Lummus Consultants Recommendations Re: GPA 2013 IRP

Introduction

Lummus Consultants reviewed the Guam Power Authority's (GPA) 2013 Integrated Resource Plan (IRP) and believes that while the IRP appropriately sets a general direction for GPA to take with respect to transitioning its generation resources to liquefied natural gas (LNG), the importance of this change in direction cannot be underestimated. We believe that the findings and recommendations in the IRP need to be evaluated within the broader context of an overall energy plan that addresses issues beyond that which may be typically included in an IRP. It is in this context that we have reservations with respect to the robustness of GPA's IRP as it relates to our ability to confirm the findings. Our concerns and recommendations, which are specific actions that GPA should take, are discussed in the sections that follow.

Recommendations

1.) Investigate Additional Cases

Lummus Consultants recommends that GPA perform an Alternate Base Case based on updated environmental compliance considerations. The rationale for this recommendation is that since the development of the IRP there have been some notable developments related to environmental compliance:

- According to conversations with GPA, the United States Environmental Protection Agency (EPA) Region 9 has indicated that Guam will not be provided an exemption to the Reciprocal Internal Combustion Engine/Maximum Achievable Control Technology (RICE MACT) requirements for the slow speed diesels.
- EPA has published guidance on timelines for establishing attainment status for states and territories with the 1-hour SO_2 National Ambient Air Quality Standards (NAAQS). This schedule is likely to delay implementation plans to lower SO_2 emissions at affected sources until the 2022 timeframe.

Re-run Strategist optimization with the following Alternate Base Case (without LNG) assumptions:

1.) Include the costs of ESPs at Cabras Units 1 and 2 for compliance with the Electric Generating Unit (EGU) MACT.
   - Note that this is a "worst case" EGU MACT compliance scenario since it has not been confirmed that Cabras Units 1 and 2 cannot meet the PM emission limit of 0.03 lb/MMBtu.Also, the EGU MACT allows emission averaging for Cabras Units 1 and 2; therefore, it may be determined at a later date that an ESP installed on one of the Cabras units is a viable compliance option.

2.) Do not include the costs of FGD systems installed at Cabras Units 1 and 2
   - It is assumed the SO_2 emission reductions from the Cabras/Piti complex in response to the RICE MACT requirements are sufficient to satisfy the 1-hour SO_2 NAAQS.

3.) Derate Tanguisson Units 1 and 2 to less than 25 MW each to avoid the EGU MACT standard.Assume these units are retired in, or before, 2022 in response to the 1-hour SO_2 NAAQS. Do not include the costs of FGD systems at Tanguisson in the Alternate Base Case.

4.) For the slow speed diesels at Cabras Units 3 and 4 and Piti Units 8 and 9, change to lower sulfur fuel now available to Guam (e.g.Ultra-low-sulfur diesel(ULSD) and add carbon monoxide(CO)catalyst at these units).

Other Cases for Analysis:

- Case A –Determine thenet present value (NPV) impact of switching only the slow speed diesels to LNG and keeping Cabras Units 1 and 2 on residual fuel oil (RFO) and Tanguisson Units 1 and 2 on RFO until retired. If the evaluations of fuel markets described in Item 3 below identify other viable low sulfur fuels that are compatible with the slow speed dieselswith CO catalyst installations, the NPV impact of such fuel switching should also be assessed.
- Case B – Remove the minimum 34,000 MMBtu/day LNG usage constraint and any constraints related to alternate technologies, then re-optimize the expansion

2.) Expand Reliability Improvement Information

The IRP does not address GPA's plan to improve Guam's system reliability beyond generation solutions; we would expect the plan to address new infrastructure, automation, enhanced maintenance and better centralized control since GPA has identified improvements in current system reliability as a goal of the IRP. The IRP should provide a balanced picture including delivery system investment requirements and prioritize the alternatives in its report to the PUC.

- Include the specific actions GPA's is currently undertaking or is planning to undertake in the near future to improve T&D system reliability in the current IRP. Information should include estimated capital expenditures, timeline for implementation, as well a discussion on the expected benefits.

3.) Address Renewables and Fuel Diversity

As part of transmission system reliability, the IRP does not address ways in which the system will be enhanced to better facilitate the expanded integration of future renewable resources even though the IRP has identified renewables as having negative impacts on the system.

- Include the specific actions GPA's is currently undertaking or is planning to undertake in the near future to facilitate the integration of renewables onto the T&D system in the current IRP. Information should include estimated capital expenditures, timeline for implementation, as well a discussion on the expected benefits.

Fuel diversity has been identified as a goal of the IRP, but the recommendations that GPA has included in the IRP need to include consideration of the type of diversity of interest, such as providing more emphasis on retaining/expanding dual-fuel capability, renewables, and non-fossil fuel alternatives in general. The recommendation in the IRP appears to simply shift overreliance on one fuel to overreliance on LNG – this does not effectively improve diversity and it does not sufficiently consider risks from potential price increases in the LNG markets over time.

- Solicit the expertise (perhaps through a request for proposals (RFP) process) to update the evaluation of the fuels market with respect to the diversity of fuels that could be available to Guam, including price forecasts and risksas well as geographic sources and supply risks of each fuel.

4.) LNG

GPA's transition to an LNG infrastructure is perhaps the main thrust of the current IRP and its importance cannot be underestimated. In the IRP, forecast prices for LNG appear to be tied into oil prices. However, historically, natural gas has not always been lower-cost as compared tooil. If the current price relationship between these two fuels reverses for some period of time, the economics of these two fuels will also reverse.

- GPA needs to demonstrate plans to ensure, by hedging or other means, against the potential for future spikes in LNG prices or LNG versus fuel oil price reversals.

Since the RW Beck study was prepared, a considerable amount of recent effort has gone into developing equipment and resources to permit shipping and receiving of smaller volumes of LNG than were contemplated. This, in a sense, outdates GPA's LNG study.

- LNG study needs to be updated to address how the impact of newer technologies and resources could act to lower the minimum daily throughput of 34,000 MMBtu/day and how a lower threshold would bring other resources and options into play

5.) Analyze Financial Considerations and the Impact on Ratepayers

Financial considerations relative to transitioning to LNG will have significant financial implications for GPA's electric customers.

- The IRP needs to include an analysis of the short- and long-term impact on rates.

Although GPA has provided pieces of information regarding inputs and outputs from the Strategist model, there still remainhigh-level Strategist outputsnecessary to be able to confirm the relative reasonableness of GPA's net present value of alternatives. The IRP needs to include:

- Greater detail for the Base Case scenario, e.g., capital expenditures by year with descriptions;
- For the present value stream of savings by year that GPA has last provided, to break down in-year present value savings between fuel and non-fuel.

With regard to the effect on ratepayers, a net present value analysis does not give sufficient insight into future points in time in which rates need to increase due to capital expenditures to achieve future fuel savings and points in which such fuel savings are realized and rates could decrease.

- The IRP needs to include analysis that shows the year-by-year analysis of selected LNG cases and in the Base Case and/or Alternate Base Cases.
- The IRP needs to identify proposed funding sources for capital expenditures in the Base Case and in the LNG cases.

6.) Construction, Operation and Maintenance of Generation Resources

The IRPshould address whether an optimal generation resource plan, including renewable, can best be achieved by means of issuing an all-resources RFP with construction and operation of these resources accomplished by means of PMC or an Independent Power Producer (IPP).