the total cost of financing would be approximately \$871.15 million.

SUMMARY

In this section of the report we have reviewed GPA's latest assessment of its potential need for new bond issuances to support the LNG-based capital expansion program. Using GPA's financial model, the Commission's Consultants presented results from five scenarios describing the rate impact of the capital expansion program.

From the scenarios presented, it is clear that variations in sales forecasts and fuel prices will result in a wide range of potential rate impacts, making it difficult to assess whether GPA's proposed expansion program will cause an increase or a decrease in the average tariff.

3.0 FINDINGS

The Findings section discusses the facts that can be derived from the analysis.

Based upon our analysis, the following findings were reached:

- GPA's LNG-based capital expansion plan – for two combined cycle units to be constructed starting in 2015 – will require senior revenue bonds to be issued in FY 2015 and FY 2017 totaling \$724.03 million in par value to fund construction expenditures of \$574.63 million.
- If GPA decided to build a third unit, GPA estimates construction costs of \$121.98 million. The estimated amount of senior bond financing would increase to \$871.15 million for the entire expansion plan.
- GPA's base rates do not reflect increases to support debt service for the 2012 and 2014 bond issuances
- To evaluate impact, the analyst can examine net present value, annuity payments or levelized data.
- Levelized data enable the analyst to consider both movements in benefit/cost streams and changes in sales.
- Using a range of assumptions for sales growth and fuel, the rate impact of the capital expansion program could result in levelized rate decreases as material as \$0.140 per kWh or levelized rate increases as large as \$0.0407 per kWh
- Fuel price parity between RFO and LNG could eliminate as much as \$0.0062 per kWh in fuel savings over the entire 31-year horizon.

4.0 RECOMMENDATIONS

The Recommendations section provides the recommendations to the Commission related to the petition to issue Senior and Subordinate Bonds.

The scope of this effort is only to estimate rate impact. At this time, we have no recommendations to offer.