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8
9 *Attorney for the Guam Power Authority*

10
11 **BEFORE THE PUBLIC UTILITIES COMMISSION**

12
13 IN THE MATTER OF) DOCKET NO.94-04
14)
15 The Guam Power Authority's Integrated)
16 Resource Plan (IRP))
17)
18 _____)
19

20 **COMES NOW**, GUAM POWER AUTHORITY and hereby files GPA's Integrated
21 Resource Plan Approach dated July 18, 2007. The primary goal of the IRP analysis is to create
22 the most cost-effective resource plan that will result in the lowest electric rates to
23 customers. The draft IRP process started in 2006 and a final draft IRP is expected to be
24 completed in summer 2008, with completion expected before the Commission's goal of
25 December 2008. GPA also expects to conduct additional studies during this period regarding
26 cost of service, rate design, and fuel diversity.

27 **RESPECTFULLY SUBMITTED** this 19th day of July, 2007, by:

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31 Legal Counsel for the Guam Power Authority

COPY

White Paper
July 18, 2007

Guam Power Authority Integrated Resource Plan Approach

1. Purpose and Goal

The overall objective of Guam Power Authority's (GPA's) 2008 Integrated Resource Plan (IRP) is to determine strategies for the type, amount and timing of new resource acquisitions to meet the electrical loads of GPA over the next 20 years – 2009 to 2028. The new resources considered should include both supply-side and demand-side options. In undertaking an IRP analysis, the primary goal is to create the most cost-effective resource plan that will result in the lowest electric rates to customers in the future. In addition to cost goals there are many other equally important goals to be considered. A number of these were articulated in GPA's recent strategic planning activities and include:

- Recognition that reliable electric service continues to be a key issue with GPA customers and while significant gains have been made, it is important that future resources not diminish this progress.
- Recognition that GPA's power plants have a significant environmental footprint and future resource selections must be in line with evolving renewable resource goals.
- It is clear that the current generating fleet is dependent on oil-based fuels. GPA has articulated its goal of diversifying its generation resources, which will include options for different types of generation or substitution of different types of fuels, such as biodiesel.
- In its recent strategic planning activities, GPA identified a greater need to include its customers in meaningful communications on issues that affect both GPA and its customers. To that end, the IRP process will include a stakeholder process as an integral part of the plan's development. It is anticipated that there will be a number of meetings with the goal of collaborative development of the IRP.
- Recognizing the impact the Department of Defense's (DOD) expansion will have on the island and the resultant impact on electrical needs, it is expected that the DOD will be a part of the stakeholder process. In addition, it would be reasonable to assume that the GPA IRP would be a part of the DOD's Environmental Impact Statement (EIS) process. The two activities are linked, particularly from an environmental standpoint.

2. Timeframe for Integrated Resource Plan

Preliminary activities for the current IRP started in late 2006. These activities included:

- Assembling the baseline load forecast.
- Developing the initial set of supply-side options.
- Constructing the initial data for the IRP computer models.

It is anticipated that the start of the stakeholder process will begin in August or September 2007. It is likely the meetings discussed below will occur over the following four to six months. A preliminary goal would be to have the initial draft IRP available in March 2008. It is also anticipated that final reviews by the Stakeholder Group, CCU, Guam Public Utilities Commission (PUC), the DOD EIS team and others would occur over the following three months. As such, this schedule assumes the final draft IRP would be available about July 2008. It is entirely possible that the process may take longer than anticipated. However, meeting the Commission's goal of a December 2008 completion date seems reasonable at this point.

3. Significant Tools and Methods to be used in the IRP

Key Analytical and Modeling Objectives

The main analytical objective of the IRP is to determine the preferred resource portfolio (supply side and demand side) for the next 20 years (2009-2028) based on a finding of need and a comparative assessment of available resource opportunities. The preferred portfolio represents the resource plan that has the best balance of cost and risk. A key analytical objective for this IRP is to treat all resource options on a comparable basis when developing alternative portfolios. To that end, GPA has licensed a resource expansion optimization tool (STRATEGIST) for use in its modeling framework. This model performs automated economic screening of resources and determines the optimal resource expansion plan based on planning scenarios. This tool enables thermal generation, renewable generation and demand-side management to compete against each other on the basis of their impact on Present Value of Revenue Requirements (PVRR), the key measure of a portfolio's performance. An important caveat associated with STRATEGIST is that it does not capture stochastic risks in its optimization algorithm. STRATEGIST cannot incorporate stochastic variables in its solution algorithm and instead addresses this type of uncertainty by running a multitude of sensitivities and scenario analyses. To the extent it is reasonable to do so, the approach will account for least six sources of uncertainty including: market conditions, fuel prices, regulatory policies, modeling and forecasting.

Integrated Resource Planning Approach Overview

The 2008 IRP approach will consist of both analytical and stakeholder processes. The analytical process is described below. The stakeholder process is discussed in Section 4.

Analytical Process

The analytical process is comprised of the eight major steps shown below.

Integrated Resource Planning Analytical Process Steps

1. Review planning environment.
2. Develop inputs and assumptions.
3. Develop load and resource balance to identify annual capacity/energy positions.

4. Define candidate resource list, including demand-side management and supply resources.
5. Use the capacity expansion optimization tool STRATEGIST to determine the optimal portfolio that eliminates annual capacity deficits according to capacity reserve margin requirements.
6. Use planning scenario results to help determine a diversified resource mix that is robust across the range of alternative futures.
7. Create risk analysis portfolios based on alternative strategies for managing portfolio risks that can be differentiated.
8. Select a preferred portfolio using evaluation criteria: *Cost, risk, system reliability, ratepayer impact, emissions.*

The outcome of the analytical process is a preferred portfolio that represents the lowest-cost diversified resource plan that accounts for the evaluation criteria discussed above. The following is a brief description of some of the important steps in the analytical process.

Develop Model Inputs and Assumptions

In general, the inputs to the model comprise both the expected future value of a variable of interest and a characterization of the uncertainty about that expected value. The purpose of this task is to develop the following inputs and assumptions that are required by the model:

- **Loads** – The model requires equations that describe the expected average (i.e., across the hours of the month) load in each month of the analysis period as well as hourly load shapes. Finally, given that a significant share of the load is represented by a small number of large customers, the loads of each of these large customers will be modeled specifically. That will allow for the development of load sensitivity cases. The required inputs will then be developed in the following manner:
 - Forecasts of annual load growth produced by GPA will be used to generate the expected values of annual loads for the Island of Guam.
 - Collect historical data on monthly average loads by customer class, hourly system loads and weather.
 - As required, adjust both the monthly and hourly data so that it reflects loads by customers other than the largest customers, which will be modeled separately.
 - Analyze the historical data on loads (by all but the largest customers) and weather to develop the expected value and variability of monthly average and hourly loads as functions of the expected forecasted values and variability of weather.
 - Determine qualitatively the probability of each large customer and its likely future loads. In addition, determine the probability of additional new loads being added to the system, and the size and shape of any such loads.

- **Transmission Adequacy** – The model requires definition of each of the transmission areas considered in the model (if any), as well as estimates of transfer limits between the areas. Defining areas will also involve assignment of generating resources to the areas. To do this, and to estimate the transfer limits between areas, GPA will review available data and studies on the transmission system. If necessary, GPA will also run a load flow model to determine the transfer limits.
- **Fuel Availability and Prices** – For each fuel that is either currently used or potentially could be used to generate electricity, the model requires the expected price in each month of the analysis period. To the extent possible, available forecasts of fuel availability and prices will be used. Alternatively, and if such forecasts are not available, they will be developed. A key issue concerns the future availability of oil and liquefied natural gas.
- **Characteristics of Existing and Potential Supply-Side Options** – The model requires detailed characterizations of all existing power supply resources on Guam, as well as new resources or plant changes that have been committed to. The capacity, dispatch characteristics, cost parameters, forced outage rates and maintenance schedules of each resource are required. Expected values of these parameters are required; if there is significant uncertainty about one or more parameters, descriptions of the uncertainty are also required.

In addition, the model requires detailed characterizations of potential new supply-side options. The process will identify the types of options to be included. Estimates will then be developed of the cost of:

- Construction and commissioning
- Fixed operating and variable operating costs
- Fuel costs
- Performance parameters including heat rates, forced outage rate, maintenance rate, etc.

Additional considerations will include:

- Load-service function
- Time to construct
- Cost to construct
- Operational life
- Fuel costs
- Fuel dependability
- Plant dependability
- Maturity of the technology
- Externalities.

For cost or performance characteristics for which there is substantial uncertainty, such as the capital cost of a new unit, the estimate may include both the expected value and its probability distribution.

For new resources, the characteristics to be estimated will include parameters representing how GPA would likely finance construction or purchase from the private sector. These parameters include debt term and interest rate, and debt-service coverage ratio requirements.

- **Characteristics of Potential Demand-Side Options** – In this step, GPA will characterize potential demand-side management (DSM) options for certain options GPA has previously identified, developed forecasts of and that have been evaluated. Estimates of the expected costs and impacts of additional options will be developed. For options with expected characteristics that are highly uncertain, the probability distributions of the parameters will also be developed. Typical parameters to be examined:
 - Expected load reduction or load shifting response
 - Time to implement
 - Cost to implement including incentives
 - Operational life
 - Ongoing costs
 - Load reduction dependability
 - Customer acceptance and penetration
 - Maturity of the technology
 - Externalities that could impact the program

4. Stakeholder Process for the IRP

The IRP stakeholder process is a necessary part of a good plan. Development of new resources (supply side or demand side) will have an impact on customers. Correspondingly it is important to create a process that encourages meaningful dialog on issues and goals of the IRP. It is important that the process be collaborative in nature so that opinions and views are solicited and taken into consideration in development of the plan.

Communication is the cornerstone of a successful IRP process. Some steps that will enhance this include:

- GPA will maintain a website where background information will be accessible by the general public. The types of materials will include:
 - Information presented at stakeholder meetings.
 - Key comments, questions or direction provided by the Stakeholder Group (as defined below).
 - Notice of future meetings.
 - Preliminary findings or separate studies addressing issues raised by stakeholders.
- GPA will provide public notice of upcoming IRP meetings so that those interested have an opportunity to attend and participate.

The creation of a Stakeholder Group is a necessary condition for a successful IRP. The Stakeholder Group is a group of people that have volunteered to attend the series of stakeholder meetings (four, at a minimum, but will likely be more) and to review various GPA work products as they are produced. It is important that the members of the group reflect the diverse interests on Guam and that the individuals be open minded in their views of the direction of the 2008 IRP. Potential stakeholder segments might include:

- Retail customers
- Commercial customers
- Tourism
- Department of Defense
- Joint Guam Program Office (JGPO) and Japan Bank of International Cooperation
- CCU
- Environmental Community
- GovGuam (Governor's office and Guam EPA)
- Private Developers (supply side and demand side)
- GPA.

It is expected that a representative of the PUC will participate in the stakeholder meetings. Given the regulatory responsibilities, it is expected the PUC representative would be an ex officio member and that the PUC representative will participate in the process, and be privy to and assist in information shared with the Stakeholder Group and direction of the analysis.

GPA in consultation with the CCU and PUC will identify and invite individuals to be members of the Stakeholder Group. It is anticipated that the Stakeholder Group may have up to 15 members.

Mirroring its Strategic Planning and the Guam Sea Water Air Conditioning stakeholder processes, the Authority may invite representatives from the following organizations to participate:

- Chamber of Commerce
- Anderson Air Force Base
- United States Navy
- Guam Environmental Protection Agency
- Guam Hotel and Restaurant Association
- The Government of Guam Executive and Legislative Branches
- US Environmental Protection Agency
- Army Corp of Engineers

As previously mentioned there will be a minimum of four stakeholder meetings with the possibility of more if warranted. The general flow of the meetings will be as follows:

Proposed Meetings and Agendas

Meeting 1	
	<ul style="list-style-type: none"> • What are the goals of the IRP? • How are IRPs undertaken? • What is the role of the Stakeholder Group? • The general analytical framework • Discussion of forecasted electric demand on Guam (including the impacts of the DOD expansion) • General discussion on how new resources or new loads impact customers
Meeting 2	
	<ul style="list-style-type: none"> • Overview of possible supply-side options <ul style="list-style-type: none"> ○ Technology ○ Fuels ○ Environmental impacts ○ Transmission system impact ○ Private development • Overview of possible demand-side options <ul style="list-style-type: none"> ○ History on Guam ○ Possible programs ○ Possible new technologies ○ Current and potential market penetration of programs • External issues or trends that may impact the IRP process or results <ul style="list-style-type: none"> ○ EPA of 2005 – Section 1250 <ul style="list-style-type: none"> – Net metering – Time of Use rates – Energy efficiency – Need to start the public process for Section 1250 items ○ Trend in the fuel markets and long term impacts ○ Trends in environmental policy – CO₂ impacts ○ Other trends
Meeting 3	
	<ul style="list-style-type: none"> • Initial screening results <ul style="list-style-type: none"> ○ Preliminary supply-side resources candidates <ul style="list-style-type: none"> – Technology – Timing – Siting – Environmental issues – Transmission network issues

Meeting 3, continued	
	<ul style="list-style-type: none"> • Initial screening results, continued <ul style="list-style-type: none"> ○ Preliminary demand-side resource candidates <ul style="list-style-type: none"> – Current or past programs – New programs – Proposed approaches and timing – Proposed implementation options – Current and expected saturation • Discussion of Key Risk Factors in execution • Discussion of possible financial impacts on GPA and financial requirements • Discussion of Third Party participation • Discussion of proposed RFP process
Meeting 4	
	<ul style="list-style-type: none"> • Presentation of preliminary IRP results <ul style="list-style-type: none"> ○ Timing and type of supply-side resources ○ Fuel supply strategy and risk management ○ Timing and type of demand-side resources • Discussion of impacts on customers, future rate making and fiscal soundness of GPA • Next steps for the Stakeholder Group • Next steps for the regulatory review of the IRP • Next steps for the IRP and the DOD EIS

The meeting agendas described above may change based on feedback and comments from the Stakeholder Group. Depending on the issues brought up or the need for additional research or explanations, one or more additional meetings may be required in order to achieve the goals of a comprehensive analysis that has been vetted with stakeholders.

The IRP analysis will be undertaken by GPA staff in coordination with the Stakeholder meeting schedule and contents. It is expected there will be information or scenarios requested by the Stakeholder Group that will result in analysis to be developed by the GPA staff.

5. Final Draft 2008 IRP

GPA will prepare and submit for comment a final draft report, which will summarize the activities and findings of all of the IRP activities. This final draft will be submitted to the Stakeholder Group and the PUC representative for comment.

The conclusions and recommendations of the final draft will include:

- An evaluation of options for meeting and shaping projected future demand for electricity, with the goal of determining the best combination of demand-side and supply-side resources.
- Recommended DSM programs.
- Recommended renewable and nonrenewable supply options.

- Achievable renewable goals.
- Fuel diversity goals and expectations.
- Expected impacts on customer costs.
- Expected capital requirements funding for GPA.
- Expected participation by the private sector in resource development.

The 2008 IRP will also lay the foundation for:

- Future analysis and discussion of the terms and conditions of utility generation service performance.
- An evaluation of GPA's resource adequacy in light of its 1) obligation to serve the public and 2) the uncertainty in future loads, and establishment of generation reserve margin planning criteria.
- Establishment of Renewable Portfolio Standards requiring GPA to procure a given percentage of power from renewable sources by a given target date.

Following a review period and possible overview meetings, comments on the final draft report will be requested. It is expected that comments will be provided by the Stakeholder Group, the CCU, GPA management and other interested parties. GPA will revise the draft report to incorporate the comments and produce the Final Draft 2008 IRP.

6. IRP Submission to PUC

Subsequent to the production of the Final Draft 2008 IRP, the document will be submitted for filing with the PUC. It is anticipated that the PUC and its staff resources will then undertake a review of the Final Draft 2008 IRP. It is also anticipated that hearings will be held on the IRP. Assuming a satisfactory review and hearing process, it is anticipated that the PUC will:

- Accept the Final Draft 2008 IRP (and related resource plans) for adoption.
- Accept the Renewable Resource Portfolio Standard as recommended in the IRP.
- Accept the recommended process for undertaking appropriate Requests for Proposals for new supply-side and demand-side needs.

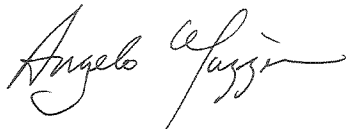
It is anticipated that a separate public process and regulatory filing will be made regarding the Energy Act of 2005 requirements pertaining to:

- Net metering,
- Time of use rates,
- Energy efficiency and
- Other issues

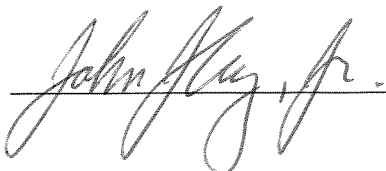
Items discussed above are considered cost, regulatory and public policy issues. While some of these issues will have an impact on the IRP process, the IRP process does not provide the complete analysis for cost of service, rate design, financial and operations

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Integrated Resource Plan Approach

impacts of these EPA 2005 issues. Similar to the current IRP process, the PUC's consideration of GPA's additional resources needed to undertake the required efforts is requested.



Angelo Muzzin
Principal
R. W. Beck, Inc.
July 18, 2007



Guam Power Authority
July 18, 2007

ID	Task Name	Duration	Start	Finish	Quarte			
					4th Quarter Oct No	1st Quarter Dec Jan Fe	2nd Quarter Mar Apr	3rd Quarter Jun Jul Aug Se
1	GPA IRP (2007 - 2008)	329 days	Mon 8/6/07	Mon 6/30/08	[Gantt bar from 8/6/07 to 6/30/08]			
2	Analytic Process & Stakeholder Meetings	194 days	Mon 8/6/07	Fri 2/15/08	[Gantt bar from 8/6/07 to 2/15/08]			
3	SH Mtg 1 (Demand Forecast / Customer Impact)	5 days	Mon 8/27/07	Fri 8/31/07	[Gantt bar from 8/27/07 to 8/31/07]			
4					[Gantt bar from 8/27/07 to 8/31/07]			
5	Review planning environment	103 days	Mon 8/6/07	Fri 11/16/07	[Gantt bar from 8/6/07 to 11/16/07]			
6	Develop inputs and assumptions	103 days	Mon 8/6/07	Fri 11/16/07	[Gantt bar from 8/6/07 to 11/16/07]			
7	Develop load and resource balance	103 days	Mon 8/6/07	Fri 11/16/07	[Gantt bar from 8/6/07 to 11/16/07]			
8	Define candidate resource list	110 days	Mon 8/6/07	Fri 11/23/07	[Gantt bar from 8/6/07 to 11/23/07]			
9	SH Mtg 2 (Supply/Demand Side Options & Issues/Trends Review)	5 days	Mon 11/26/07	Fri 11/30/07	[Gantt bar from 11/26/07 to 11/30/07]			
10					[Gantt bar from 11/26/07 to 11/30/07]			
11	Determine the optimal portfolio (STRATEGIST)	19 days	Mon 12/3/07	Fri 12/21/07	[Gantt bar from 12/3/07 to 12/21/07]			
12	Determine a diversified resource mix	5 days	Mon 1/7/08	Fri 1/11/08	[Gantt bar from 1/7/08 to 1/11/08]			
13	SH Mtg 3 (Initial Screening Results/ Risk & Finance Discussions)	5 days	Mon 1/14/08	Fri 1/18/08	[Gantt bar from 1/14/08 to 1/18/08]			
14					[Gantt bar from 1/14/08 to 1/18/08]			
15	Create risk analysis portfolios	12 days	Mon 1/21/08	Fri 2/1/08	[Gantt bar from 1/21/08 to 2/1/08]			
16	Select a preferred portfolio using evaluation criteria	5 days	Mon 2/4/08	Fri 2/8/08	[Gantt bar from 2/4/08 to 2/8/08]			
17	SH Mtg 4 (Preliminary results / Next Steps)	5 days	Mon 2/11/08	Fri 2/15/08	[Gantt bar from 2/11/08 to 2/15/08]			
18					[Gantt bar from 2/11/08 to 2/15/08]			
19	Complete Draft Document	0 days	Fri 3/28/08	Fri 3/28/08	[Gantt bar at 3/28/08]			
20	Draft Review and Editing	89 days	Mon 3/31/08	Fri 6/27/08	[Gantt bar from 3/31/08 to 6/27/08]			
21	Final Document	0 days	Mon 6/30/08	Mon 6/30/08	[Gantt bar at 6/30/08]			

Project: GPA IRP (2007 - 2008)
Date: Thu 7/19/07

Task
 Split
 Progress
 Milestone

Summary
 Rolled Up Task
 Rolled Up Split
 Rolled Up Milestone

Rolled Up Progress
 External Tasks
 Project Summary

Stakeholder Meeting #1
 Stakeholder Meeting #2
 Stakeholder Meeting #3
 Stakeholder Meeting #4
 3/28 GPA Submit DRAFT
 6/30 FINAL

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