

July 27, 2014

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 the proposed bond financing under GPA Docket No. 14-09

Slater, Nakamura & Co, LLC is pleased to present its report on the review of the proposed bond financing by the Guam Power Authority. The review was conducted under Guam Public Utilities Commission ("Commission") Docket GPA 14-09.

In the filing, GPA requested approval to borrow up to \$94 million from senior revenue bonds and \$5 million in subordinate revenue bonds. The senior revenue bonds will support up to \$69 million in projects including

- \$56.47 million in generation projects comprised of :
  - \$35.0 million for energy storage solutions
  - \$11.6 million for deferred maintenance
- \$5.58 million for transmission improvement projects
- \$1.58 million for distribution improvement projects
- \$2.90 million for SCADA upgrades
- \$2.45 million for Cyber Security / IT upgrades

The subordinate revenue bonds will be used for a revolving fund for a legislatively approved demand side management ("DSM") program. GPA has not provided any implementation details on these projects.

The results of our review are contained in the attached report.

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

Sincerely,

Roger D. Slater  
Managing Partner



**Revision History**

<i>Version</i>	<i>Changed By</i>	<i>Date</i>	<i>Revision Description</i>
Draft	A. Finder	07/20/2014	Completed draft report
Revision 1	A. Finder	07/21/2014	Completed draft report
Rev 2	A.Finder and J. Steadley	07/24/2014	Added RFIs and documents provided by GPA

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## 1.0 EXECUTIVE SUMMARY

### Overview

On May 29, 2014, the Guam Power Authority (GPA) requested from the Guam Public Utilities Commission (Commission) a review of proposed bond financing under the Commission's bond review protocol.

In the filing, GPA requested authority to issue up to \$94 million in senior revenue bonds. The proceeds of the senior bonds would be used to support up to \$69 million in projects including:

- \$56.47 million in generation projects comprised of
  - \$35.0 million for energy storage solutions
  - \$11.6 million for deferred maintenance
- \$5.58 million for transmission improvement projects
- \$1.58 million for distribution improvement projects
- \$2.90 million for SCADA upgrades
- \$2.45 million for Cyber Security / IT upgrades

The filing also requested authority to issue \$5 million in subordinate revenue bonds to fund a legislatively approved demand side management ("DSM") program.

GPA included with its filing – in the form of a letter updating the Commission about its commercial paper programs filed in Docket 13-07 – a request for FAS 71 treatment of deferred maintenance programs and LNG conversion costs.

As the Commission's Consultants, Slater, Nakamura & Co LLC "consultants") undertook an investigation of the proposed bond issuance. Based on our communications with the ALJ for the Commission, the Commission will be deferring the FAS 71 treatment issues until a later date.

Our investigation analyzed the following areas:

- Proposed use of senior bond funds and relationship between the bond repayment schedule and service lives of programs to be funded
- Intended use of subordinate revenue bond funding for demand-side management programs
- Specific concerns about bond financing in the context of available regulatory alternatives

We understand that many of the capital programs are urgently needed to deal with deferred maintenance, reliability, environmental compliance and other GPA requirements. In the face of that urgency, we understand that the Commission has previously expressed concerns about specific elements of the capital improvement projects proposed for bond financing. As part of our recommendations, we incorporate specific actions that are relevant for

other dockets. The other dockets will address approval of specific projects and the prospect of recovery in GPA's rates. Even though the issues are discussed here, we want to avoid the appearance of approving matters properly addressed in other dockets designed to deal with approval of projects and their recovery in rates.

## Findings

Based on the analysis, we conclude:

- GPA's request to issue \$69 million in senior revenue bonds is supported by a definitive listing of 26 capital improvement projects ("CIPs")
- It appears that the senior revenue bond issue will be a reasonable alternative to funding the 26 CIPs on a pay-as-you-go basis through rate recovery. This is based upon an analysis using assumed values
- There is some risk - if GPA's service life estimates reflect actual service lives of the 26 CIPs - GPA will need to replace some facilities before their financing has been repaid. The risk will be especially acute if GPA does not request timely rate relief when projects are completed
- The proceeds of the bond issuance earmarked for energy storage will not be sufficient to fully fund the 40 mW included in the petition
- The 40 mW battery storage facility will need to be tightly managed to ensure that its costs are within budget and installation does not occur earlier than expected. GPA could choose to mitigate this risk by adjusting the installation schedule to stagger the dates when banks of batteries are placed into service
- A comparison between the interest rate of 9.09 % - from our hypothetical revenue requirements analysis required to recover in rates an amount sufficient to fund debt service on the senior revenue bonds - and 5.50% - the average embedded taxable bond rate authorized for investor-owned utilities by state commissions in the first quarter of 2014 - is somewhat indicative of the cost of turning to bonds in place of conventional rate increases
- GPA is likely to book Allowance for Funds Used During Construction (AFUDC) on at least some of the 26 CIPs. As a result, the amount recovered in rates for depreciation - once the projects are approved and included in base rates - is likely to be less than the amounts required to fund principal repayment on the senior revenue bonds. This will mitigate somewhat the 9.09% effective interest rate that was required in the hypothetical revenue requirements analysis
- During the period when GPA will be implementing its Integrated Resource Program (IRP), GPA will need to closely monitor its major operation and maintenance ("O&M") needs on existing facilities that are likely to remain in service after the 113 additional CIPs are placed in service between 2014 and 2021. This will be critical between 2014 and 2021 when the IRP is expected to cost \$1.08 billion

- Transaction costs associated with subordinate revenue bonds will cause the net present value of debt service repayments to exceed net proceeds for the revolving fund by 28%
- Given the lack of specificity for subordinate revenue bonds – in terms of how funds will be used and recovered, interest rate, amount and maturity; the rate payers will be better off with a pay-as-you-go approach using rate recovery options
- Multiple alternative approaches to rate recovery for project costs are available and could be evaluated when GPA submits the 26 CIPs for approval

## **Recommendations**

- Given the justification for CIPs included in GPA's filing, the senior bond issuance should be approved as requested
- To protect rate payers' interest in only being charged for prudently incurred expenditures, the Commission should consider including in its order a representative list of informational requirements and approval criteria it anticipates will be applied when GPA seeks recovery of expenditures associated with those CIPs through rates
- When GPA seeks approval for storage projects included in the proposed senior revenue bond issuance, to protect rate payers from the need to issue additional bonds to support these projects, GPA should be required to submit documentation to reconcile the cost of storage funded from the current bond issuance with the total cost of these projects
- The Commission should consider issuing a policy statement articulating its views on:
  - Alternative recovery mechanisms and the need for an appropriate docket to consider them
  - Limitations on costs to be recovered using LEAC filings for items such as deferred maintenance projects, battery storage and environmental compliance costs
- Within 60 days of this order GPA should provide to the Commission a comprehensive listing of major overhauls that it expects to undertake between 2014 and 2021 and that were not included in the 26 CIPs

## 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.

According to the filing, GPA plans to use the proceeds from the \$94 million senior bonds to support up to \$69 million in projects including:

- \$56.47 million in generation projects comprised of:
  - \$35.0 million for energy storage solutions
  - \$11.6 million for deferred maintenance
- \$5.58 million for transmission improvement projects
- \$1.58 million for distribution improvement projects
- \$2.90 million for SCADA upgrades
- \$2.45 million for Cyber Security / IT upgrades.

*Of the \$69 million requested for senior revenue bonds, over \$56 million will fund generation projects.*

If granted by the Commission, the authority to issue \$5 million in subordinate revenue bonds will be used to create a revolving loan fund that will support a legislatively approved demand side management ("DSM") and renewable energy program for residential and commercial customers.

GPA included with its filing – in the form of a letter updating the Commission about its commercial paper programs filed in Docket 13-07 – a request for FAS 71 treatment of deferred maintenance programs and LNG conversion costs. After further communication with GPA, the Commission will be deferring the FAS 71 issue until a later date.

When reviewing a request to issue bonds, the Commission considers several factors:

- The general bond terms including maturity, costs of issuance and debt service reserve requirements
- The total interest costs ("TIC") associated with repayment
- Relationship with projects to be funded

*Commission bond review protocol does not include review and approval of individual projects.*

The review does not encompass approval of the funded projects. Those issues are dealt with in separate dockets.

### 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 Both Debt Issues

Assumption / Value	Senior	Subordinate	Combined
Construction fund	\$69,000,000	\$5,000,000	\$74,000,000
Par value	\$83,735,000	\$6,410,000	\$90,145,000
Premium	\$1,800,187	Not applicable	\$1,800,187
Call premium (early redemption)	2%	Not applicable	
Issuance / Underwriting			
Share of par	2.0%		
Total	\$1,674,700	\$128,200	\$1,802,900
Interest rate	5.0%		
Capitalization period	2 years		
Capitalized interest	\$8,882,911	\$642,223	\$9,525,134
Debt service reserve fund			
Share of par	7.24%	10.0%	
Value	\$6,065,275	\$641,000	\$6,706,275
Net debt service <sup>1</sup>	\$156,602,288	\$6,539,951	\$163,142,239
Ratio 1: Debt Service / Construction fund	2.27	1.31	2.20
Net present value (@ 5%)	\$84,247,242	\$6,385,273	\$90,632,515
Difference: Net present value less construction funds	\$15,247,242	\$1,385,273	\$16,632,515
Ratio 2: Net present value / Construction fund	1.22	1.28	1.22
<p><b>Sources:</b> GPA calculations for individual debt issuances and all information presented prior to Ratio 1. Information provided to the Commission's Consultants by GPA in response to discovery question 1-FA1-9. The Commission's Consultants compiled calculations for (1) the Debt service reserve fund share of par (2) all other calculations from Ratio 1 through the end of the table and (3) all combined totals.</p> <p><b>Note:</b></p> <p><sup>1</sup>Comprised of repayment of principal, annual interest, and capitalized interest net of debt service reserve fund.</p>			

The important point to glean from Table 1 is: to fund \$74 million in projects, GPA customers will need to provide \$163.1 million in revenues over a 30 year period. On a net present value basis, ratepayers will be indifferent to the additional costs that borrowing money requires but only if:

1. There are no transaction costs to acquire bond finance.
2. The discount rate is identical to the interest rate on the bonds, which is assumed to be 5% in this analysis.

*To fund up to \$74 million in projects for two bond issuances, GPA customers will need to provide \$163.1 million in additional electricity rates over 30 years.*

According to principles of financial valuation, the second requirement is always met because it is the only appropriate way to evaluate whether to borrow money to fund a capital program. The first requirement cannot be met because transaction costs are always present. For the debt issuance requested by GPA for this docket, transaction costs – comprised of premium, issuance costs and debt service reserve funds – are responsible for approximately \$10.3 million. When capitalized interest is considered alongside transaction costs, the difference between net present value and construction proceeds from debt issuance is nearly fully accounted for.

Moreover, in accordance with regulatory principles, as long as the underlying program to be financed consists entirely of prudently-incurred expenditures, then transaction costs are recoverable if the cost of financing the program from current revenues is not feasible for customers to pay during the construction period.

#### **PROJECTS TO BE FUNDED – SENIOR REVENUE BONDS**

GPA filed with its petition Resolution 2014-03 of the Guam Combined Commission on Utilities (“CCU”). The petition included two tables providing a summary listing and a detailed listing of capital improvement projects (“CIPs”) to be funded by the senior bond issuance. GPA later reduced the cost of one item on the list – Energy Storage and Renewable Energy Mitigation – but did not modify the CIPs in any way. In response to questions from the Commission’s Consultants, GPA further clarified that some of the CIPs are actually deferred major maintenance expenses. Combining the information provided by GPA to us with the tables in CCU Resolution 2014-03, we present high-level information on the projects to be funded in Table 2:

*GPA may need to replace some of the 26 CIPs before the bonds have been fully retired.*

**Table 2: Types of Projects to be Funded**

<b>Category</b>	<b>Amount (\$1,000)</b>
Generation	\$56,477
1. Energy Storage and Renewable Mitigation	\$35,000
2. Major Operations and Maintenance ("O&M") Deferral	\$10,334
3. LNG Start up	\$3,000
4. Other generation projects	\$8,143
Transmission and Distribution ("T & D")	\$7,173
1. Projects	\$5,933
2. Major O&M Deferral	\$1,240
SCADA (System Control and Data Acquisition)	\$2,900
Physical Security	\$1,350
Cyber Security / Information Technology (IT)	\$1,100
All CIPs Combined	\$69,000

In a bond issuance review docket, the Commission does not assess the prudence of proposed projects. Its primary concern about projects is whether they are capital-related and consistent with long-term borrowing requirements. We conclude that, in general, the projects listed are related to capital improvement and therefore qualify for bond financing.

We did evaluate whether the senior bond financing repayment schedule was matched to the intended service lives of the 26 CIPs that GPA intends to fund with the senior bonds. The evaluation assesses whether the timing of a capital program's physical retirement – and in principle the end of when customers will be responsible for revenue requirements to support it – is consistent with repayment of principal on the debt which initially paid for the capital program.

*The 26 projects are capital-related and qualify for bond financing.*

Our assessment made a simplifying assumption that all 26 projects would be initiated immediately upon receipt of bond proceeds into the construction fund. Using service lives provided by GPA and a pro forma debt service schedule, we analyzed the relationship between the repayment schedule and

when the useful life of the 26 CIPs may end. We conclude that there is some risk - if GPA's service life estimates reflect actual service lives of facilities - GPA will need to replace some facilities before their financing has been repaid. The risk will be especially acute if GPA does not request timely rate relief when projects are completed. In Table 3, we present the results of our high-level analysis.

**Table 3: Principal Repayment and Useful Life**

Bond Year	Cumulative Amounts (\$Thousand)			
	Bond Principal Repaid	Facilities At End of Useful Life	Net Debt Service	Estimated Revenue Requirements Collected
10	\$8,225	\$4,720	\$41,350	\$72,153
15	\$20,775	\$9,490	\$71,684	\$94,785
20	\$36,900	\$19,273	\$102,015	\$112,048
25	\$57,475	\$55,623	\$132,341	\$123,691
30	\$83,735	\$66,860	\$156,602	\$126,348
50	NA	\$69,000	NA	\$127,611
<b>Sources:</b> First four columns - Our totals based on data provided by GPA under simplifying assumptions. Last column - Our pro forma analysis relying on GPA provided data on CIPs and assuming (1) straight line depreciation with no salvage value; (2) depreciable lives identical to useful lives; (3) 5% rate of return (based on expected bond rate) applied to year-end rate base; (4) no AFUDC and (5) no delay post completion prior to recovery in rates.				

As the table indicates, through Year 20 of the senior bond's anticipated repayment schedule, GPA's principal repayments are outpacing - by a comfortable margin both:

- The useful lives of facilities funded by the senior bonds; and
- Revenue requirements.

By Year 25, the margin - between principal repaid and capital at the end of its useful life - declines to \$1.8 million. The results assume that amounts dedicated from the 2014 bond issue will fully fund the construction costs of all 26 CIPs included in the capital program. If that is not the case, then some projects may need to be delayed to ensure that they do not reach the end of their useful lives until after the 25<sup>th</sup> maturity year for the bonds.

In reviewing Table 2, it is important to focus on the largest scale project and how it affects the relationship between principal repayment and useful facility lives. Using data from the table, the cost of the 40 mW storage project - \$35 million according to the petition for bond review - is responsible for nearly half the cost of the \$69 million in the 26 CIPs to be funded. Looking at Table 2, the storage project is responsible for the overwhelming share of generation projects. As a result, the 40 mW battery storage facility will need to be tightly managed to ensure that its costs are within budget and installation does not occur earlier than expected. GPA could choose to mitigate this risk by adjusting the installation schedule to stagger the dates when banks of batteries are placed into service.

Moreover, under the simplifying assumptions underlying the last column of Table 3, revenue requirements between Years 20 and 25 are not keeping pace with debt service based on assumptions made in our pro forma analysis. We performed a special analysis that estimated revenue requirements using a conventional rate of return approach only financed by debt. In the analysis, we allowed the interest rate to increase to exactly the level where the revenue requirements for the 26 CIPs would exactly equal their debt service. Depreciation on the CIPs funded the principal repayment and the hypothetical return on rate base funded the remainder of the debt service. The rate of return on debt that recovered full debt service requirements was nearly 9.09%. This rate is significantly higher than the average embedded taxable bond rate authorized for investor-owned utilities by state commissions in the first quarter of 2014 - 5.50%.

*Between Years 20 and 25, there is a risk that (1) principal repayment may occur after facilities have been retired; and (2) rate recovery may lag debt service obligations.*

For the Commission's benefit, it is important to note that the normal process for setting base rates will not mirror any of the approaches underlying Table 3 or the Commission's Consultants special analysis described in the preceding paragraph. Once the 26 CIPs facilities are placed in service, GPA under a traditional ratemaking approach could reasonably be expected to file an application to increase its base rates. When that happens, GPA will add to the capital costs any amounts booked to Allowance for Funds Used During Construction ("AFUDC") on CIPs approved by the Commission. The implication of AFUDC is that the rate base associated with any individual CIP - and all 26 together - will be comprised of both capital cost and AFUDC. The stream of rate payer charges required to service debt would be modeled in the same way that GPA and the Commission calculate the carrying charges. Using that approach, the amounts paid to bond holders are likely to collect the full amount of debt service required during the relevant maturity periods. Nonetheless, the results point to the importance of modeling revenue requirement impacts when GPA requests approval for individual projects.

There are two additional important considerations that need to be addressed:

- GPA Support for cost of storage
- The need for major O&M deferrals

### **GPA SUPPORT FOR COST OF STORAGE**

In its petition for bond review GPA estimated the cost of a 40 mW storage project to be \$35 million. In response to a second round of questions about data request 1-FA2-5, GPA provided support for its estimate that batteries will cost \$28 million before installation cost.<sup>1</sup>

We reviewed the study and found that the consultant had provided a range of estimates – between \$37.2 and \$43.0 million – to install battery storage at the Agaña station. In fact, when estimates of installed cost at two other stations are reviewed, the midpoint of the estimate range for all three locations is approximately \$40 million.<sup>2</sup>

Based on the review, we conclude that the proceeds of the bond issuance earmarked for energy storage will not be sufficient to fully fund the 40 mW included in the petition.

### **MAJOR O&M DEFERRALS**

In the United States over the past 20 years, it has been common for utilities to capitalize the cost of major operations and maintenance (“O&M”) for generating facilities. During the past 30 years, deferred generation O&M has not been an issue in the utility industry based in the lower 48 states. It has been an issue in Puerto Rico. Except during the nuclear construction boom of 1977 through 1990, deferred transmission and distribution (“T&D”) O&M has not been the norm over the past 50 years. However, after the recession hit Guam in 2009, GPA’s revenues have not been growing at the same pace as they were earlier in the decade. It is likely that GPA has deferred these O&M projects – totaling nearly \$12 million – due to inadequate revenues from tariffs. In a letter included with its bond review petition<sup>3</sup>, GPA confirmed the reason for the deferral for Cabras Unit 2:

*GPA’s filing appears to have under-reported the cost of battery storage – the single largest CIP to be funded – compared with the estimates from its expert consulting report.*

*However, when the projects were included in the Fiscal Year 2014 budget submission, they could not be funded without impacting other previously scheduled maintenance.*

<sup>1</sup> TG Engineers, PC, **Engineering & Technical Services for Energy Storage Feasibility Study Final Draft Report**, June 27, 2014

<sup>2</sup> *Ibid.*, Tables 7-3, 7-6 and 7-7 as well as Appendix E. Midpoints based on Slater, Nakamura calculations using information in Table 7-7.

<sup>3</sup> Correspondence from Joaquin Flores, P.E. General Manager, GPA, to Frederick J. Horecky, Esquire, Administrative Law Judge, Guam Public Utilities Commission, May 23, 2014, page 3.

Because the financing docket is not the proper forum for considering the extent of deferrals, our investigation did not look into whether the inclusion of these projects will resolve all of GPA's deferred O&M. Given GPA's intent to undertake major construction as part of its Integrated Resource Plan ("IRP"), it is quite possible that additional O&M deferrals may arise during the period when GPA intends to undertake this significant construction program. GPA included a table in its response to our question 1-FA1-9 indicating that 139 candidate CIPs, projected to cost approximately \$1.2 billion, could potentially be undertaken between fiscal years 2014 and 2021. During that time period it will be important for GPA to monitor its major O&M needs on facilities that are likely to remain as part of plant in service after the 113 additional CIPs have been completed.

*Given GPA's anticipated borrowing and capital needs over the next 8 years, it will need to monitor its O&M program to avoid material deferrals. There may simply be no room for catch-up on deferred O&M given that GPA expects to spend over \$1 billion on CIPs.*

### **SUBORDINATE BOND CONCERNS**

GPA, in its petition and in responding to information requests, has discussed some features of the Subordinate Revenue Bonds including:

- Rationale – creates a revolving fund for legislatively mandated demand side management ("DSM") and renewable energy programs for residential and commercial customers
- Intended amount
- Likelihood that interest payments will not be tax exempt

GPA has provided illustrative calculations of the debt service requirements associated with these bonds based on assumptions for interest rate, amount and time period when interest will be capitalized and likely debt service reserve fund. We have previously listed this information in Table 1.

Unfortunately, GPA has not compiled:

- A candidate list of specific DSM and renewable energy measures that will be funded
- An approximate timing and costs of measures to be funded
- The proportion of the expenditures to be fully repaid to GPA and the form of payment
- Timing pattern for recovery of funds collected from participating and other customers to retire the revolving fund

Under the Commission's usual approach, these issues will be resolved at the time GPA requests approval for the programs to be offered through the legislatively-mandated programs. In the interim, the lack of clarity around the intended use or recovery of the funds makes it difficult to assess the benefits of the subordinate revenue bond.

In terms of the costs, we demonstrated in Table 1, that transaction costs associated with the Subordinate Revenue Bonds cause the net present value of the repayment stream – discounted at the expected subordinate bond interest rate – to exceed the construction fund by 28%.

While we understand that the Commission is conceptually supportive of DSM and renewable energy, this bond issuance does not appear to be the most desirable method for delivering these programs to customers. The lack of specificity regarding the DSM and renewable energy program is a major concern that does not appear to be solvable by the time the bond is issued. Because transaction costs cause the net present value of the bond repayment schedule to exceed the value of the proceeds, bond financing is less attractive than other regulatory recovery mechanisms in paying for comparable short-term programs. A brief description of examples of these recovery mechanisms is provided in the next section of the report.

*The subordinate revenue bond request lacks specificity in (1) key bond terms (maturity and interest rate); (2) projects to be funded; and (3) how revolving fund will be re-paid. It also incurs greater transaction costs than raising money from pay-as-you-go tariff-based programs.*

In several US states, surcharges have been used to fund DSM, infrastructure renewal and new generating station construction programs on a pay-as-you-go basis. When applied to DSM, these surcharges are often referred to as either “public benefit” or “public mandate” components of tariffs. The incremental transaction costs associated with public benefit surcharges are generally lower because collecting revenue from rate payers can occur easily once Commissions approve surcharges. Moreover, the programs are funded by customers on a “pay-as-you-go” basis and avoid interest charges as well. The net result is that less external finance is used to pay for the programs than would occur under the proposed subordinate revenue bonds.

The scope of the bond review protocol does not include approving of specific expenditures, but it is clear that rate recovery mechanisms would return more benefit to ratepayers than bond financing. This is especially true for a smaller expenditure such as the \$5 million contemplated in the subordinate bond issuance.

## **SUMMARY**

In this section of the report we have reviewed the major features of the two bond programs in a manner consistent with the bond review protocol. At this time, only pro forma estimates of key parameters – and their associated costs – are available for review. No firm estimates for interest rates, premiums, or debt service reserve levels will be available until the bonds are issued. Only for senior revenue bonds has a list of projects been compiled. GPA intends to use the subordinate bond issue proceeds to fund



legislatively-mandated DSM programs. No specific elements of that program are available for review at the time we conducted our investigation.

The points discussed in this section establish that the senior bonds will be used to pay for 26 CIPs and are likely to be the most effective option. GPA has provided documentation for projects and estimates of debt service repayment costs based on assumptions about parameters for the senior bonds. GPA has provided similar estimates of debt service costs for subordinate bonds. However, only the purpose for the underlying projects is known at this time: a revolving fund to support a legislatively-mandated DSM and renewable energy program for residential and commercial customers. It appears that common recovery options widely used in the US for DSM would be a better option for rate payers.

### 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 request to issue \$69 million in senior revenue bonds is supported by a definitive listing of 26 capital improvement projects ("CIPs")
- , It appears that the senior revenue bond issue will be a reasonable alternative to funding the 26 CIPs on a pay-as-you-go basis through rate recovery. This is based upon an analysis using assumed values
- There is some risk - if GPA's service life estimates reflect actual service lives of the 26 CIPs - GPA will need to replace some facilities before their financing has been repaid. The risk will be especially acute if GPA does not request timely rate relief when projects are completed
- The proceeds of the bond issuance earmarked for energy storage will not be sufficient to fully fund the 40 mW included in the petition
- The 40 mW battery storage facility will need to be tightly managed to ensure that its costs are within budget and installation does not occur earlier than expected. GPA could choose to mitigate this risk by adjusting the installation schedule to stagger the dates when banks of batteries are placed into service
- A comparison between the interest rate of 9.09 % - from our hypothetical revenue requirements analysis required to recover in rates an amount sufficient to fund debt service on the senior revenue bonds - and 5.50% - the average embedded taxable bond rate authorized for investor-owned utilities by state commissions in the first quarter of 2014 - is somewhat indicative of the cost of turning to bonds in place of conventional rate increases
- GPA is likely to book Allowance for Funds Used During Construction (AFUDC) on at least some of the 26 CIPs, the amount recovered in rates for depreciation - once the projects are approved and included in base rates - is likely to be less than the amounts required to fund principal repayment on the senior revenue bonds. This will mitigate somewhat the 9.09% effective interest rate that was required in the hypothetical revenue requirements analysis
- During the period when GPA will be implementing its Integrated Resource Program (IRP), GPA will need to closely monitor its major operation and maintenance ("O&M") needs on existing facilities that are likely to remain in service after the 113 additional CIPs are placed in service between 2014 and 2021. This will be critical between 2014 and 2021 when the IRP is expected to cost \$1.08 billion
- Transaction costs associated with subordinate revenue bonds will cause the net present value of debt service repayments to exceed net proceeds for the revolving fund by 28%

- Given the lack of specificity about how funds will be used and recovered, interest rate, amount and maturity of subordinate revenue bonds; the rate payers will be better off with a pay-as-you-go approach using rate recovery options
- Multiple alternative approaches to rate recovery for project costs are available and could be evaluated when GPA submits the 26 CIPs for approval

## 4.0 RECOMMENDATIONS

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

Based upon the investigation of supporting documents, we recommend that:

- Given the justification for CIPs included in GPA's filing, the senior bond issuance should be approved as requested
- To protect rate payers' interest in only being charged for prudently incurred expenditures, the Commission should consider including in its order a representative list of informational requirements and approval criteria it anticipates will be applied when GPA seeks recovery of expenditures associated with those CIPs through rates
- When GPA seeks approval for storage projects included in the proposed senior revenue bond issuance, to protect rate payers from the need to issue additional bonds to support these projects, GPA should be required to submit documentation to reconcile the cost of storage funded from the current bond issuance with the total cost of these projects
- The Commission should consider issuing a policy statement articulating its views on:
  - Alternative recovery mechanisms and the need for an appropriate docket to consider them
  - Limitations on costs to be recovered using LEAC filings for items such as deferred maintenance projects, battery storage and environmental compliance costs
- Within 60 days of this order GPA should provide to the Commission a comprehensive listing of major overhauls that it expects to undertake between 2014 and 2021 and that were not included in the 26 CIPs

## 5.0 REGULATORY ISSUES

*In this section is presented information related to regulatory issues that the Commission may consider for CIPs being funded by the senior revenue bond issue*

### OVERVIEW

Given the Commission's bond review process, issues of prudence or other matters related to rate recovery are not intended to be considered when evaluating a bond issuance. However, recognizing that GPA may request approval of expenditures in subsequent dockets, this report affords the Commission's Consultants the opportunity to highlight issues for future consideration.

While the previous section discussed examples of regulatory approaches, it did not discuss them at length. This sub-section is designed to raise awareness of sample approaches that could be used to accommodate a capital investment program that could amount to \$1.2 billion between now and 2021. In the future, when GPA seeks recovery of these costs, it can identify its choices for recovery methods other than base rates. It will be up to the Commission to decide what course of action best balances the interests of the Government, bondholders and rate payers.

*The Commission should focus on future issues that will arise when GPA requests recovery in rates for the 26 CIPs*

As recently as its order in GPA Docket 14-03, the Commission has clarified that the Levelized Energy Cost Adjustment ("LEAC") was not originally intended to be used for capital cost recovery, even in the face of examples when it was. However, the Commission has not indicated whether additional options exist for recovery of capital costs other than through base rates.

This section focuses on two major questions:

- What approach could potentially be used for rate recovery of the 26 CIPs listed in GPA's petition and for a DSM and renewable energy program?
- What criteria will the Commission use to evaluate capital expenditures when GPA seeks recovery through rates?

### RATE RECOVERY OPTIONS

In this section we focus on three major variants for the 26 CIPs and one variant for the DSM and renewable energy program:

1. Recovery of carrying charges during construction
2. Incremental recovery of CWIP
3. Base rate recovery options
4. Public benefit or public mandate surcharges

### Recovery of Carrying Charges During Construction

During the past decade, the US investor-owned electric utility industry shifted to a "back-to-basics" strategy and invested billions of dollars in infrastructure renewal. As it planned for the capital expenditures, the

industry sought and received approval to collect in rates – through special surcharges – the carrying charges on capital. The methods generally allowed recovery of at least the debt component of carrying charges. In some instances, the approval also permitted recovery of the equity component as well. These regulatory innovations set aside concerns related to inter-generational equity – or the notion that current rate payers should not be required to subsidize future rate payers. In addition, they moved closer to a decision to sidestep concerns over including Construction Work in Progress (CWIP) in the rate base.

Mechanically, these surcharges were based on several alternative approaches. For some states, the company identified its expectations and then reconciled projected and actual expenditures within a fixed time period. In others, the time period for reconciliation was left open and the utility was permitted to request increases in the surcharge without reconciliation and outside the base rate case process.

### **Incremental Recovery of CWIP Prior to Completion**

In Georgia and South Carolina, the State Legislature changed the public service law to permit recovery of CWIP prior to facility completion. The utility periodically requests that a portion of CWIP be included in rates. Once the Commission accepts its inclusion, the approved CWIP is deemed to be prudent in all future cases. The Georgia Public Service Commission set a hard cap for the facility at issue – a two-unit addition to an existing nuclear plant. Expenditures in excess of the cap are ineligible for future recovery in rates.

### **Infrastructure Renewal Surcharges**

There are three major approaches to infrastructure renewal:

1. Gas and water main replacement
2. Limited SmartGrid Investment

The first approach, replacement clauses, are surcharges whose levels are set either in base rate cases or in brief cases just prior to implementing a requested change. The second approach operates similarly to the first but is only applied to SmartGrid projects.

### **Base Rate Recovery Options**

These are variations on the familiar theme of seeking recovery in a conventional rate case. There are two alternative recovery approaches in use today:

1. Fixed multi-year recovery through multi-year tariff
2. Variable, formula rate approach

In the first approach, offered by commissions in California and New York, the company files a three-year case. The first year is a conventional approach,

but the second and third years include additional rate base for new facilities expected to be in service at the beginning of each year.

A variable, formula rate permits comprehensive changes in operating and capital expenses for a multi-year period. Once the account categories are specified in the order, the company makes an informational filing approximately 60 days before the start of the subsequent year. FERC has relied on such an approach for the past 20 years for transmission service tariffs. Several variations on the FERC approach are used in Alabama, Illinois, Louisiana and Mississippi. Mississippi's plan includes performance parameters and has been in place since the 1980s.

### **Public Benefit or Public Mandate Surcharges**

In several US states, surcharges have been used to fund DSM and are often referred to as "public benefit" or "public mandate" components of tariffs.

These can be designed to recover expected costs on a prospective basis or actual costs on a retrospective basis. With either the prospective or retrospective approach, there are often true-up (or reconciliation) reviews that occur either before the next revision of the surcharge or the next base rate review, whichever comes first.

California is one of several states that have used this approach. The incremental transaction costs associated with public benefit surcharges are generally lower than if the programs were capitalized because collecting revenue from rate payers can occur easily once Commissions approve surcharges. Moreover, the programs are funded by customers on a "pay-as-you-go" basis and avoid interest charges as well. The net result is that less external finance is used to pay for the programs than capitalizing them for the purpose of rate recovery.

### **EVALUATIVE AND INFORMATIONAL CRITERIA FOR RECOVERY**

We are unaware of any instance in which a US regulatory commission has articulated its evaluative criteria in advance of recovery except for two that have been in place for over 100 years:

1. Used and useful
2. Prudently-incurred

Because of widespread use, most practitioners are aware, at least at a summary level, of the meaning of these two criteria.

In recent years, two state commissions – in Indiana and Mississippi – have side-stepped a qualitative approach to define "prudently-incurred" in favor of a quantitative one involving caps, or maximum levels of acceptable expenditures. The caps are established in a proceeding that affirmatively approves the construction of the facility in advance of its start.

The two states first applied the approach in cases involving a new generation technology – integrated gasification, combined cycle (“IGCC”) with carbon sequestration– in Edwardsport, Indiana and Kemper, Mississippi.

This method relies on two levels of maximum expenditures:

1. Soft cap
2. Hard cap

The soft cap is the lower level. As long as the total cost of the facility is no larger than the soft cap, the utility can be assured of recovery of its capital expenditures. If spending rises above the soft cap but is less than the hard cap, then the utility has an opportunity to request recovery but will need to establish and prove a case that the incremental expenditures are well-documented and prudent. Any expenses exceeding the hard cap are presumed to be imprudent and ineligible for recovery.

Informational criteria are similarly not specified in advance. However, given some of the controversy the Guam Commission has already faced on LNG consultancy fee recovery and the potential magnitude of the construction program, it is advisable to establish at a high level at least some basic understanding of what documentation will be required:

- Timeline of major changes in design, cost and schedule
- Evidence of management review of major construction decisions
- Comprehensive record retention for all studies, memoranda, cost-to-complete estimates and schedule revisions associated with major changes in construction costs
- Economic evaluation of alternatives to completing facility when expected costs increase above a pre-specified threshold

Given the limitations of the bond review process, the Commission will need to consider recovery options, prudence criteria and informational requirements when GPA submits the 26 CIPs projects for approval.

## **SUMMARY**

In this section we have identified several approaches to recovering the cost of capital improvement and public mandate programs through rates. These approaches do not need to be evaluated until GPA requests recovery of its costs in rates. They are provided only as an overview of approaches that could be used for some programs as an alternative to borrowing.



## APPENDIX A – GPA'S RESPONSES TO QUESTIONS

In the following tables are the questions presented to GPA by the Commission's Consultants and GPA's responses.

Table 4: Questions and responses

Bond Terms, Financials and Conditions		GPA Response
Index	PUC Consultant Question	
1-FA1-1	For each type of debt (senior and subordinated), I would like to obtain some basic facts. [Applies to 17 questions] Planned maturity in years and/or months.	We are hoping the useful lives of the projects will support a 30 year bond. It may have to be a little shorter. If there is a subordinate bond, it would likely be 5 years.
1-FA1-2	Interest rate (if it differs during the maturity period, please provide a schedule).	We won't know the interest rate until the bonds are sold. The interest rates for bonds of similar quality have been selling in the low 5% range. Barclay's advised us last week that interest rates have been falling recently.
1-FA1-3	Any penalties for early retirement of bonds.	We expect there will be a 2% call premium in the first 10 years.
1-FA1-4	Whether capitalized interest will be charged in some initial period after flotation	Yes, there will be Capitalized Interest.
1-FA1-5	The duration of the period (in days, months, quarters or years) during which capitalized interest will be charged.	We are looking at a September issuance date with capitalized interest applied through September 30, 2016.
1-FA1-6	The rate at which interest will be capitalized if different from the rate used for estimating interest payments.	We expect it to be the same rate.
1-FA1-7	The time period in which capitalized interest balances will be retired (for example, remaining life of bond, by year 10).	The cost of the capitalized interest will be paid over the life of the bond.
1-FA1-8	How will interest be paid to bond-holders – lump sum at maturity, periodic interest payments or some other option?	Interest will be paid every six months on October 1 and April 1 until the bond is paid off.

Index	PUC Consultant Question	GPA Response
1-FA1-9	<p>Of the total financing contemplated, what are the specific amounts anticipated for</p> <p>a) Repayment of principal</p> <p>b) Repayment of debt issuance costs</p> <p>c) Underwriting fees</p> <p>d) Interest</p> <p>e) Capitalized interest balance at close of period when it is being accumulated</p>	<p>Please see tabs "2014 Revenue Bond" and "2014 Sub Bond" of the workbook <b>FY14-FY18 Revenue Requirement (94M Rev Bond) 05 16 2014.xls</b>. These are estimates GPA made based on prior bond issuances.</p>
1-FA1-10	Interest rate on bonds.	Please see response to 1-FA1-2
1-FA1-11	Anticipated rating of GPA at time of issuance	<p>Same as the 2012 Revenue Bond rating BBB for S&amp;P, BBB- for Fitch, and Baa3 for Moody's.</p>
1-FA1-12	Collateral requirements, if any.	Net Revenues
1-FA1-13	Compensating balance requirements, if any and interest paid on compensating balances.	None.
1-FA1-14	Reserve requirements and form in which reserves will be held (reserve accounts on GPA's books, escrow accounts with banks or other)	Debt Service Reserve Fund and P&I Fund with the Trustee and Co-Trustee
1-FA1-15	How proceeds of bond issuance will be transferred from agent to GPA	<p>As in the past bond closing, there will be a final closing memorandum of wire instructions where the funds will be transferred to GPA.</p>
1-FA1-16	Penalties for early maturity, if any	We expect there will be a 2% call premium if the bonds are paid off in the first 10 years.
1-FA1-17	Debt Service Coverage or other financial covenants (days cash on hand, etc)	<p>Please see attached workbook <b>FY14-FY18 Revenue Requirement (94M Rev Bond) 05 16 2014.xls</b>.</p>
3-FA1-1	<p>In the Excel Workbook attached to your e-mail of July 7, 2014, the worksheet "2014 Revenue Bond" includes the amount to be financed and the Debt Service Reserve balance requirement. What percentage – of either "Construction Fund" or some combination of line items (please specify which ones) – did GPA use in estimating the required amount for Debt Service Reserve. A simple calculation indicates 8.79% of</p>	<p>The debt service reserve is equivalent to the Maximum Annual Debt Service (MADS). For the Senior bond it is approximately 7% of the par amount and for the subordinate debt it is 10% of the par amount.</p>

Index	PUC Consultant Question	GPA Response
3-FA1-2	<p>"Construction Fund" as the percentage for the Debt Service Reserve requirement for 2014 Revenue Bond and 12.92% for the Subordinate Bond. Please indicate how GPA derived that assumption.</p> <p>In the Excel Workbook attached to your e-mail of July 7, 2014, the worksheet "2014 Rev Bond CIPs", please identify by row number and project name which projects will be included in which of the two types of bonds – "Revenue Bond" and "Subordinate Bond".</p>	<p>All the CIPs listed in the "2014 Rev Bond CIPs" tab are covered by the "Revenue Bond". Except the total amount was not updated to reflect the total cost of the Energy storage. It was reduced to \$35M from the original \$40M. There is no list of projects for the Subordinate bond as the \$5M is intended for demand side and renewable energy programs.</p>
3-FA1-3	<p>In the Excel Workbook attached to your e-mail of July 7, 2014, I am unable to match data in worksheet "AGMO CIP" with those in worksheet "2014 Rev Bond CIPs". Please provide – for each project listed in "2014 Rev Bond CIPs" a listing by row number in worksheet "AMGO CIP"</p>	<p>Please disregard the "AGMO CIP" tab in the worksheet, at the time the file was created the "AGMO CIP" is outdated. Please see attached updated "AGMO CIP" on excel file <b>AGMO Master – CIP2014-01-13 Ver4.xls</b>.</p>
3-FA1-4	<p>In the Excel Workbook attached to your e-mail of July 7, 2014, please indicate whether the amount listed for "Energy Storage and Renewable Energy Mitigation" in worksheet "2014 Rev Bond CIPs" is the correct amount for the 40 MW of batteries or if the amount of \$35 million from "Attachment C" is the correct amount. Please indicate which items were removed from the estimate and where they might appear in the Excel workbook. If nothing was removed, did GPA reduce its estimate of the cost of batteries or other items to estimate the \$35 million amount included in "Attachment C"?</p>	<p>Yes, the only change is the reduction in the project cost of the "Energy Storage and Renewable Energy Mitigation" from \$40M to \$35M.</p>
3-FA1-5	<p>Using data included in worksheet "2014 Rev Bond CIPs", I estimate that a little more than \$13 million in costs will have service lives in excess of 25 years.</p>	<p>The service life estimates came from Engineering, Plant accounting has the service life for these assets based on GPA's Useful Life</p>

Index	PUC Consultant Question	GPA Response
	(This calculation uses Excel's "SUMIF" function similar to the way GPA used it in the formulas at the bottom of worksheet "AGMO CIP" in cell range N136 to U151). Of the remaining amount, approximately \$41 million are estimated to have service lives of 25 years. How might a service life of less than the life of the bonds affect the credit rating of the bonds? Are the service life estimates in the worksheet "2014 Rev Bond CIPs" based on accounting principles or engineering principles?	policy
3-FA1-6	Using data included in worksheet "2014 Rev Bond CIPs", we estimate that \$55.6 million of investments, if finished with 12 months after receiving the bond funds would have service lives of 25 years or less. (See attached worksheet "AEF Revised 2014 Rev Bond CIPs"). Does the service life schedule pose any financial risks in repaying principal on the revenue bonds for which \$57.5 million in principal is due by the end of the 25th year?	Pending.
3-FA1-7	<p>In its petition in GPA Docket 14-09, the company indicated that some tax would be due on projects funded by the subordinate bond issue . What are the tax implications of the projects in the subordinate bond issue? For example:</p> <ol style="list-style-type: none"> <li>Is debt interest not tax deductible?</li> <li>Is the revenue stream on projects treated differently than customers' bill revenues?</li> <li>Are the expenses not tax deductible?</li> <li>Is there a registration tax for the subordinate bonds that is not required for the revenue bonds?</li> <li>If GPA elects to amortize the regulatory asset, is that a deductible business expense?</li> <li>Is there a different composite rate of depreciation</li> </ol>	There are no tax implications to GPA. GPA is tax exempt entity. The interest earnings received by the bondholders on the subordinate bond will be taxable as compared to the Tax exempt bonds. The interest earnings from Tax exempt bonds have triple exemption (federal, state and local).

<b>Index</b>	<b>PUC Consultant Question</b>	<b>GPA Response</b>
	used on the projects funded by subordinate bonds as compared with the revenue bonds? b) g. Is there some other reason?	
4-FA1-1	Please provide copies of correspondence with, analyses from or memoranda from bond counsel, consultant or financial institution indicating for 2014 Senior Revenue bonds any analytic results describing "TIC", net present value of alternative maturities and other financial parameters	No response received
4-FA1-2	Please provide copies of correspondence with, analyses from or memoranda from bond counsel, consultant or financial institution indicating for 2014 Subordinate Revenue bonds any analytic results describing "TIC", net present value of alternative maturities and other financial parameters	No response received
4-FA1-3	Were any of the assumptions about interest rate, issuance premium, flotation costs etc. shown in <b>FA1-9 &amp; FA1-17 - FY14-FY18 Revenue Requirement (\$94M Rev Bond) 05 16 2014.xls</b> provided to GPA by bond counsel, consultant, investment banker?	No response received

**Battery Storage**

<b>Index</b>	<b>PUC Consultant Question</b>	<b>GPA Response</b>
1-FA2-1	What technology will be used (Lead acid, Lithium Ion, other battery chemistry, chilled water, pumped storage, etc)?	The ESS primary function will be a spinning reserve application. For this application, lithium-ion or advanced lead-acid technologies are expected to be the most viable battery options at this time.
1-FA2-2	For batteries, what is the assumed length of the discharge cycle.	The assumed length of the discharge cycle is 15 minutes.
1-FA2-3	What is the anticipated service life (in an engineering sense)? How many recharge cycles can the battery provide during the engineering life?	For the spinning reserve application, approximately 1000 cycles over the 20- year lifetime is estimated.

Index	PUC Consultant Question	GPA Response
1-FA2-4	What is the anticipated maximum duration before the battery needs to be replaced?	Lithium-ion and advanced lead-acid batteries range from 1000 to 10,000 cycles at 100% depth of discharge.
1-FA2-5	What is the anticipated cost (total) to acquire batteries from the manufacturer?	The estimated cost for the battery alone is \$28M.
1-FA2-6	Where does GPA anticipate locating the batteries? Can you provide a table showing the names of substations, approximate location (or GPA coordinates, if available) where batteries will be located and how many KW will be installed?	It is recommended that siting the 40 MW ESS at Agana Substation has the advantage of an existing structure to house the system as well as the preferred connection to the 115 kV system.
1-FA2-7	If the planning estimates have progressed sufficiently, can you segregate the costs of the batteries among site preparation, transmission or distribution system upgrades, control center enhancements (if applicable), substation upgrade costs and control system upgrade costs (e.g., SCADA, dispatching controls, voltage management, distribution management, etc.)	Please refer to the attached cost estimate.
1-FA2-8	Has GPA undertaken load flow or other studies to develop a plan for integrating the batteries into its system along with operating procedures specific to the batteries?	Yes, GPA has undertaken load flow studies for integrating the batteries into the system. Specific operating procedures have not been developed yet.
1-FA2-9	Will the project be managed through the same PMO that is overseeing IRP implementation?	No, the GPA will manage the Project.
1-FA2-10	Has GPA modelled the impact on metrics such as SAIDI, SAIFI, CAIFI, etc.)? Please provide an estimate of impact on system operating procedures.	The Energy Storage System (ESS) Project has several phases. The Phase I is the installation of a 40 MW system. This will reduce under-frequency outages by 77%. It will limit under-frequency outages to primarily the first stage. This assumes additional use and configuration of smart inverters and voltage and frequency ride-through capabilities for intermittent renewable systems integrated into the GPA grid. These

Index	PUC Consultant Question	GPA Response
2-FA2-1	Please identify the source for the estimates of discharge cycle, number of cycles, battery lifetime (usually cycle dependent), and number of cycles at full discharge. If different, please identify source for each measure provided	configurations and interconnection requirements have not been defined. Finally, as a point of reference, the information provided for the Operational Study and ESS Feasibility Study regarding outages indicated that 60% of outages are rooted in under-frequency load-shedding events.
2-FA2-2	Please indicate GPA's basis for using an engineering life estimate of 20 years as compared with a service life estimate of 25 years used in worksheet "2014 Rev Bond CIPs" that is part of the Excel Workbook attached to your e-mail of July 7, 2014 <b>[FA1-9 &amp; FA1-17 - FY14-FY18 Revenue Requirement (\$94M Rev Bond) 05 16 2014.xls]</b> . Which life estimate is appropriate to use when issuing the bonds – engineering life or service life?	There have been changes from the original ESS Feasibility Study draft and the final version in review. Here is the final version. Some of the questions you may have are due to the evolution of the Study from initial to final draft as new information is incorporated.
2-FA2-3	In reviewing the updated ESS study, I find discrepancies between the battery cost at the Agaña station. Please see the attached spreadsheet and indicate how to reconcile the \$35 million cost in Attachment C (Excel extract attached) with the data presented in Table 7-7 and Appendix E (see Excel file ESS Table 7-7 extract.xlsx) in rows 7, 8 and 11. Which of the ESS study estimates has GPA decided will apply (for example, Table 7-7 lower bound or average of two bounds; Appendix E without contingency; with contingency but without GRT; with both contingency	There have been changes from the original ESS Feasibility Study draft and the final version in review. Here is the final version. Some of the questions you may have are due to the evolution of the Study from initial to final draft as new information is incorporated.

Index	PUC Consultant Question	GPA Response
	and GRT? If there is a difference between the selected estimate and the \$35 million cited in Attachment C, please provide a work paper or description showing how to adjust the ESS data source to the amount shown in Appendix E.	
2-FA2-4	Given that 40 mW is the size of the batteries, using arithmetic the estimated cost per kilowatt ("kW") is \$875. Does GPA concur that it is relying on an estimate of lead acid or lithium ion battery cost of \$875 per kW?	There have been changes from the original ESS Feasibility Study draft and the final version in review. Here is the final version. Some of the questions you may have are due to the evolution of the Study from initial to final draft as new information is incorporated.
2-FA2-5	If after answering 2-FA2-4 GPA decides to revise its intended spending on the portion of the battery cost to be funded by Revenue Bonds by fiscal year, please provide an updated worksheet for "2014 Rev Bond CIPs".	There have been changes from the original ESS Feasibility Study draft and the final version in review. Here is the final version. Some of the questions you may have are due to the evolution of the Study from initial to final draft as new information is incorporated.
2-FA2-6	Please identify the technology alternatives selected for load flow studies that did not use batteries as an alternative.	There have been changes from the original ESS Feasibility Study draft and the final version in review. Here is the final version. Some of the questions you may have are due to the evolution of the Study from initial to final draft as new information is incorporated.
2-FA2-7	Please provide a table of estimated amount of outages (kilowatt hours, megawatt hours, capacity with time, number of outages) would be avoided?	There have been changes from the original ESS Feasibility Study draft and the final version in review. Here is the final version. Some of the questions you may have are due to the evolution of the Study from initial to final draft as new information is incorporated.



Index	PUC Consultant Question	GPA Response
2-FA2-8	Please provide any estimates of incremental reduction in SAIFI, SAIDI, CAIDI, etc.)?	There have been changes from the original ESS Feasibility Study draft and the final version in review. Here is the final version. Some of the questions you may have are due to the evolution of the Study from initial to final draft as new information is incorporated.
2-FA2-9	Is it correct to consider that on an aggregate annual basis, the batteries after installation can be expected to reduce 46.2% of all outages (the product of 60% of outages rooted in under-frequency load shedding and 77% reduction in under-frequency load shedding due to batteries)?	There have been changes from the original ESS Feasibility Study draft and the final version in review. Here is the final version. Some of the questions you may have are due to the evolution of the Study from initial to final draft as new information is incorporated.
2-FA2-10	Please indicate the time horizon which the percentages represent – for example, life of batteries, typical year, first year after installation, nth year after installation, average of several years after installation.	There have been changes from the original ESS Feasibility Study draft and the final version in review. Here is the final version. Some of the questions you may have are due to the evolution of the Study from initial to final draft as new information is incorporated.
2-FA2-11	Please provide benefit-cost ratios for batteries and all other technology alternatives modeled for which benefit and cost estimates are available	There have been changes from the original ESS Feasibility Study draft and the final version in review. Here is the final version. Some of the questions you may have are due to the evolution of the Study from initial to final draft as new information is incorporated.














## FAS 71 Treatment

	PUC Consultant Question	GPA Response
1-FA3-1	<p>In GPA's petition in GPA Docket 14-09, it indicated (in attachment labelled "Docket 13-07 Commercial Paper Update", page 5) that FAS 71 treatment would be applied to some deferred maintenance expenses to be deferred, please indicate:</p> <p>a) Whether the deferred LNG Conversion expenses are associated with items excluded from the LEAC filing in GPA</p>	<p>a) Not sure what the question meant, please clarify.</p> <p>b) Please see attached excel file "Attachment C (Major O&amp;M)", the total amount of deferred maintenance costs is \$11.6M.</p>

PUC Consultant Question		GPA Response
	Docket 14-03 as ordered in GPA Docket 14-02? b) What is the total amount of deferral to be booked for all projects? c) Does GPA intend to include a return on capital (estimated based on either interest costs or a combination of debt and equity) in the deferred charges?	c) As in the past revenue bond issuance, GPA has recorded AFUDC ( Allowance for funds used during construction) as part of the project costs.

## APPENDIX B – REFERENCE DOCUMENTS

As part of the review, the Commission's Consultant worked closely with the ALJ and the staff of GPA to gather data to support the analysis. The information presented to the Commission's Consultant included:

GPA File Attachments		PUC Attachments	
 2013 06 28 - PUC  2014 Bond RFI - Foc  GPA Energy Storage  GPA Feasibility Study Draf	 AGMO Master -  Attachment C (Major  O&M).xlsx  FA1-9 & FA1-17 -  FY14-FY18 Revenue I	 GPA CER 2014 2nd  Draft 7 13 14 (2)_Gp  GPA Resource  GPA Implementation Plan	

## APPENDIX C – PRUDENCE INFORMATIONAL REQUIREMENTS

1. Record of studies including selection of recommended alternatives
  - a. Planning assumptions
    - i. Load forecast
    - ii. Interest rates
    - iii. Growth, inflation and economic parameters
    - iv. Project costs assumptions and sources
  - b. Economic cost-benefit studies of proposed alternatives
  - c. Contingency analyses
  - d. Scheduling – GANTT and PERT charts
2. Independent assessments of studies (optional)
  - a. Adequacy of study methodology and implementation
  - b. Selection of reference set of technical and operational alternatives
  - c. Specification and reasonableness of assumptions
  - d. Reasonableness of cost estimates
  - e. Adequacy of scenario testing under alternative assumptions
3. Vendor solicitation documentation
  - a. Process description
  - b. RFP and responses
  - c. Scoring documentation
4. Project control documentation
  - a. Authorization to proceed
  - b. Invoice receipt, review and approval
  - c. Payments
  - d. Resolution of disputes
5. CCU meeting minutes and approval resolutions
6. Results from study updates when economic conditions shift
  - a. Record of studies
  - b. Database of studies performed
  - c. Analytic results
7. Scope change documentation

- a. Policies, procedures and controls
  - b. Documentation of request and approvals
  - c. Project viability analyses for major scope changes
  - d. Results of special negotiations to reduce costs, change quality and durability, obtain concessions from sub-contractors
8. Work order accounting documentation
  9. Property accounting records
  10. Material testing plan
    - a. Test scripts and procedures
    - b. Detailed results
  11. Acceptance testing
    - a. Test scripts and procedures
    - b. Detailed results
  12. Grid synchronization tests
    - a. Test scripts and procedures
    - b. Detailed results
  13. Post in-service list of necessary warranty repairs
  14. Accountant testing of controls
  15. Equipment and architect engineer representations and warranties