050879

ICF RESPONSE TO MAYOR HANRAHAN'S MARCH 5, 2006 COMMENTS
MARCH 14, 2006

CITY OF GAINESVILLE
ELECTRICAL SUPPLY NEEDS
RFP No. 2005-147

1. Regarding Demand Projections

Q1-a. What wholesale contracts currently exist, for how much power, and for how long, and how would ending these contracts affect GRU's need for new power generation? What percentage of our overall load demand is attributable to these contracts?

Answer:

The following table summarizes the status of GRU's long-term firm wholesale contracts.

Counter Party	Current Load	Expiration Date
Starke	3 MW (fixed)	12/31/06
Alachua	22 (growing)	12/31/07
Seminole	15 (growing)	12/31/12

Q1-b. Are there technical, legal, economic or environmental constraints that would prohibit or discourage GRU from ending these contracts? For example, are some of our wholesale customers directly integrated with our distribution system? What are the other most likely service providers for these wholesale customers, and is their power source "cleaner" than our current generators and/or our proposed new generators? In other words, if we were to end our wholesale contracts and these customers were to instead receive their power from Progress or Clay or someone else, is this end result better or worse from an environmental perspective?

Answer:

We have been informed by GRU that these firm contracts may have been beneficial to GRU's ratepayers by providing economies of scale and cost recovery. It may be expensive to terminate these contracts early because of contractual obligations, but not because of physical connectivity to the distribution system. Notice has been issued that the Starke contract will not be extended. It may be beneficial to GRU's ratepayers to extend the Alachua and

Seminole contracts if energy supply pricing competitive to other options available to these systems can be maintained. Progress Energy and FMPA are currently interested in serving these loads.

Q1-c. ICF has used past growth as a predictor for future demand, but we are aware of numerous large projects underway that may represent an increase in demand in excess of that projected (the new Shands Cancer Hospital; the proposed expansion of Butler Plaza; the 12 story Gainesville Greens development downtown; the 8 story University Corners project; the Springhills DRI; numerous large new subdivisions in High Springs, Alachua, Hawthorne, LaCrosse, and West Gainesville) Have these projects been taken into consideration in the demand projections? Is the opportunity for distributed generation, especially for cooling, been taken into consideration as one option for reducing the capacity needed at a central power station?

Answer:

Recently announced projects suggest that current forecasts may be conservative (low), as was suggested by ICF in our analysis and as discussed in the report which does not contain a low before DSM demand growth case, but does include a high growth case. This is even the case if participation in chilled water systems is a cost-effective way to promote energy conservation in these larger projects.

2. Regarding Buying and Selling Power on the Grid

Q2-a. If the Commission were to delay building a power plant to the point that our demand did exceed our ability to fully meet our native load, and/or we were in violation of our required reserve margins, what would be the consequence? Can the Public Service Commission reduce our service territory or levy fines, or is the primary downside simply that we are foregoing revenue to our system?

Answer:

Failure to maintain adequate reserves under current NERC policies could in the extreme result in the grid severing ties and failing to provide emergency resources if needed. This would also be considered a negative development by the State of Florida, though the regulatory leverage and likely action of the State of Florida is not clear to ICF. Under new legislation, FERC is to establish an Electrical Reliability Organization, and fines are clearly being contemplated though they have not yet been codified. GRU could ultimately be subject to fines and other penalties from an ERO (Electrical Reliability Organization) soon to be established by FERC under the Energy Policy Act of 2005. See ICF discussion of reserve margins and the reasons no scenarios resulting in violation of reserve margin were contemplated.

Q2-b. During the presentation, Mr. Rose referred to a technical limitation for importing power to our system in excess of 30 MW, I believe. Is this a constraint associated with the transmission system, or is it a constraint of some other type?

Answer:

The limit is associated with the need to provide a backup for a key GRU transformer as described at the end of Chapter 1 and prevents imports for reserve margin or reliability purposes though under favorable circumstances much more power can be imported (i.e., no problems at this transformer). This problem was identified by ICF AC load flow studies. Additionally, purchasing several years of interim capacity supply could be very expensive, especially if it is done at the last minute (see Q2-a).

Q2-c. As I recall, prior to my election and before GRU entered into the current integrated resource planning process, the City Commission rejected the idea of participating in a larger project with JEA, the City of Tallahassee and other partners. I understand that the referenced project is going forward in Taylor County. Although in general I prefer that we take local responsibility for our own environmental impacts (and keep those jobs local as well), I am wondering if we have considered all the pros and cons of adding an increment of power generation to that plant, rather than building a new plant here at Deerhaven. Is this still a viable option?

Answer:

This is a viable option if and only if transmission upgrades are undertaken. The extent of the upgrades depends on the amount of power purchased. See also ICF discussion of the economies of scale from larger power plants which is especially significant for baseload plants. This is discussed in ICF's report specifically to remind readers of this option.

3. Regarding the Maximum Demand Side Management Option, Plus Solar Energy Issues

Q3-a. The assumptions made to analyze the maximum DSM scenario assumed high natural gas prices and a high CO_2 allowance price. While this certainly would give a sense of the best conditions that would support increased conservation measures, it would also be useful to have an understanding of how

much DSM would be clearly beneficial both environmentally and economically under current operating conditions, or those projected as likely for in the short term future. Is it possible to get a sense of which of the conservation measures analyzed would be justifiable now, as well as within five to ten years?

Answer:

The same DSM progams would be chosen under base case natural gas prices and CO_2 prices. Therefore, all the Maximum DSM measures would be justifiable now.

Q3-b. Why are FLP, Progress, and TECO are currently spending so much more money per capita on demand side management (DSM) in comparison to GRU? Are we able to estimate their energy savings per capita or other measure of success relative to GRU? Where do Tallahassee and Lakeland fall in this continuum? As I read the table titled "Comparison of Maximum DSM Scenario Spending with Other Utilities," ICF is estimating that GRU's current spending could essentially quadruple, from $21.75/capita/year currently to $81.23/capita/year. This would be far in excess of the $64.50/cap/yr currently being spent by Austin Energy. How much additional spending on DSM is economically justifiable under our current circumstances? Does the amount of spending on DSM that would be recommended vary depending on the generation technology we choose?

Answer:

While individual variances exist, the primary differences in the DSM program portfolios and per-capita expenditure of the investor-owned utilities and those considered cost-effective for GRU are the large load-control programs. For example, the 2004 expenditures of FPL (shown in the table below) reveal that of their total expenditure, over 63% is for residential and commercial load control programs. Given this, their kWh savings per capita would be low compared to other programs, but their kW savings per capita would be comparatively high. Therefore, direct comparison with the metrics developed for GRU would not be appropriate, since GRU's programs need to have a large energy focus in order to be cost-effective.

FPL 2004 DSM Program Expenditures

FPL Program	2004 Expenditure		
1. Residential Conservation Service Program	$	8,779,009	*6.0%*
2. Residential Building Envelope Program	$	1,535,262	*1.0%*
3. Residential Load Management ("On Call')	$	62,277,198	*42.4%*
4. Duct System Testing & Repair Program	$	2,018,243	*1.4%*
5. Residential Air Conditioning Program	$	16,622,838	*11.3%*
6. Business On Call Program	$	2,445,992	*1.7%*
7. Cogeneration and Small Power Production	$	317,897	*0.2%*
8. Commercial/Industrial Efficiency Lighting	$	655,877	*0.4%*
9. Commercial/Industrial Load Control	$	30,601,502	*20.8%*
IO. C/I Demand Reduction	$	945,356	*0.6%*
11. Business Energy Evaluation	$	4,599,538	*3.1%*
12. C/I Heating, Ventilation & AC Program	$	2,390,665	*1.6%*
13. Business Custom Incentive Program	$	23,074	*0.0%*
14. C/I Building Envelope Program	$	911,079	*0.6%*
15. Conservation Research & Development	$	216,208	*0.1%*
16. BuildSmart Program	$	594,574	*0.4%*
17. Low Income Weatherization Retrofit	$	264	*0.0%*
18. Photovoltaic R&D	$	928	*0.0%*
19. Green Energy Project			*0.0%*
20. GreenPower Pricing Project	$	(38,034)	*0.0%*
21. Low Income Weatherization Program	$	70,334	*0.0%*
22. Common Expenses	$	11,908,144	*8.1%*
TOTAL	$	146,875,948	

Tallahassee and Lakeland report annual kWh reductions of 8.06% and 0.04% of 2004 annual sales respectively (compared to the 8.3% after program maturity estimated for GRU under the Max DSM case.) Note however that the wide range in these numbers highlights some of the difficulty in making comparisons across service territories.

ICF is estimating (based on the revisions made in the final report) that GRU's DSM spending could increase from $21.10/customer to $73.16/customer over time. This entire amount would be cost-effective under current circumstances given the assumptions made. Theoretically, if GRU were to choose a more expensive generation option, even more DSM would be cost-effective. However, given that the cost difference between the various generation options is not very large, the amount of additional DSM justified would probably not be great.

Q3-c. Several citizens have expressed concerns that solar energy technologies were not given full consideration, or that there was a gap of information regarding price and availability of various distributed options (solar hot water heaters, roof photovoltaics connected to the grid, etc.). Is it possible to receive an analysis of the range of solar programs being used throughout the U.S., their costs,

penetration in the marketplace, and similar information? How much of the total electricity demand could conceivably be avoided with a robust solar program?

Answer:

See Chapter 4 Exhibit 4-10 which shows solar thermal highly uneconomic and Chapter 3, pages 104-109 which shows solar water heating and distributed PV to be uneconomic. ICF used what it believed to be the best information available on the costs of the solar water heater and PV programs, including direct quotes from manufacturers, data from the Florida Solar Energy Center, and data from the large CA renewable DSM programs. This information is set forth in the final report and the final presentation to the Commission.

Q3-d. Are there examples of communities that have implemented reasonably regulatory efforts to reduce energy demands (such as requiring energy efficient construction or interruptible service under appropriate circumstances) that would be feasibly applied in Gainesville and Alachua County? Is there anything in state law that would discourage or prohibit such efforts?

Answer:

There are examples of local authorities that have adopted "energy codes" or similar building codes to encourage conservation. However, Florida state law prohibits Gainesville from adopting a building code "more strict" than the state code. However, we are not aware of restrictions that would prohibit use of other fees, assessments, and credits that could be used in a similar manner and ICF would suggest that such be considered as a low-cost delivery option for certain of the cost-effective measures if acceptable to the community. We are not aware of any examples where interruptible or similar rates have been required.

Q3-e. Are there billing, metering or pricing structures that might have a significant impact toward encouraging conservation?

Answer:

Yes, there are a variety of rates that have the potential make a cost-effective impact on load, especially on peak demand. Interruptible rates (where the customer agrees to shut-down operation on short-notice from the utility), stand-by rates (where the customer agrees to start their own, typically diesel-fired generators in response to a call from the utility), real-time pricing (where the price of electricity varies hourly throughout the year), and time of use pricing (where the price varies by time of day and/or season) among others, may all be worthy of additional investigation.

ICF anticipates that such rates may have some applicability in Gainesville. ICF would note, however, that the opportunity for certain rates will be limited due to the small number of large customers with flexible operations, the large "energy component" driving GRU's need for additional capacity, and the need to carefully compare the added metering, billing, and incentive costs of such rates with the amount of load reduction.

4. Regarding the GRU Proposal (CFB with Biomass, Coal and Petroleum Coke)

Q4-a. Does ICF's analysis of the environmental, economic and employment impacts from the CFB proposal take into account the greenhouse gas offset fund that was proposed as part of the CFB option? If not, can its impact be analyzed as well?

Answer:

The greenhouse offset fund is a voluntary program. ICF analyzed potential mandatory greenhouse gas regulations and focused on relatively stringent CO_2 control programs with large incentives to restrict CO_2 emissions in part due to the strong emphasis on CO_2 controls by Commissioners.

Q4-b. What is the maximum amount of waste biomass that could be used as part of this (or the IGCC) proposal, in terms of a percentage of the generating capacity? What types of waste biomass are feasible for use?

Answer:

Biomass is discussed in Chapter 5, starting on page 145 where forecasts of biomass are part of the modeling. The maximum percentage of waste biomass available is fifty-seven percent. All solid fuel options examined use large amounts of biomass by 2025, an option not available under the Taylor county plant (see Q2-c).

Q4-c. How can we ensure that we are not encouraging damage to natural ecosystems (clearing for crop production, or deforestation for fuel generation) as part of a biomass plant?

Answer:

ICF assumes that Biomass crop production for energy use was one of four biomass fuel supply options and that any protections to the ecosystem would be enforced as part of existing regulations of contract provisions requiring certification that biomass was obtained in a manner consistent with eco-rhythm protection.

Q4-d. In the analysis of this option (and the next two), was the reduction in air emissions attributable to no longer burning waste wood at construction and forest products sites taken into account? Are air impacts from transportation of biomass, coal and/or petroleum coke taken into account? If not, can they be?

Answer:

We did not take into account the air emission impacts of waste burning at other sites, though we did highlight this fact in the report vis~a~vis sudden large amounts of burning after hurricanes. We estimated the emissions resulting from truck traffic to be lower than stack emissions. Please see Chapter 6 page 167 for further discussion.

5. <u>Regarding the IGCC Option (with Biomass, Coal and Petroleum Coke)</u>

Q5-a. GRU officials have expressed a concern that our utility is too small to efficiently operate an IGCC plant. What is the ICF assessment of this concern?

Answer:

ICF believes that this is potentially a legitimate concern in that only a large commitment towards IGCC will overcome these problems.

Q5-b. Are the operational difficulties that have been experienced at the TECO IGCC plant likely to be reduced or eliminated in the technology that may be commercially available by the 2011 operational date under consideration?

Answer:

After several years of start up problems the TECO IGCC plant now is operating at 95% availability using fuel backup. The plant is operating at 82% using a gasifier, which is only slightly lower than the US coal plant average. Incremental improvements in IGCC are assumed to be available by 2011, and additional delays might lead to incremental improvement in efficiency and or perceived reliability and a decline in capital costs.

Q5-c. Are the rating agencies likely to downgrade our bond rating if they perceive IGCC to be less reliable than CFB or some other more tested technology?

Answer:

A downgrade to bond rating is possible and hence, higher financing costs could result especially assuming 80 percent debt financing. ICF assumes loan guarantees and/or contractual guarantees will prevent that from happening. See discussion in the ICF report which recommends that if IGCC is pursued to financing a second option also be pursued in the event financing problems emerge.

Q5-d. What assumptions led to the ICF initial conclusion that IGCC might actually be less expensive to build as compared to CFB?

Answer:

ICF's initial conclusion remains its final conclusion that IGCC is less expensive to build for a 220 MW plant which is relatively small by utility standards. In contrast, ICF believes IGCC costs more than pulverized coal plants at large plant sizes. The IGCC cost disadvantage is also mitigated by the higher CFB costs relative to pulverized coal which gives the CFB more flexibility to burn such fuels as biomass and petroleum coke. A detailed capital cost breakout on the IGCC issue was provided to GRU. Also, see additional ICF discussion in the report on potential IGCC risks.

Q5-e. Is there any real likelihood of being able to capture and sequester carbon from an IGCC plant over the expected lifetime of this project?

Answer:

ICF believes that capture and sequestration of CO_2, from an IGCC is possible over the lifetime of this plant and in some contexts provides important flexibility. But the particular site is far from ideally suited for this type of sequestration and pursuing IGCC in Gainesville is more likely to help promote this option elsewhere. See discussions in ICF report.

Q5-f. Is GRU likely to qualify for loan guarantees or other assistance that would keep the cost of borrowing money for an IGCC plant similar to the cost for a more conventional technology?

Answer:

Yes.

6. <u>Regarding the Maximum DSM Plus Biomass Only Option</u>

Q6-a. Under aggressive conservation scenarios and realistic demand projections, if we were to implement a smaller biomass plant, when would GRU be facing the need for additional generating capacity if we were to build the smaller biomass plant as analyzed?

Answer:

GRU needs additional supplies in 2018 without relying on imports and 2021 if it is relying on 30MW of imports.

Q6-b. Is it feasible to develop a biomass delivery system that uses existing rail infrastructure rather than adding truck traffic to 441? If not, is it feasible to enter the GRU site from another route, to avoid additional large truck traffic near residential areas?

Answer:

ICF assumes that use of rail is feasible and included costs for this in its high biomass supply cost case as is discussed in Chapter 5. However, ICF has not investigated biomass transportation in detail. ICF has not evaluated detailed trucking alternatives.

Q6-c. Why are CO_2 generation figures for the biomass option not substantially lower than shown, given that biomass is often referred to as a "carbon neutral" option?

Answer:

The Biomass option has lower emissions than the other two solid fuel options which can use fossil fuel. The Exhibit ES-30 illustrates this. Also see Exhibit ES-31 where Biomass has the lowest grid wide emissions. This advantage is mitigated by model forecast of switching to biomass by the other two solid fuel options in some cases at the end of the horizon.

7. <u>Regarding the Natural Gas Option</u>

Q7-a. How does the retirement of existing natural gas generators impact our ability to power up and power down units to address peak demands?

Answer:

No major retirements are expected until 2023 and only one 23 MW unit is retiring before 2018. Thus, the retirement effect is small in the near term. In the long run, ICF forecasts that significant combustion turbine capacity will be built by GRU, with excellent ramp up and ramp down capability.

Q7-b. Given that the capital cost of a natural gas unit is so much lower than a coal unit, and given that capital costs are much less speculative than fuel costs, is it possible that a natural gas unit might conceivably end up being a lower cost solution in the long run?

Answer:

In the low natural gas price case, the natural gas combined cycle (NGCC) is the least cost option for a significant amount of the capacity being built grid-wide. Also, this is a key reason why ICF recommended that a NGCC option be examined. See discussion of this in the ICF report in Chapter 1 and elsewhere.

Q7-c. Given that natural gas units can be built quickly and in smaller economical increments as compared to coal units, would it be feasible to build a smaller (50 to 100 MW) natural gas generator in the short term, in an effort to allow some of the emerging technologies to become better tested?

Answer:

As noted, ICF forecasts large amounts of turbine capacity addition for GRU over time. Smaller gas plants are feasible but much more expensive on a per unit basis than larger gas plants. Natural gas plants show poorer scaling characteristics than CFB plants even though their capital costs overall are lower. LM6000 gas plants with great operational flexibility can be added in approximately 40-45 MW increments. Their per unit capital costs are close to the combined cycle costs shown in Exhibit 4-10, while their thermal efficiencies are only somewhat better than peakers.

8. Regarding Carbon Emissions and Pollution Credits for SO_x, NO_x and mercury reductions

Q8-a. Is it possible for the city to implement other programs (for example, using biodiesel as appropriate in our fleet; capturing methane from wastewater plants by enclosing some tanks; increasing tree planting; increasing energy efficiency in our own buildings and in the private sector through codes changes and incentives) that would enable an overall reduction in greenhouse gas emissions from municipal operations, including the power plants? I believe the city completed a greenhouse gas inventory a few years ago, to establish a baseline.

Answer:

Yes, while ICF has not evaluated specific CO_2 reduction (offset) opportunities from elsewhere in the Gainesville municipal system, GHG emissions reductions from methane sources such as wastewater plants can be an effective way to reduce the city's GHG footprint.

Q8-b. When the pollution control retrofit of the Deerhaven II plant is complete, it is my understanding that we may be able to sell pollution credits in the commodities markets. What are we expecting the market value of these credits to

be, and what are the pros and cons of selling the credits and applying the proceeds to emission reduction or conservation efforts that might not otherwise be considered financially feasible?

Answer:

Yes. With the FGD (scrubber) installed on Deerhaven 2 in 2010, it is forecast that the unit will effectively "overcontrol" relative to its SO_2 allocation and therefore have a net long SO_2 allowance position that could then be sold into the national SO_2 allowance market. These allowances could be sold at the prevailing market rate. Our forecast of the market prices are 827 (2003$/ton) in 2010, 1,151(2003$/ton) in 2015 and 1,600 (2003$/ton) in 2020.

CO_2 credit information is already provided.