BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

SUPPLEMENTAL TESTIMONY OF EDWARD J. REGAN

ON BEHALF OF

GAINESVILLE REGIONAL UTILITIES AND

GAINESVILLE RENEWABLE ENERGY CENTER, LLC

DOCKET NO. 090451-EM

MARCH 15, 2010

**Q. Please state your name and business address.**

A. My name is Ed Regan. My business address is 301 SE 4th Avenue, Gainesville, FL 32601.

**Q. By whom are you employed and in what capacity?**

A. I am employed by Gainesville Regional Utilities (GRU) as Assistant General Manager for Strategic Planning.

**Q. Have you testified previously in this proceeding?**

A. Yes I have.

**Q. What is the purpose of your supplemental testimony?**

A. The purpose of my testimony is to demonstrate that:

- GREC is the least cost alternative for meeting the Gainesville City Commission's policy objectives while improving GRU's

electric system reliability and integrity while also mitigating the cost of increasing fossil fuel prices and volatility;

- GREC's risk adjusted benefits exceed costs by more than 10 to 1 under a mid-range probabilistic cost analysis, and benefits exceed costs by a ratio of more than 2 to 1 in an extremely biased worst case probabilistic analysis;
- The power purchase agreement between GRU and GREC LLC (PPA) is structured to provide as much as $88 million (net present value in 2010 dollars) of benefits for GRU's customers in the form of protection from: construction cost over-runs; financing interest rate increases; long term operation and maintenance escalation; unexpected equipment failure and damage; loss of unit efficiency; and failure to perform;
- GRU has a number of mechanisms to manage ongoing risks such as the ability to: resell a portion of GREC's output at no less than a fair market price; financially hedge against diesel and labor costs in GREC's fuel contracts; and apply financial tools such as prepayment contracts; and
- GREC meets the requirements for a Determination of Need pursuant to Section 403.519, Florida Statutes.

**Q. Have you provided any exhibits to your supplemental testimony?**

A. Yes. My exhibits include the following:

| | | |
|---|---|---|
| Exhibit No. ____ [EJR-4] | Financial Costs Associated With Policy Objectives, Environmental Regulations, Fuel Price Volatility and Adding New Generation Capacity; |
| Exhibit No. ____ [EJR-5] | Biased Expected Value Risk Analysis for GREC; |
| Exhibit No. ____ [EJR-6] | Gas Price Forecasts are Unstable; |
| Exhibit No. ____ [EJR-7] | Mid-Range Expected Value Risk Analysis for GREC; |
| Exhibit No. ____ [EJR-8] | Black & Veatch, Biomass Sizing Study, January 2007; |
| Exhibit No. ____ [EJR-9] | FMPA, Letter to Florida Public Service Commission, February 24, 2010; and |
| Exhibit No. ____ [EJR-10] | OUC Letter to GRU General Manager, March 8, 2010. |

## GREC Risks and Risk Mitigation

**Q. During the February 9, 2010 Agenda Conference, Chairman Argenziano and Commissioner Skop both expressed concern that the GREC project is risky, primarily based on a scenario for which a potential ratepayer cost of $100 million dollars (net present value) was identified by staff [TR P6, L4; P29, L7; P37, L4]. What is GRU's assessment of the risks that the project is designed to mitigate?**

A. There are no economic disadvantages to GREC if the benefits in terms of jobs and the $609 million (net present value in 2010 dollars) of increased regional income as testified to by Mayor Hanrahan are included in the calculations. Even if these benefits are excluded, the biggest risk for GRU ratepayers is to not proceed with the project. GREC is not only the most cost-effective alternative for GRU to obtain the renewable energy needed to meet the City's environmental policy objectives, but it also provides substantial protection against the following risk factors:

- Fuel supply, price volatility and cost;
- Reliability and production cost issues associated with an aging generation fleet;
- Ownership cost over-runs associated with adding new capacity;
- Potential reductions in unit efficiency through time;
- Unplanned outages;
- Renewable portfolio standard (RPS) requirements; and
- Carbon regulation.

**Q. Has GRU performed an assessment to address risks?**

A. Yes. Two probabilistic risk analyses have been prepared in the form of "Expected Value" analyses. I deliberately biased the first analysis presented against the GREC project; this worst-case analysis indicates a benefit to cost ratio of greater than 2 to 1. In fact, the model used for the risk analysis can be exercised to demonstrate that all three of the following probabilities would have

to be assumed to result in the GREC project's benefits being less than its costs (or, more technically, its benefit to cost ratio being less than 1):

- Carbon legislation – zero probability;
- RPS – zero probability; and
- Gas and coal prices exceed current forecasts – zero probability.

GRU believes that these hypothetical probabilities are not reasonable, for reasons that will be discussed.

The second analysis employs mid-range probabilities and found that the benefits of GREC exceeded the potential costs of GREC by a ratio of greater than 10 to 1.

**Q. Please discuss how the Expected Value analysis was performed.**

A. The first step in the Expected Value analysis was to quantify the potential financial costs of each risk factor.

The second step was to quantify the effect that the decision to proceed with GREC with commercial operation by the end of 2013 will have on each risk factor. The resulting cost and benefits (reductions in potential risks) are shown in Exhibit No. __ [EJR-4].

The third step was to assign a probability to the likelihood of each outcome. The probability was then multiplied by the value of the outcome to obtain the

"risk adjusted" value for each outcome as shown in Exhibit No. __ [EJR-5], and Exhibit No. __ [EJR-7].

The fourth and final step was to sum the risk adjusted values to obtain the overall Expected Value of the decision under analysis, in this case the decision to construct GREC.

**Q. Why are the costs of meeting the City of Gainesville's Kyoto Protocol objectives as well as U.S. Environmental Protection Agency (EPA) Clean Air Interstate Rule (CAIR) and Clean Air Mercury Rule (CAMR) objectives included in Exhibit No. __ [EJR-4]?**

A. These costs are included in the table to illustrate how much more expensive it would be to meet the City's Kyoto Protocol policy objectives without GREC and to demonstrate that regulatory changes and the risks associated with them are a normal part of GRU's business. They were not included in the Expected Value analysis. Since biomass power is the lowest cost form of renewable energy available to the City, failure to obtain a Determination of Need for GREC would result in substantial additional costs to GRU's customers if the City is to meet its environmental policy goals.

**Q. What was the result of the biased Expected Value analysis performed?**

A. As shown in Exhibit No. __ [EJR-5], the biased analysis results in a benefit to cost ratio of 2.2 to 1 for GREC with a risk adjusted benefit of $74.1 million (net

present value in 2010 dollars), excluding any of the benefits from economic development.

**Q. Please discuss the probabilities, biased against the GREC project, that were assigned by GRU in the Expected Value analysis in Exhibit No. __ [EJR-5].**

A. I have assigned a probability of 100 percent to not being able to resell power at contract price and only being able to resell it at market prices as a concession to facilitate discussion.

I have also assigned a very low probability (10 percent) that some form of carbon regulation will be enacted. I viewed this as an unrealistically low assessment given that the EPA has already made an endangerment finding and has issued a notice of proposed rulemaking.

I have assigned a low (20 percent) probability to the enactment of an RPS. I believe 20 percent is unrealistically low given that: (1) 35 states have already adopted either a renewable portfolio standard (RPS) or renewable energy goals; (2) legislation is currently proposed to this effect both nationally and for Florida; (3) there is still an outstanding Executive Order for an RPS in Florida; and (4) the most recent report from the Florida Department of Agriculture and Consumer Affairs finds an RPS of 7 percent to be in fact beneficial to Florida's economy as discussed by witness Schroeder (Exhibit No. ___RMS-9]).

Exhibit No. __ [EJR-6] compares average annual wellhead prices for natural gas at Henry Hub from 1997 through 2009 with US Energy Information Administration's Annual Energy Outlook commodity price forecasts for the last seven years. The prices have quadrupled over this period with marked increases in volatility, then collapsed with the overall economic recession. Given that the current commodity fuel prices are the lowest in seven years, and 64 percent of the historical forecast years shown were below the actual natural gas price it is very likely that fuel prices will increase by at least 10 percent. I assigned a low probability of only 1 in 3 chances for this occurring (33 percent) to these factors.

The remaining factor considered in the Expected Value analysis is ownership risk. The design of the PPA between GRU and GREC LLC has a number of key features that eliminate most of the following risks:

- Inability to economically dispatch (dispatch costs are less than coal);
- Efficiency degradation (a guaranteed heat rate);
- Planned, unplanned, and forced outages (no energy equals no payments by GRU);
- Construction cost over-runs (30 year fixed price);
- Operation and Maintenance cost over-runs and escalation (30 year fixed price);
- Equipment renewal, replacement and repair (30 year fixed price);
- Financing costs (30 year fixed costs); and

- Carbon and RPS regulation (GRU owns all environmental attributes produced by GREC).

The estimated benefits of the structure of the GREC LLC PPA are conservative in that the analysis did not consider the heat rate guarantee, or liquidated damages for failure to perform. Only reduced risks related to potential construction, operating and maintenance (O&M), and financing cost over-runs were included in the analysis. The probability I assigned to the sum of these PPA benefits is half of what I otherwise would consider realistic.

**Q. What were the results of the Expected Value analysis performed using mid-range probabilities?**

A. As shown in Exhibit No. __ [EJR-7], the Expected Value analysis performed to represent a mid-range estimate of probabilities resulted in a benefit to cost ratio for GREC greater than 10 to 1, with an expected value of $297million (net present value in 2010 dollars). This analysis excluded any of the benefits from economic development.

**Q. Please briefly discuss the conclusions that you've drawn from the Expected Value analysis.**

A. In addition to being the least cost way for GRU to meet the City's environmental objectives while improving system reliability, GREC has substantial hedge value. The results of the Expected Value analysis that used probabilities very biased against GREC, indicate that it is hedge with a benefit to cost ratio

exceeding 2 to 1 with an expected value of $74.1 (net present value in 2010 dollars). Using mid-range probabilities, GREC has a benefit to cost ratio of greater than 10 to 1 with an expected value of $297.9 million (net present value in 2010 dollars). The value at risk (approximately $62 million, on a net present value basis discounted to 2010) is quite small when compared to: a) GRU's alternatives to obtain renewable energy; b) the investment in environmental quality already made by the City; and c) the dramatically greater potential benefits of proceeding with GREC.

The substantial benefits of increased employment and investment in the local community associated with GREC (over $600 million net present value in 2010 dollars, as discussed in Exhibit No. __ [PH-2] of the supplemental testimony of Mayor Hanrahan) have not been addressed in the Expected Value analysis and add further weight to the City's conclusions that proceeding with GREC is in the best interest of GRU and our customers, and that not proceeding with GREC is a bad option.

**Q. Please explain why the estimate of $100 million (net present value) downside risk mentioned during the February 9, 2010 Agenda Conference differs from the estimate of $62 million (net present value) previously discussed employed in the Expected Value analysis.**

A. Public Service Commission Staff had requested that GRU model a scenario where the capacity, energy, and environmental attributes of GREC had zero

resale value. Notwithstanding GRU's and GREC's belief that such a scenario was highly improbable, the study was performed as requested by PSC Staff, and resulted in a cost of $100 million (net present value, in 2010 dollars). GRU has since modeled the scenario with more realistic assumptions that, at a minimum, the capacity and energy of the unit had market resale value even if no additional value was extracted from other GRU generating units. This corrected analysis resulted in the $62 million (net present value, in 2010 dollars) value employed in the Expected Value analysis. The resale value of GREC's output was modeled as the same terms and conditions as the existing firm baseload PPA between GRU and Progress Energy Florida ("PEF") (which is similar to the PPA between Seminole Electric Cooperative and PEF), with no premium for GREC's environmental attributes. This contract has a demand charge and an energy cost as the average of designated PEF baseload units, which is effectively a contract sale indexed to a basket of fuel costs (45 percent natural gas, 35 percent coal, 20 percent nuclear).

Exhibit No. __ [EJR-9] and Exhibit No. __ [EJR-10] from the Florida Municipal Power Agency and the Orlando Utilities Commission affirm their interest and support for the GREC project.

**Q. Does the estimated cost of $62 million (net present value in 2010 dollars) capture all of the benefits of GREC in the Florida wholesale power market?**

A. No. The form of the analysis used to obtain this value does not include the value to be extracted from GRU's generation capacity that GREC will make available. Due to its low incremental cost, GREC will economically dispatch before all of GRU's units except for the 11 MW share of nuclear generation. Accordingly some of GRU's other generating units would become available for off-system sales. The analysis used to develop the $62 million (net present value in 2010 dollars) cost did not include any consideration of this value. As a result, this scenario greatly penalized GREC's potential economic benefits as well.

The supplemental testimony of witness Bachmeier includes the results of a power market study performed by The Energy Authority (TEA) (Exhibit No. __ [RDB-5]) that specifically addresses the value that GREC could add to GRU from off-system sales. As testified by witness Bachmeier, TEA's modeling resulted in a net benefit to GRU of $182 million (net present value in 2010 dollars) from off-system sales made possible by adding 100 MW of biomass to GRU's fleet. Applying these results instead of the market proxy modeled as PEF's contract structure reduces the cost of $62 million (net present value in 2010 dollars) discussed above by $19 million (net present value in 2010 dollars) to a lower value of $43 million (net present value in 2010 dollars).

The modeling performed by TEA involves large quantities of data processed by a proprietary software system and the results are only presented here as evidence

that the cost of $62 million (net present value in 2010 dollars) is potentially overestimated.

## Cost-Effectiveness Considerations for Municipal Utilities

**Q. During the February 9, 2010 Agenda Conference, Commissioner Edgar asked how cost-effectiveness considerations might be different for a municipal utility than for an investor-owned utility. [TR P13, L19] Are there differences that should be considered?**

A. Yes. The differences, summarized below, are significant enough to lead to different conclusions based on the same data.

Cost – Effectiveness Differences Between Investor-Owned Utilities and GRU

| Perspective/Interest | Investor-Owned Utility | GRU |
|---|---|---|
| Fiduciary responsibility | Shareholders & banks | Customers & bond holders |
| Environmental externalities | No valuation | Value expressed by public |
| Public welfare | Electrical safety and reliability | Electrical safety and reliability, as well as public health, safety, and welfare |
| Consumer protection | External agency required | Elected board of directors |

**Q. How can different conclusions based on the same data be drawn?**

A. As an example, consider that the tangible property taxes that will be paid by GREC to the City of Gainesville and Alachua County over the next 30 years are estimated to be $7.2 million per year with a net present value of approximately $114 million (2010 dollars). Although these are revenues extracted from GRU's customers, they are returned to the community to pay for schools, libraries, police, fire protection, emergency medical transportation, roads, and other

municipal and county services. Without this revenue, local taxes would have to be raised to provide the level of service thus afforded. In the Public Service Commission's evaluation of GREC, this $114 million (net present value) is treated as a cost. From the perspective of the taxpayers of Alachua County, this is seen as a "wash," since without these taxes from GREC, other tax revenues would have to be increased to provide the same level of service. If this $114 million (net present value) were treated in a similar manner by the Public Service Commission, there would not be a single scenario with a negative outcome that would outweigh this benefit.

**Q. Commissioner Skop expressed his concern that the project has open risks that have not been fully mitigated. [TR P37, L10-12] Does GRU have any additional policies or resources to mitigate risks that you have not yet discussed?**

A. Yes. GRU staff has developed a number of policies and has identified techniques to mitigate risks that I have not addressed yet. These are summarized as follows:

- The amount of the electric system general fund transfer has been decoupled from GRU's operating revenue requirements, which include GREC payments.
- GRU has reviewed the project in detail with Moody's Investment Services and Standard and Poor's bond rating agencies, who have concurred that the GREC LLC PPA does not constitute a capital

obligation that would trigger additional debt service reserves or bond coverage requirements.

- GRU has met with a number of major investment banking firms who are familiar with, and have engaged in, third party prepayment financial structures pursuant to the federal safe harbor provisions for such practices for municipal natural gas and electric power prepayment, and GRU has made certain that the PPA with GREC LLC would allow such provisions. A reasonable estimate of the potential savings from such a structure is roughly 10 percent. No such structure will be contemplated until after the plant commences operation.
- Experience has shown that the fuel contracts will likely be indexed against diesel fuel and labor costs. Diesel fuel costs are readily hedged with over the counter commodity contracts, and GRU will investigate ways to hedge against labor cost as well.
- Failure to obtain sufficient fuel would render the facility unavailable. Pursuant to the terms and conditions of PPA between GRU and GREC LLC, under this circumstance, GRU will have no financial liabilities and the clock on liquidated damages for GREC LLC would begin. Furthermore, under Section 3.4.2 of the PPA with GREC LLC, GRU will have the ability to adjust its obligations to reimburse GREC LLC for ad valorem taxes on a pro-rata basis if the unit is unavailable for a

protracted period. Finally, under Section 4.1 of the PPA with GREC LLC, GRU could take over fuel acquisition.

- Section 4.7 of the PPA with GREC LLC provides that GRU can continuously monitor fuel costs and ensure that the gain/loss sharing provisions of the PPA are correctly applied. Given the anticipated portfolio of fuel contracts, the scenario presented would only apply to a small portion of the fuel supply. GRU will have the ability to evaluate the effect of this tranche of energy on its overall cost. If this tranche would place some of the output from GREC at an untenable price, GRU has the option to request that the purchase not be made in exchange for dispatching the unit at a slightly lower capacity factor or to obtain its own additional fuel supply. For example, if 90 percent of the fuel is purchased at an economic price, and the next increment of fuel cost is uneconomic, GRU can choose to have GREC LLC not purchase the uneconomic fuel and dispatch GREC at a slightly lower capacity factor.
- GRU is a member of The Energy Authority (TEA). TEA is a power marketing group managing all of GRU's generation assets in excess of requirements to meet native load on a real time basis and represents GRU in the hourly Florida Cost Based Broker System. TEA is managing over 25,000 MW nationwide, and has a significant market presence. This market presence helps GRU

achieve the lowest possible power cost for its native load, and also helps GRU extract the highest possible value from all its generation assets. Thus, to the extent that GRU has surplus generation assets after adding GREC to its generating fleet, TEA will manage all of GRU's assets so as to maximize value to GRU and minimize GRU's customers' rates. Additionally, in the unlikely event that GRU does not contract with other Florida utilities (such as OUC, FMPA, Lakeland, and Reedy Creek) for the sale of 50 MW of GREC's capacity and energy, GRU expects that it will be able to mitigate rate impacts by asking TEA to market the capacity, energy, renewable attributes, and carbon regulation values of GREC.

**Q. Commissioner Skop expressed concern whether GRU fully appreciated the risks to the ratepayers. [TR P46, L19-24] How would you address Commissioner Skop's concerns, and why have biomass fuel supply contracts and power purchase agreements for excess capacity not been executed as of this date?**

A. The Expected Value analysis discussed previously clearly illustrates the care and thought that went into managing the risks of GREC, especially through the terms and conditions of the PPA. As discussed in witness Schroeder's testimony, executing fuel contracts prior to regulatory approval would result in a higher cost for the fuel, as the commitment by the suppliers would reduce their

options should other purchasers enter the market whereas the certainty of the project is unknown. Negotiating the terms and conditions for off-system wholesale power sales prior to having received all regulatory approvals has the same consideration, compounded by the uncertainty of fuel contract prices and indexing terms and conditions. Knowing that GREC LLC will have to secure its fuel supply prior to obtaining financing, in the interest of obtaining the best PPA terms and conditions for GRU's customers, GRU has decided to not execute these wholesale contracts prior to having regulatory approvals and fuel contracts. Exhibit No. __ [EJR-9] and Exhibit No. __ [EJR-10], which are letters of support for the GREC project from the Florida Municipal Power Agency (FMPA) and the Orlando Utilities Commission (OUC), demonstrate their continuing interest in and support for the project.

**Optimal Size and Timing of GREC**

Q. **During the February 9, 2010 Agenda Conference, Commissioners Edgar [TR P17, L5], Klement [TR P64, L20], and Skop [TR P35, L9] each questioned the decision to make GREC a 100 MW net unit, whether a phased implementation of two smaller units would be cost effective, whether the possibility of installing a unit of less than 75 MW had been considered, and if the alternative of re-powering Deerhaven 1 with a biomass boiler had been considered. Please address these questions for the Commissioners.**

A. GRU decided to pursue the GREC based on engineering analyses and an evaluation of the alternatives proposed through its competitive solicitation process. GRU never contemplated sizing a facility to circumvent the Public Service Commission's Determination of Need process or the Florida Department of Environmental Protection's Site Certification process.

GRU has had two studies performed that address the economies of scale inherent in power generation facilities. The first study, performed by ICF Consulting in March 2006 entitled "City of Gainesville Electrical Supply Needs" (included as Exhibit No. __ [RMS-4] to the supplemental testimony of witness Schroeder) compared the cost of various generating units using various fuels for the size range of 75 MW to 800 MW. The second study, performed by Black & Veatch in January of 2007 entitled "Biomass Sizing Study" (Exhibit No. __ [EJR-8]), explicitly compared a number of biomass technologies for 50 MW and 100 MW units. Both studies demonstrated substantial economies of scale for larger units (in other words, the cost per unit output decreased with the increase in size of the unit). The results from the Black & Veatch study are directly applicable to the GREC technology and are summarized below. These economies of scale accrue from the improved surface to volume ratio of the boiler and turbine components, and the cost of controls and equipment. Other benefits accrue from the savings in plant operation personnel and improved heat rates. Characterization of the GREC site's high water conditions, foundation conditions, configuration of access roads, and redundant fuel handling systems

indicate that the economies of scale associated with GREC are more pronounced than summarized in the table below.

Comparison of the Economies of Scale Between 50 MW and 100 MW Bubbling Fluidized Bed Biomass Generation Systems

| Item | Cost Comparison |
|---|---|
| Capital Cost per Kilowatt | -15% |
| Fixed Non-Fuel O&M | -40% |
| Variable Non-Fuel O&M | -24% |
| Net Plant Heat Rate | -11% |

Source: "Biomass Sizing Study", pages 1-1 and 4-6

Phased construction of two smaller units will sacrifice these economies of scale and will also incur the costs of having to mobilize construction twice, and the escalation over time in cost for the second unit will increase costs even further as compared to construction of a 100 MW unit.

GRU investigated a range of repowering options in a study by Black & Veatch in March 2004 entitled "Supplementary Study of Generating Alternatives for the Deerhaven Generating Station" (included as Exhibit No. __ [RMS-3] to the supplemental testimony of witness Schroeder). The option of repowering Deerhaven 1 would not have resulted in additional capacity to support GRU's long term facility management plan, and the economics of such a repowering would be adversely affected by unit inefficiency due to not having the optimal match of steam temperature and pressure, resulting in a less efficient design.

**Q. During the February 9, 2010 Agenda Conference, Commissioner Klement questioned why GRU is pursuing a biomass resource. [TR P19, L1-2] Staff's response was that biomass was chosen for its base load characteristics and that municipal solid waste was rejected. [TR P19, L14-16] Were there additional reasons why GRU selected biomass?**

A. GRU agrees with Staff that biomass (as opposed to some other forms of renewable energy) has the advantage of being suitable to meeting GRU's long term needs for base load capacity. The primary decision to write GRU's request for proposals (RFP) to solicit proposals for biomass resources was based on the policy decision to only add renewable energy generation at a central station, the abundance of biomass fuel in the region, and the low cost of biomass generation compared to other forms of renewable energy. Under the proposal evaluation process developed by the City Commission, municipal solid waste was not ruled out but would have been heavily disadvantaged by the factors and their weights.

Sufficient study had been conducted by GRU to make it evident that biomass was the least cost alternative for obtaining the substantial amount of renewable energy to meet the City's Kyoto Protocol policy objective. The different types of renewable energy reasonably available to GRU are summarized in the table below, along with their costs and resource potential.

Relative Costs of Renewable Energy Alternatives in Florida

| Type | Cost Range ($ per MWh) | GRU Resource Potential (MW) |
|---|---|---|
| Landfill Gas to Energy | 75-95 | 3-6 |
| Biomass | 100-135 | 250 |
| Wind | Not Commercially Proven | Nil |
| Photovoltaic | 320-430[a] | 60-100[b] |

a. Before tax incentives, $5.5-$7.5 per watt, 25 year amortization at 7% interest.
b. Within GRU's service territory

**Q. During the February 9, 2010 Agenda Conference, Chairman Argenziano inquired about the timing of GRU's need for GREC, and Staff indicated that the need for GREC for purposes of reserve margin reliability is in 2023. [TR P 21, L9-14] Chairman Argenziano also asked "is there a need for reliability right now?"[TR P49, L7-8] What is GRU's current need for generation capacity to improve system reliability?**

A. GRU's near term need is for generating resources to improve system reliability and integrity. Staff was correct with respect to reserve margins, but did not address GRU's immediate need for baseload capacity to improve system reliability and fuel diversity. Prior to GREC coming on line, GRU's existing PPA with PEF provides for 50 MW of baseload capacity intended to back up its low cost coal generation and provide economical power during times of high gas prices. This PPA will terminate at the end of 2013. A more complete discussion of the benefits of GREC on system reliability may be found in the GREC Need for Power Application (Sections 15.3 and 16.2) and is mentioned in Staff's January 28, 2010 recommendation to approve the GRU and GREC LLC joint petition to determine need for GREC (pages 6 through 8, and pages 26 through 27).

**Q. During the February 9, 2010 Agenda Conference, concerns were raised about the timing of GRU's need for capacity. When is GREC needed to meet the need citeria listed in Section 403.519, Florida Statutes?**

A. The table summarizes the various need criteria listed in Section 403.519, Florida Statutes, with the date at which GREC would fulfill that need. Delaying the project is not a good option for GRU's customers, in that GRU strongly believes that its customers' rates will be lower, over the long run, with GREC added in December 2013 than under any realistic delay scenario.

GRU's Need for GREC

| Criteria | Date | Comment |
|---|---|---|
| Fuel Diversity | 2014 | Also delivery reliability |
| System reliability and integrity | 2014 | Many eggs in one basket- Deerhaven 2 |
| Promoting renewable energy | 2014 | Multiple policy mandates |
| Least cost alternative | 2014 | Among renewable alternatives |
| Adequate electricity at a reasonable cost | 2014 | See Expected Value analysis |
| Meet regulatory requirements | 2014 | EPA $CO_2$ regulation is under development |
| Reserve margins | 2023 | Avoids additional capacity through 2032 |

**Biomass Resource Sustainability**

**Q. During the February 9, 2010 Agenda Conference, Chairman Argenziano asked if during the City Commission's deliberations and public hearings there was any concern or anyone who was speaking to the sustainability of the biomass resource, especially if other biomass projects were in fact developed within GREC's fuel catchment area? [TR P21, L21 through P22, L2]. Staff's response was that there was one who questioned the sustainability of the fuel resource and that there were others who testified**

**that there was sufficient biomass. [TR P22, L20-23] Does this characterize the extent to which this issue was considered by the City Commission?**

A. No. This characterization oversimplifies the City Commission's examination of this issue. Resource sustainability came up in many City Commission meetings over the past 5 years, which is why GRU conducted four biomass studies and empowered an ad hoc Forest Stewardship task force to develop minimum standards for the forest derived fuel for GREC. The ad hoc task force was comprised of Florida Division of Forestry staff, as well as local citizens including forestry professionals, growers, and environmental activists. The City Commission also adopted a financial incentive program to encourage growers to participate in third party stewardship certification programs. (See Exhibit No. __ [RMS-11] to the supplemental testimony of witness Schroeder, which is the Forest Sustainability Fact Sheet).

**Q. During the February 9, 2010 Agenda Conference, Chairman Argenziano expressed concern about how GRU's customers would be impacted if GREC were unable to obtain biomass in sufficient quantities to power the plant. [TR P24, L15-17] Please address this concern.**

A. GRU's customers will not incur any costs for GREC under such a scenario. Failure to obtain sufficient fuel would render the facility unavailable. Pursuant to the terms and conditions of the PPA between GRU and GREC LLC, under this circumstance, GRU will have no financial liabilities and the clock on liquidated damages for GREC LLC would begin. Furthermore, under Section

3.4.2 of the PPA with GREC LLC, GRU will have the ability to adjust its obligations to reimburse GREC LLC for ad valorem taxes on a pro-rata basis if the unit is unavailable for a protracted period. Finally, under Section 4.1 of the PPA with GREC LLC, GRU could take over fuel acquisition.

**Carbon and Renewable Energy Legislation and Regulation**

**Q. Chairman Argenziano requested an update on the current status of legislation that would impact renewable energy projects. [TR P51, L12-13] Can you please provide this update with a discussion of how GRU would be affected?**

A. Please see the summary of the current status of federal and state legislation that I have developed below:

**Federal Carbon Cap and Trade**

House Bill 2454 (HR 2454), known as the American Clean Energy and Security Act of 2009 (ACES), was adopted by the full House on June 26, 2009. ACES employs a downstream cap and trade program for carbon that has the point of regulation at the electric generator.

S1733, known, as the Clean Energy Jobs and American Power Act of 2009, was voted out of the Senate Energy and Public Works Committee but was not brought to a floor vote during the 2009 session. S1733 contains carbon cap and trade provisions similar to those of HR 2454. While the caps and timelines are virtually the same, S1733 awards approximately 15 percent fewer "free"

allowances to distribution utilities and would result in greater cost to utilities and their customers than HR 2454. Both HR 2454 and S1733 would add significantly to GRU's energy costs. GREC will significantly reduce this liability by offsetting coal and natural gas combustion. Without GREC, under the provisions of HR 2454, GRU will have an allowance shortfall of 28.51 million metric tonnes of $CO_2$ through 2034. With GREC, this shortfall will be reduced 30.7 percent to 19.97 million metric tonnes of $CO_2$. Based on $CO_2$ allowance costs developed from "EPA Analysis of the American Clean Energy and Security Act of 2009 H.R. 2454 in the 111th Congress 6/23/09", by 2034 GREC is estimated to reduce the HR 2454 cap and trade related rate increase for GRU from 36 percent to 25.1 percent in the low cost case and from 115.4 percent to 80.6 percent in the high cost case.

For the above reasons, GRU believes federal legislation regulating carbon emissions or imposing a renewable electricity standard, or both, is a distinct possibility.

**Federal Renewable Energy Standards**

HB 2454 has a renewable electricity standard (RES) that requires that a utility produce 20 percent of its electric energy from renewable sources by 2020, starting at 6 percent in 2012. This program is under a separate title and adds cost to utility operations beyond the cap and trade program. Up to 25 percent of the RES can be met through energy efficiency projects. These projects can produce energy efficiency credits (EECs) for compliance or sale. Utilities have

the compliance option of adding renewable energy resources to their own system or buying renewable energy credits (RECs) or EECs from other entities. In addition, utilities have the ability to make alternate compliance payments (ACPs). The alternate compliance payment starts at $25 per megawatt hour (in 2009 dollars) and increases each year based on inflation. Currently utilities with less than 4,000,000 MWh sales per year are exempt from the RES standard. However, it is likely that smaller utilities (such as GRU) will be able to create RECs that can be sold into the RES market. It is estimated that the cost of RECs will be slightly less than that of the alternate compliance payment. In the event that GRU becomes subject to the RES under HR 2454, GREC should enable GRU to meet the renewable electricity requirements and still have RECs that could be marketed. GRU estimates that through 2034 GREC will produce a surplus of about 3.17 million RECs with a value of $79 million in 2009 dollars. However, without GREC, the GRU system would have a deficit of 7.2 million RECs by 2030 with a cost of $180.8 million. Note that only a 7 percent RPS requirement was employed in the Expected Value analysis for GREC that I've discussed previously in my testimony.

**More Recent Federal Legislative Proposals**

There are two alternative legislative approaches in addition to S1733 that have gained some momentum in the U.S. Senate:

- S2877, the Carbon Limits and Energy for America's Renewal (CLEAR) Act is a bipartisan bill sponsored by Senator Maria Cantwell (D) of Washington and Senator Susan Collins (R) of

Maine. Unlike S1733, the CLEAR Act regulates carbon upstream at the primary source of energy. This would include refineries, coal mines, and natural gas producers. The CLEAR Act is sometimes referred to as a "cap and dividend" bill in that all the carbon allowances are auctioned only to the primary energy sources that are regulated, with 75 percent of the revenue from the auction returned directly (dividend) to American households. Twenty-five percent of the auction revenues are to be used on carbon reduction technologies and energy efficiency innovations. The carbon costs are reflected in fossil fuel prices. The caps and timelines in this proposal are modest in the first few years of the program and increase significantly in later years when carbon control technology is more likely to be available and cost effective.

- The Kerry Graham Lieberman Energy Bill is a bipartisan bill under development by Senators Kerry, Graham, and Lieberman. Only a general outline of this bill has been released at this time. It is expected this bill will contain both an energy title with an RES and a climate provision, possibly utilizing a cap and trade approach to reduce carbon emissions from fossil fuel-fired electric generation.

Implementation of either the CLEAR Act or the Kerry Graham Lieberman Energy Bill would increase the electricity cost of fossil fuel-fired generation,

and GREC will therefore enhance GRU's renewable energy position in the energy market, either by reducing GRU's compliance costs or by enabling GRU to benefit economically by selling its RECs, carbon allowances, or other renewable attributes at market prices.

In addition to the bills discussed previously, Senator Carper has introduced a three pollutant bill to reduce the emissions of $SO_2$, $NO_x$ and mercury by 90 percent. Although this bill does not regulate carbon dioxide, it will significantly increase the cost of coal-fired generation and the GREC project will therefore enhance GRU's renewable energy position in the energy market.

**U. S. EPA Regulatory Action**

On December 7, 2009, the EPA Administrator signed two distinct findings regarding greenhouse gases under section 202(a) of the Clean Air Act:

- **Endangerment Finding:** The Administrator determined that the current and projected concentrations of the six key well-mixed greenhouse gases--carbon dioxide ($CO_2$), methane ($CH_4$), nitrous oxide ($N_2O$), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride ($SF_6$)--in the atmosphere threaten the public health and welfare of current and future generations.
- **Cause or Contribute Finding:** The Administrator determined that the combined emissions of these well-mixed greenhouse gases from new motor vehicles and new motor vehicle engines

contribute to the greenhouse gas pollution which threatens public health and welfare.

EPA's Endangerment Finding sets the stage for the regulation of carbon dioxide and other greenhouse gases by EPA under the Clean Air Act. While EPA's initial Endangerment Finding will result in greenhouse gas regulation of the transportation industry, the regulation of large stationary sources such as fossil fuel-fired electric generating units is inevitable. It is uncertain whether EPA regulation of carbon dioxide emissions from electric generating units will be more or less stringent than in currently proposed legislation. However, EPA GHG regulations will increase the cost of fossil fuel-fired generation. As a result, the GREC project will enhance GRU's renewable energy position in the energy market, either by reducing GRU's compliance costs or by enabling GRU to benefit economically by selling its RECs, carbon allowances, or other renewable attributes at market prices.

**Federal Council on Environmental Quality**

The Council on Environmental Quality (CEQ) recently issued new draft guidelines on evaluating the effects of greenhouse gas emissions on climate change. Under draft guidelines released February 18, 2010, federal agencies will have to consider greenhouse gas emissions and climate change effects when carrying out National Environmental Policy Act reviews. Many expect this to lengthen the licensing process for major energy projects.

**Other Federal Renewable Portfolio Standards**

In addition to the renewable electricity standard found in HR 2454, Senate Bill 1462, reported out of the Senate Energy and Natural Resources Committee June 17, 2009, contains a renewable energy standard (RES). As currently written, S1462 applies to utilities generating greater than 4,000,000 MWh annually. The RES starts at 3 percent of generation in 2011 and increases to 15 percent in 2021. This is slightly less stringent than the RES found in HR 2454. ACP costs in S1462 start at $21/MWh (in 2008 dollars) and increase each year based on inflation. In addition, Senator Graham has released a discussion draft bill entitled the Clean Energy Act of 2009. This bill establishes a clean energy standard (CES) of 13 percent in 2012 increasing to 50 percent by 2050. The CES differs from the RES in that in addition to renewable energy sources, new nuclear generation, coal-fired generation with carbon capture and sequestration (CCS), and certain incremental hydroelectric and geothermal generation can be included for compliance purposes. Qualifying generation sources are treated differently in awarding clean energy standard credits (CESCs). Biomass projects will receive bonus allowances while coal-fired units adding CCS will receive discounted CESCs. The Graham ACP starts at $50/MWh. This bill may serve as the renewable component of the Kerry Graham Lieberman Energy Bill and would be the most stringent ACP to date. While GRU's generation is less than 4,000,000 MWh annually, this bill would allow for voluntary participation by smaller utilities such as GRU and would provide a market for clean energy

credits created by GREC. This provision would add value to the environmental attributes associated with GREC.

**Florida 2010 Legislative Session Initiatives**

As of the date this testimony was prepared, numerous bills in both the Florida Senate and House of Representatives have been proposed which would increase the economic viability of GREC through different measures. Some of these bills focus on ratifying the rules on the RPS adopted by the Commission, some on allowing renewable energy projects to get cost recovery instead of avoided cost payments, while other bills focus on deleting provisions requiring the Commission to adopt rules on the RPS but allow for exemptions from determination of need requirements for renewable energy facilities. Again, the passage of these bills would enhance the value of the renewable energy output from GREC. The following is a synopsis of the twelve bills presented during the 2010 Florida Legislative Session to date:

**2010 Florida Senate Legislation**

- **S596 - Relating to Energy** (Detert)

  S596 introduced by Senator Detert amends Section 366.92, Florida Statutes, to establish a clean energy requirement for electric utilities that requires a clean energy portfolio standard to provide 7 percent of energy sales by 2014 based on 2013 sales. The amount periodically increases to 20 percent of energy sales by 2022 based on 2021 sales. Three classes of clean energy are established: Class I includes wind and solar generation; Class II

includes other renewable energy sources including biomass generation; and Class III includes nuclear and coal-fired generation with carbon capture and sequestration technology. The legislation also establishes alternative compliance through the purchase of clean energy credits (CECs). In addition the legislation creates a new section 366.99 that is designed to promote expanded use of natural gas. The legislation also removes solar energy projects from regulation under the Florida Electrical Power Plant Siting Act.

- **S774 Relating to Renewable Energy Policy** (Constantine)

  Ratifies the rules on renewable portfolio standards adopted by the Public Service Commission January 9, 2009.

- **S1086 Relating to Renewable Energy** (Detert)

  Requires that a purchase contract offered to producers of renewable energy contain payment provisions for energy and capacity based upon a public utility's equivalent cost-recovery rate for certain clean energy projects rather than the utility's full avoided costs.

- **S1126 Relating to Permitting** (Altman)

  Clarifies duties of the Office of Tourism, Trade, and Economic Development (OTTED) to approve expedited permitting and comprehensive plan amendments. Revises criteria for businesses submitting permit applications or local comprehensive plan

amendments. Provides that permit applications and local comprehensive plan amendments for specified biofuel and renewable energy projects are eligible for the expedited permitting process, etc.

- **S1186 Relating to Renewable Energy** (Bennett)

  Revises legislative intent regarding the state's renewable energy policy. Deletes provisions requiring that the PSC adopt rules for a renewable portfolio standard. Requires that the commission provide for full cost recovery for certain renewable energy projects. Redefines the term "electrical power plant" for purposes of the Florida Electrical Power Plant Siting Act to exclude solar electrical generating facilities, etc.

- **S2346 Relating to Renewable Energy** (Altman)

  Cites act as the "Florida Farm to Energy Act." Requires investor-owned electric utilities and participating municipal electric utilities and rural electric cooperatives to collect renewable energy fees from retail electric customers. Provides for the deposit and use of such fees. Provides procedures for municipal electric utilities and rural electric cooperatives to participate or terminate their participation, etc.

- **S2404 Relating to Renewable Energy** (Bennett)

  Requires each electric utility in the state to collect from each residential, commercial, and industrial customer a designated

monthly systems charge. Requires the electric utilities to deposit collected funds into the Sustainable and Renewable Energy Policy Trust Fund. Creates a direct-support organization for the Florida Energy Office. Revises the expiration date for the Solar Energy System Incentives Program, etc.

**2010 Florida House of Representatives Legislation**

- **HB 773 - Relating to Expedited Permitting** (Kreegel)

  Transfers authority over expedited permitting and comprehensive plan amendment process from OTTED to Secretary of Environmental Protection; revises job-creation criteria for businesses to qualify to submit such permit applications and local comprehensive plan amendments; provides for expedited review of specified renewable energy projects; provides for establishment of regional permit action teams through execution of memoranda of agreement developed by permit applicants and secretary; provides for appeal and challenge of expedited permit or comprehensive plan amendment; revises provisions for review of sites proposed for location of facilities eligible for Innovation Incentive Program; specifies expedited review for certain electrical power projects.

- **HB 1267 Relating to Renewable Energy** (Rehwinkel Vasilinda)

  Requires electric utilities to collect monthly systems charge from residential, commercial, & industrial customers; provides for

deposit of collected funds into Sustainable and Renewable Energy Policy Trust Fund; creates direct-support organization for Florida Energy Office; requires contract between office and direct-support organization; provides for use of funds; requires annual audit; requires purchase contract offered to producers of renewable energy contain payment provisions for energy and capacity based upon public utility's equivalent cost-recovery rate for certain clean energy projects; extends period of time for which residents are eligible to receive rebates for specified solar energy systems; provides schedule for rebate amounts.

- **HB 1371 Relating to Renewable Energy** (Randolph)

  Requires that purchase contract offered to producers of renewable energy contain payment provisions for energy and capacity based upon public utility's equivalent cost-recovery rate for certain clean energy projects rather than utility's full avoided costs.

- **HB 1417 Relating to Renewable Energy** (Kriseman)

  Deletes provision requiring certain net metering be made available when utility purchases power generated from biogas produced by anaerobic digestions of agricultural waste; ratifies rules on renewable portfolio standards adopted by Public Service Commission.

- **HB 1471 Relating to Renewable Energy** (Williams)

  Amends section 366.92 to delete provisions requiring the adoption of rules for a renewable portfolio standard by the PSC. The legislation also requires the PSC to provide for full cost recovery including a return of equity of not less than 50 basis points above the last PSC approved rate of return for the utility. The legislation also requires the PSC to approve a total of 700 MW of renewable energy projects for years 2010 to 2012. The legislation establishes a finding of the Florida Legislature that there is a need for new Florida renewable resources and that this determination will serve as the need determination required under section 403.519 and also as the commission's agency report under section 403.507 (4) (a). In addition, the legislation requires the commission to vote on the petition for new renewable generation within 90 days of receipt of filing. The legislation also creates an exception for a solar electric generating facility of any capacity under the Florida Electrical Power Plant Siting Act.

## Summary and Conclusions

**Q. Please summarize your testimony.**

A. My testimony may be summarized as follows.

- GREC is the least cost alternative for meeting Gainesville's policy objectives, improving GRU's electric system reliability

and integrity, mitigating the risks of future greenhouse gas and renewable energy regulations, and mitigating the risks of increasing fossil fuel prices and volatility, as well as numerous other risks.

- GREC will create over 700 permanent jobs in the north central Florida region with an income of $31 million per year (2010 dollars) which is equivalent to a $608 million net present value (2010 dollars).
- When the benefits of economic development are considered, GREC has no downside risk. Excluding economic development benefits, and making biased and unrealistic assumptions against GREC, the expected value of GREC's risk adjusted benefits exceed costs by more than 2 to 1, with a benefit of $74.1 million (net present value in 2010 dollars). This assumes that unrealistically low probabilities are assigned to carbon regulation (10 percent), renewable energy requirements (20 percent), and the possibility of fossil fuel prices increasing (33 percent).
- Under mid-range probabilities, benefits exceed costs by a ratio of greater than 10 to 1 with an expected value $297.7 million (net present value in 2010 dollars).
- To obtain a benefit cost ratio of less than 1, all of the benefits of economic development have to be excluded, the probability of carbon regulation *must be assumed to be zero*, the probability of

renewable energy requirements *must be assumed to be zero*, and the possibility of fossil fuel prices increasing *must be assumed to be zero*. The implausibility of these outcomes is demonstrated by the initiatives already taken by the U.S. EPA to regulate greenhouse gases and pollutants, the groundswell including 35 states with RPS standards or goals and twelve (12) bills introduced to the Florida legislature to promote renewable energy so far this year, and the evidence provided in Exhibit No. __ [EJR-6] of the trends in natural gas price compared to forecasts since 2004.

- The power purchase agreement between GRU and GREC LLC is structured to provide as much as $88 million (net present value in 2010 dollars) of additional benefits for GRU's customers in the form of protection from: construction cost over-runs; financing interest rate increases; long term operation and maintenance escalation; unexpected equipment failure and damage; loss of unit efficiency; and failure to perform.
- GRU has a number of mechanisms to manage ongoing risks such as the ability to: resell a portion of GREC's output at no less than a fair market price; financially hedge against diesel and labor costs in GREC's fuel contracts; and apply financial tools such as prepayment contracts.

In conclusion, GREC will provide substantial reliability, cost savings, and risk mitigation benefits to GRU's customers and the broader Gainesville community, and the Commission should grant the requested determination of need.

**Q. Does this conclude your testimony?**

A. Yes it does.