BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

DIRECT TESTIMONY OF PEGEEN HANRAHAN

ON BEHALF OF

GAINESVILLE REGIONAL UTILITIES AND

GAINESVILLE RENEWABLE ENERGY CENTER, LLC

DOCKET NO. 090451

SEPTEMBER 18, 2009

Q. Please state your name and business address.

A. My name is Pegeen Hanrahan, and I am the Mayor of the City of Gainesville. My business address is 200 E University Ave., Gainesville, FL 32601

Q. Please discuss your role within the City of Gainesville.

A. I am in my twelfth year of elective service with the City of Gainesville, and was re-elected Mayor in March 2007. As Mayor, among numerous other duties, I preside at Gainesville City Commission meetings and currently serve as the Chair of the City Commission's Audit, Finance and Legislative Committee.

COM 5
ECR 2
GCL 2
OPC 1
RCP
SNC
SGA
ADM
CLK 1

Q. What is your educational background?

A. I have Bachelors and Master's degrees in Environmental Engineering from the University of Florida. I also have a BA in Sociology from the University of Florida. I am a registered Professional Engineer in Florida.

Q. What is the purpose of your testimony in this proceeding?

A. The purpose of my testimony in this proceeding is to discuss the City of Gainesville's decision to move forward with the Gainesville Renewable Energy Center (GREC) biomass facility.

Q. Are you sponsoring any exhibits to your testimony?

A. No.

Q. Please describe the responsibilities of the City Commission.

A. The City Commission is responsible for governing the City of Gainesville including Gainesville Regional Utilities. The City Commission sets the City budget and tax rates and adopts ordinances and resolutions that set policy for utilities, land use, transportation, law enforcement, fire protection, and other services that affect public welfare. The City Commission is comprised of seven members: four City Commissioners are elected from single member districts, two City Commissioners are elected at-large, and one member is elected as Mayor. As Mayor, I set the agenda and preside over the City Commission meetings.

Q. Please briefly discuss the City of Gainesville's decision to pursue the Gainesville Renewable Energy Center biomass facility.

A. The City of Gainesville's decision to pursue the Gainesville Renewable Energy Center biomass facility is really the culmination of initiatives launched nearly seven years ago with the City Commission's authorization for Gainesville

Regional Utilities (GRU) to investigate solid fuel generating unit alternatives. GRU's subsequent resource planning process (described in detail in the testimony of other witnesses in this proceeding) evolved into comprehensive analyses of biomass alternatives and the decision to move forward with purchasing power from the Gainesville Renewable Energy Center. This multi-year planning process was conducted in the public eye with well over a dozen City Commission meetings, workshops, and public forums conducted on the subject. Overall, the decision to pursue biomass is consistent with the desire of the Gainesville community to reduce carbon emissions through the use of renewable resources. Approving the GREC LLC power purchase agreement (PPA) is one of the actions the City of Gainesville has taken to meet the desires of the community.

Q. Can you please describe the City's pledge to reduce carbon, in particular emissions of carbon dioxide (CO_2)?

A. In 2005, City of Gainesville leaders, along with cities across the US, pledged to reduce carbon. I signed the US Mayors' Climate Protection Agreement on behalf of the Gainesville City Commission. The Climate Protection Agreement calls for reducing carbon emissions to 7 percent below 1990 levels by 2012, and the City of Gainesville is on track to do so in late 2013. This is a particularly aggressive goal, and therefore an impressive accomplishment, given that approximately 60 percent of the electricity currently used to serve Gainesville's homes and businesses comes from coal generation.

Our strategy to reduce CO_2 emissions consists of four main elements: (i) improving energy and water efficiency; (ii) improving the efficiency of power generation; (iii) increasing the use of renewable and domestic fuels to generate electricity; and (iv) adopting policies to improve transportation and land use.

Q. Please discuss how the biomass resource fits into this strategy.

A. Overall, our approach to increasing the use of renewable and domestic fuels to generate electricity includes the use of solar, biomass, and landfill gas. The biomass resource represents a critical component of the Gainesville community's strategy to reduce emissions of CO_2. When compared to other alternatives (with the exception of energy conservation), biomass provides the most significant reductions in CO_2 emissions at the lowest cost.

Q. Given that GRU anticipates no need for future generating capacity in the immediate future to maintain reserve margin requirements, can you please discuss why a 100 MW biomass facility was selected?

A. There are a number of reasons for selecting the GREC biomass project. By selecting a 100 MW biomass facility, GRU is able to capitalize on lower costs associated with economies of scale when compared to smaller biomass alternatives. The selection of the 100 MW biomass facility will allow the Gainesville community to meet the CO_2 emissions reductions targets I've discussed previously and to prepare the community to meet potential renewable portfolio standards and carbon constraint legislation. The proposed project can operate consistently at a high output level that is dispatchable by GRU. As such,

it is an important companion to our solar photovoltaic Feed-in-Tariff program. The City Commission also weighed the other benefits of the project such as significant local area employment and environmental benefits. The City Commission ultimately determined that the GREC was in the overall best interest of the Gainesville community. The benefits associated with the proposed GREC project are discussed in more detail throughout the testimony of Mr. Ed Regan.

Q. Please summarize the events leading to the decision to enter into the PPA with GREC LLC.

A. In 2003, our utilities staff began evaluating the economic and environmental consequences of coal, petroleum coke, natural gas, municipal solid waste, biomass, and solar technologies. This process included numerous public outreach meetings and presentations before the City Commission, which were broadcast over public access television. One outcome of the process was to embark on an aggressive customer energy efficiency program, including financial rebates, low interest loans, give-away programs, and information. The decision to proceed with the GREC LLC PPA took these new levels of conservation and demand reduction into account, but it was realized there were a number of other factors that needed to be taken into consideration including the need for renewable energy to achieve carbon reduction goals, the long-term need for additional economic capacity, and the other benefits associated with the project such as economic development through job creation and reduced particulate emissions in the region.

Q. How will the GREC LLC PPA affect costs to GRU's customers?

A. Our staff have projected that the GREC will reduce GRU's customers' costs in the long term. There may be some moderate short term cost increases during the early years of the project. These potential short term increases were presented to the City Commission and public during the City Commission meetings leading up to the approval of the GREC LLC PPA.

Q. In conclusion, what are the main benefits that the GREC LLC PPA provides to the Gainesville community?

A. The main benefits are long-term economical baseload capacity that helps us to achieve our carbon reduction goals, fuel diversity, improved system reliability, economic development, and improved environmental conditions in the region.

Q. Does this conclude your testimony?

A. Yes.

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

DIRECT TESTIMONY OF EDWARD J. REGAN

ON BEHALF OF

GAINESVILLE REGIONAL UTILITIES AND

GAINESVILLE RENEWABLE ENERGY CENTER, LLC

DOCKET NO. _____

SEPTEMBER 18, 2009

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. Please describe your responsibilities in that position.

A. I am responsible for electric, water, wastewater, and natural gas system planning including power supply planning. I am responsible for demand-side management (DSM); load and revenue forecasting; cost of service and rate design; electric system permitting and regulatory compliance; financial planning; and community, legislative, and regulatory affairs. I am also responsible for managing generation dispatch operations, coordinating GRU's

interaction with The Energy Authority (TEA), participating on GRU's Risk Oversight Committee, and coordinating GRU's contracts for wholesale power, solar energy, and combined heat and power services.

Q. Please state your educational background and professional experience.

A. I received my Bachelor of Sciences degree in Behavioral Psychology and my Master of Environmental Sciences degree from the University of Florida. I am a registered Professional Engineer licensed in the State of Florida. I have 30 years of experience in the utility industry.

Q. What is the purpose of your testimony in this proceeding?

A. The purpose of my testimony in this proceeding is to discuss GRU's need for the Gainesville Renewable Energy Center (GREC) biomass facility. I will provide an overview and summary of the GREC Need for Power Application, Exhibit No. __ [GREC-1]. In addition to this general summary, I will discuss GRU's existing system, GRU's reliability criteria and need for capacity, the economic parameters used throughout the GREC Need for Power Application, and GRU's resource planning process. I will also discuss GRU's power purchase agreement with the GREC biomass project, GRU's DSM and supply-side efficiency activities, strategic considerations associated with GRU's decision to pursue the GREC facility, consequences of delaying the GREC facility, and that GRU has the financial resources to commit to the GREC LLC power purchase agreement (PPA).

Q. Are you sponsoring any exhibits to your testimony?

A. Yes. Exhibit No. __ [EJR-1] is a copy of my resume. Exhibit No. __ [EJR-2] summarizes GRU's existing residential and non-residential DSM programs. Exhibit No. __ [EJR-3] summarizes GRU's recent base rate and fuel adjustments.

Q. Are you sponsoring any sections of Exhibit No. __ [GREC-1], the GREC Need for Power Application?

A. Yes. I am sponsoring Sections 1.0, 2.0, 3.0, 5.0, 6.0, 8.1 through 8.4, 9.3, 9.5, 13.0, 15.0, 16.0, and 17.2, all of which were prepared by me or under my direct supervision.

Q. Please summarize the GREC Need for Power Application, Exhibit No. __ [GREC-1].

A. GRU and GREC LLC are co-applicants, submitting this Need for Power Application in support of the proposed GREC biomass facility to be located at GRU's existing Deerhaven site within the City of Gainesville's corporate limits in Alachua County, Florida. The GREC facility will be owned and operated by GREC LLC, a subsidiary of American Renewables, LLC. GRU will receive power from the GREC facility under a 30 year PPA with a fixed nonfuel energy charge per megawatt-hour (MWh) covering construction, debt service, and all fixed operating and maintenance (O&M) costs.

Exhibit No. __ [GREC-1] summarizes the planning process leading to the decision to pursue the GREC LLC PPA, and presents the results of a comprehensive analysis that was performed to demonstrate that the GREC LLC PPA satisfies the statutory criteria set forth in Section 403.519, Florida Statutes.

Q. Please discuss these statutory criteria.

A. Section 403.519(3), Florida Statutes, sets forth the following criteria which the Florida Public Service Commission must consider, without specifying the weight the Florida Public Service Commission should give to each criteria, in making need determinations:

- The need for electric system reliability and integrity.
- The need for adequate electricity at a reasonable cost.
- The need for fuel diversity and supply reliability.
- Whether the proposed plant is the most cost effective alternative available.
- Whether renewable energy sources and technologies, as well as conservation measures, are utilized to the extent reasonably available.
- Whether there are conservation measures taken by or reasonably available to the applicant or its members which might mitigate the need for the proposed plant.

Q. Please summarize how the PPA with GREC LLC satisfies these statutory criteria.

A. The proposed GREC facility is planned to begin commercial operation by December 2013. As a result of the success of GRU's DSM efforts, the addition of combined heat and power and landfill gas-to-energy projects, ongoing additions of solar photovoltaic (PV) capacity through GRU's solar feed-in tariff (FIT), and the effects of the recent economic downturn, GRU does not forecast a need for capacity to simply maintain our 15 percent reserve margin criteria until 2023. However, reserve margin is not the only criterion for the need for additional generating capacity.

The PPA with GREC LLC provides GRU with capacity that is needed to improve and maintain the reliability of GRU's system. The capacity from GREC is needed to replace capacity from GRU's lowest cost existing fossil fueled unit, Deerhaven 2, during maintenance and forced outages. Deerhaven 2 serves approximately 50 percent of GRU's system peak demand and, as an aging facility that will be 32 years old when the GREC facility goes into service in late 2013, the availability of Deerhaven 2 is expected to decrease.

The analysis of supply-side alternatives presented in the GREC Need for Power Application, Exhibit No. __ [GREC-1], demonstrates that the PPA with GREC LLC provides lower cost power than comparable natural gas alternatives over the 30 year term of the PPA. While a coal unit may provide lower cost power

when not considering costs associated with potential regulation of emissions of carbon dioxide (CO_2), when such considerations are taken into account the PPA with GREC LLC provides lower cost power than coal alternatives.

In addition to enhancing the reliability and integrity of GRU's electric system in the most cost-effective manner, the PPA with GREC LLC will diversify GRU's existing fuel mix, which is dominated by coal and therefore is potentially at risk under future CO_2 regulations, and natural gas, which is subject to volatility in price and availability and also at risk under future CO_2 regulations. The GREC facility will take advantage of multiple streams of various types of biomass fuel, which will further enhance the reliability of GRU's fuel supply.

GRU offers our customers the opportunity to participate in numerous DSM programs, and has worked with several consultants to structure a DSM portfolio that maximizes results. Combined with improvements to the efficiency of our supply-side resources and increased customer-sited renewables and distributed generation, GRU has demonstrated through previous and on-going actions that we are committed to utilizing renewable energy resources and conservation and energy efficiency measures to the extent reasonably available.

Q. Please describe GRU.

A. GRU operates a fully vertically integrated electric power production, transmission, and distribution system, which is wholly owned by the City of

Gainesville. In addition to retail electric service, GRU also provides wholesale electric service to the City of Alachua and Clay Electric Cooperative. GRU's distribution system serves our retail territory of approximately 124 square miles and approximately 93,000 residential and commercial customers in both the incorporated and unincorporated areas of our service territory. GRU also provides natural gas, water, wastewater, and telecommunications services.

GRU has generating units at two primary generating sites – Deerhaven and John R. Kelly. Each site has steam turbine and combustion turbine units, and the Kelly site also includes a combined cycle unit. GRU's existing net summer generating capacity is approximately 608 MW. GRU's existing generating units include three fossil fuel steam turbines, six simple cycle combustion turbines, one combined cycle unit, a share of Progress Energy Florida's Crystal River 3 nuclear unit, and distributed generation. GRU's main generation unit is the 222 MW coal fueled Deerhaven Unit 2 which went into service in 1981. GRU also has a generating station called the South Energy Center which provides combined heat and power services to a new Shands HealthCare cancer hospital.

Q. Does GRU utilize power purchases as part of its power supply portfolio?

A. Yes. GRU has entered into a 15 year contract to receive 3 MW of landfill gas fueled capacity at the Marion County Baseline Landfill from G2 Energy Marion, LLC. The facility began commercial operation in January 2009, and net output is expected to increase to 3.8 MW by December 2009.

GRU has a PPA with PEF for 50 MW of baseload capacity, which began January 1, 2009 and continues through December 31, 2013. An additional 25 MW of baseload capacity was contracted for January 1, 2009 through December 31, 2010, and another 25 MW of baseload capacity was contracted for March through August of 2009 and March through August of 2010. We also have a solar feed-in-tariff (FIT), under which we purchase distributed solar power.

Q. Please discuss the solar FIT.

A. In March 2009, GRU became the first utility in the US to offer a European-style solar FIT. Under this program, GRU agrees to purchase 100 percent of the distributed solar power produced from any private installation at a fixed rate for a contract term of 20 years. The FIT rate is set at a level designed to recover costs and provide a profit to system owners in order to incentivize the installation of solar in the Gainesville community and help create a strong solar marketplace.

Q. Please describe GRU's transmission system.

A. GRU's bulk electric power transmission network consists of a 230 kV radial and a 138 kV loop connecting GRU's two generating stations, GRU's nine distribution substations, one 230 kV and two 138 kV interties with PEF, a 138 kV intertie with Florida Power & Light Company, a radial interconnection with

Clay Electric Cooperative at the Farnsworth Substation, and a loop-fed interconnection with the City of Alachua at Alachua No. 1 Substation.

Q. What planning reliability criteria does GRU use?

A. GRU uses a minimum 15 percent reserve margin criterion for both summer and winter seasons. This is lower than the minimum 20 percent reserve margin criterion that the investor owned utilities in Peninsular Florida have stipulated to use. The 15 percent minimum reserve margin is equal to the 15 percent minimum reserve margin requirement in Rule 25-6.035, F.A.C., required for reserve sharing in the State. The 15 percent minimum reserve margin is also consistent with the reserve margin criterion used by many other utilities across the nation.

Q. How is the 15 percent reserve margin criterion applied?

A. The 15 percent reserve margin criterion is applied to GRU's annual peak demand projections. GRU plans to have available capacity, including capacity from generating units owned by GRU and provided to GRU through PPA resources, that exceeds the annual peak demand plus the 15 percent reserve margin.

Q. Please discuss GRU's expected need for additional capacity to satisfy reserve margin requirements under the base case load forecast.

A. Due to GRU's demand-side management programs, distributed generation at the South Energy Center and the solar FIT, GRU's initial need for additional capacity to maintain reserve margin requirements is expected to occur in 2023 based on our most recent forecasts, which reflect recent economic downturns in the Florida economy.

Q. Please describe the economic parameters used in the GREC Need for Power Application, Exhibit No. __ [GREC-1].

A. A 2.5 percent annual general inflation rate was used. Escalation rates of 2.5 percent annually were used for capital and O&M costs. An annual rate of 4.2 percent was used for the long-term tax-exempt municipal bond interest rate, interest during construction rate, and present worth discount rate. The 4.2 percent rate is based on GRU's current cost of capital.

Q. Are these economic parameters appropriate for use in this Need for Power Application?

A. Yes. They are consistent with current economic conditions and economic parameters that been used in similar evaluations before the Florida Public Service Commission. More importantly, they are internally consistent across the economic evaluations of the GREC LLC PPA included in the GREC Need for Power Application, Exhibit No. __ [GREC-1].

Q. Please summarize GRU's planning activities that led to the decision to pursue the PPA with GREC LLC.

A. GRU began an intensive resource planning process in 2003, when our need for additional baseload capacity was in the 2011 timeframe. Extensive, in-depth discussions with the community followed and included evaluations of demand and supply resources, consideration of air quality, and consideration of climate change trends. The resulting process included numerous major policy changes that are summarized in Section 8.1 of the GREC Need for Power Application, Exhibit No. __ [GREC-1], while the timeline of public participation activities is presented in Section 8.2. GRU's integrated resource planning process ranged from technology feasibility screening studies and bus bar comparisons to detailed generation optimization studies.

GRU's resource planning process led to several decisions, including the adoption of using the Total Resources Cost (TRC) test instead of the Rate Impact Measure (RIM) test when evaluating the cost-effectiveness of DSM measures; the issuance by GRU of a solicitation to garner information on the state of the art in power generation (i.e. gasification, integrated gasification combined cycle, plasma arc, etc.); and the decision to not consider additional fossil fuel resources and instead pursue biomass for future baseload capacity. Ultimately, GRU issued a competitive biomass solicitation in 2007. Prior to, and in conjunction with, the competitive biomass solicitation, four biomass

resource studies were conducted to determine if sufficient fuel might be available within reach of a biomass plant constructed within GRU's system.

Q Who made the decision to only consider biomass fueled technologies, and why?

A. That decision to pursue only biomass options was made by the seven member Gainesville City Commission (City Commission) on June 18, 2007 after spending several years discussing and reviewing alternatives for future power supply and extensive public outreach and community participation. A number of factors contributed to this decision which was primarily made for long term strategic purposes rather than strictly short term economic benefits. Concern about climate change and potentially consequent regulations that would drive up power production costs for conventional fuels, especially coal was a topic discussed very thoroughly. This concern was the manifest reason that the City passed a resolution to meet the US Mayors' Climate Protection Agreement to meet Kyoto protocols. The City Commission was also keenly sensitive to the environmental emissions associated with various fuels other than carbon, which led to a preference for the use of woody biomass materials rather than municipal solid waste. The City Commission was very aware of the increasing volatility and cost of natural gas and coal, and the benefits of improving energy independence and fuel diversity. Biomass fuels are readily available and for all intents and purposes immune from interruption due to transportation blockages. Finally, the City Commission was aware of the age of GRU's generation fleet,

and investing in an appropriate technology with immediate environmental, local economic, and regulatory hedge value, combined with the ability to meet long term capacity and reliability requirements, was a policy decision they made unanimously May 7, 2009.

Q. Please discuss GRU's PPA with GREC LLC.

A. GRU has entered into a 30 year PPA (from the date of completion of the facility) to purchase 100 percent of the output of the GREC biomass facility. The PPA has been structured to provide long term stable pricing while avoiding any potential for stranded cost. This has been accomplished by structuring all billing elements on a cost per MWh basis. GRU only pays for fixed costs for available energy, and only pays for fuel and variable O&M when GRU actually accepts delivery. In this context, fixed costs include all construction, financing, operation and maintenance costs as a charge per MWh that will not change over the 30 year term of the PPA. The PPA also includes a guaranteed heat rate and availability. The facility will be constructed on property leased from GRU on the Deerhaven power plant site.

Q. Please describe how the PPA protects GRU from risk.

A. The PPA protects GRU from at least five types of risks: construction risk; financing risk; operational risk; inflation risk; regulatory risk; and replacement power costs in the event of Deerhaven Unit 2 outages. GREC LLC bears all the risk of construction cost overruns and financing interest rate changes once the

notice to commence is issued. The fixed costs associated with the project are based on a $/MWh energy charge. Thus, if the project is not available to run, GRU won't pay for the fixed costs associated with the project. GRU has the right to dispatch the project as needed and can reduce its generation down to the project's minimum load. The non-fuel energy charge for fixed costs does not escalate over the term of the PPA which protects GRU from the risk of inflation. The use of biomass also protects GRU from a number of regulatory risks related to potential renewable energy portfolio requirements and regulations imposing carbon constraints as will be discussed later in my testimony.

Q. Given the timing of the need for additional capacity to maintain reserve margin requirements that you discussed previously relative to the commercial operation date of the GREC biomass facility, has GRU considered sharing the capacity from GREC with other parties?

A. Yes. GRU is currently negotiating with other municipal utilities that have expressed an interest in becoming a counter party to take a share of the renewable energy output from the GREC for the initial period of operation.

Q. What sort of off-take arrangements are being considered by GRU?

A. GRU envisions structuring an arrangement whereby the counter party(s) will share the costs borne by GRU on a pro-rata basis with the addition of wheeling fees and transmission losses required for the delivery of power to the border of

GRU's control area. GRU is considering reselling 50 percent of the facility's output for the initial ten years of GREC's operation.

Q. Have other entities expressed an interest in such an arrangement with GRU?

A. Yes. To date, at least four municipal utilities have expressed interest in such an arrangement.

Q. Please summarize GRU's historical and ongoing DSM efforts.

A. GRU has been offering incentives and services to encourage energy conservation and demand reduction since 1980. Through 2008, GRU's DSM programs have resulted in cumulative energy reductions of 151 GWh and cumulative peak demand savings of 30 MW. Through 2025, GRU is projecting cumulative energy savings of 366 GWh and cumulative peak demand savings of 108 MW. GRU's existing residential and non-residential DSM programs are summarized in Exhibit No. __ [EJR-2].

Q. Does GRU use rate design to promote energy conservation?

A. Yes. As shown in Exhibit No. __ [EJR-3], GRU has implemented increasing block rates for residential and general service non-demand customers t result in higher costs of electricity as consumption increases. GRU also offers time-of-use rates for all customer classes. Exhibit No. __ [EJR-3] summarizes the history of these rates and charges from fiscal year 1997 through fiscal year 2010.

Also included in Exhibit No. __ [EJR-3] is the annual average fuel adjustment, which is applied equally to all kWh sales.

Q. Please discuss GRU's public infrastructure projects.

A. GRU's newest generating unit is the South Energy Center, the first combined heat and power (CHP) plant of its type to serve a hospital in the southeast. The plant is 75 percent thermally efficient, and the site offers the opportunity for expansion to provide services to other nearby public facilities.

GRU has supported City of Gainesville infrastructure improvements such as light emitting diode (LED) stoplights and LED crosswalk signals. GRU successfully partnered with the City of Gainesville in pursuing federal funds for a demonstration PV array atop the GRU Administration Building and LED pedestrian lighting at several city-owned facilities.

Q. Please discuss GRU's supply-side efficiency activities.

A. GRU has several programs to improve the adequacy and reliability of the transmission and distribution systems, resulting in reduced energy losses. Our activities include installing distribution capacitors, purchasing high-efficiency distribution transformers, and reconductoring the feeder system.

Q. How will the PPA with GREC LLC benefit GRU from a strategic perspective?

A. GRU's PPA with GREC LLC will provide GRU with numerous benefits from an economic, environmental, and regulatory perspective. The pricing structure of the PPA with GREC LLC is roughly two thirds fixed over the 30 year term of the PPA, and the portion that is not fixed is not nearly as volatile as natural gas or even spot coal prices.

GRU's PPA with GREC LLC will provide long term benefits to the community and GRU's ratepayers. Over the term of the PPA, the cost of energy from the GREC LLC PPA will be more economical than conventional combined cycle capacity. The PPA also brings benefits in the form of replacement capacity for units scheduled to be retired. The GREC LLC PPA will add value to GRU's generation portfolio by modernizing GRU's generating fleet, of which two thirds of the capacity is currently at least 28 years of age. The capacity from the GREC facility will improve GRU's generating system reliability from both a firmness of capacity perspective and from the perspective of exposure to high costs of replacement power.

In addition, the GREC capacity will provide benefits from a regulatory perspective, helping GRU to satisfy the renewable energy portfolio standards that have been proposed at the state and federal levels and will serve as a hedge against the risk associated with potential future regulations of CO_2 emissions.

The price of biomass as fuel for the GREC facility is expected to be much less volatile than conventional fossil fuels and is expected to escalate much more slowly. The benefits of biomass from a fuel diversity standpoint include benefits in terms of diversity of transportation, mitigating fuel price volatility, and contributing to Florida's overall energy independence.

Other aspects of the GREC biomass facility contribute to the Gainesville community, and some of these more tangible benefits associated with the GREC facility include minimal exposure to construction and operating risk, creation of over 500 jobs in the region, substantial reduction in the open burning of biomass, no surface water discharge of industrial wastewater, reducing landfill requirements, promoting ecosystem restoration, promoting removal of hazardous fire fuel adjacent to urban development, and supporting silviculture, a major regional industry.

Q. How will delay in operation of the GREC biomass facility adversely impact GRU?

A. In general, delay in operation of the GREC biomass facility will postpone GRU's realization of all the benefits associated with the project that I have discussed previously in my testimony. If the GREC biomass facility has not begun commercial operation by January 1, 2014, it will not be eligible to obtain the Renewable Energy Grant contained in H.R. 1 (the American Recovery and Reinvestment Act of 2009). The increase in GRU's cost of power from the

GREC facility resulting from not obtaining the Renewable Energy Grant is $8.10/MWh, which equates to $6.4 million per year.

The PPA with GREC LLC contains a clause to adjust the nonfuel energy charge by escalation indices to the time of construction commencement. Based on the 2.5 percent escalation discussed previously in my testimony, the cost of delay is $29.6 million per year of delay.

Additional consequences of delay include postponing indirect economic benefits. GREC will employ an estimated 42 people in operation of the project with an estimated payroll of $4 million per year. An additional 400 to 500 people will be employed obtaining the fuel supply, with an estimated annual payroll of $18 million. At peak construction, GREC will employ 400 people with an estimated payroll of $1.5 million per week during the peak construction period. Over the entire construction cycle, construction payroll will total approximately $102 million.

Delay in operation of the GREC biomass facility will delay the reliability benefits, as well the regulatory and legislative benefits, associated with the GREC LLC PPA that I have discussed previously.

Q. How will GRU's financial position be affected by the PPA with GREC LLC?

A. Given that the transaction with GREC LLC is structured as a PPA rather than GRU obtaining an equity share in the facility, the annual costs for GRU's participation are not tied to an investment in a self-build asset. As such, the ability to finance construction of a new generating unit is not an issue.

GRU's strong credit ratings are, however, important from a project finance perspective, as GRU is the counterparty to the PPA upon which GREC LLC will obtain project financing. Standard & Poor's and Moody's have issued bond ratings to GRU of AA and Aa2, respectively. GRU stands out with these superior ratings, being among the top 20 of the highest rated municipal utilities that are rated by these two agencies. GRU has maintained a total debt service coverage ratio of 2.0 times, a fixed charge coverage of 1.5 times, and an equity ratio of 20-30 percent in fiscal year ending 2009. These economic indicators are projected to continue to improve in later years due to the GREC LLC PPA. All of these ratios are well within the range of other organizations with the same bond ratings from Standard & Poor's and Moody's that GRU has been issued.

Q. In conclusion, what are the main benefits that the PPA with GREC LLC provides GRU?

A. Next to landfill gas, which GRU already has and which is very limited in quantity, biomass generation is the lowest cost renewable energy resource

available to GRU, baseload or otherwise. The structure of the PPA with GREC LLC has the further benefit of providing economical firm, dispatchable power with minimal risk to GRU. The GREC LLC PPA will enhance GRU's system reliability and increase the diversity and reliability of fuel supply for GRU's generating units. The GREC LLC PPA will provide GRU with a substantial hedge against future RPS and regulations of CO_2 emissions.

Q. Does this conclude your testimony?

A. Yes.

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QUALIFICATIONS

-Senior executive experienced in managing a customer focused, financially strong, and environmentally sensitive electric, water, wastewater, natural gas, and telecommunications municipal utility system, with over 878 employees and $420,000,000 per year in gross revenues, which is prepared for deregulated and carbon constrained power markets and operated by a diverse group of employees with aligned interests and objectives.

-Nearly thirty (30) years of progressive responsibility related to an extremely broad range of electric, water, wastewater, natural gas, and telecommunication issues for a municipal utility system that consistently earns a "Double A" bond rating from both Moody's and Standard and Poor's' investor services.

-Knowledgeable about: FERC, NERC, USEPA and Public Service Commission regulations, standards, and policies; electric generation planning; bulk power and transmission operations; wholesale power contracts; rate design; forecasting; corporate modeling; demand side management; rail and pipeline fuel transportation; ecosystem analysis; groundwater modeling; and water and wastewater distribution, collection, treatment, and disposal.

-Proven leadership in developing demand and supply side programs to promote the efficient use of utility services and to reduce the carbon footprint of utility operations, including consumer rebate programs and the development of landfill gas, solar, and biomass resources as well as: 1) introducing the first European-style Solar Feed in Tariff to be offered by a utility in the USA; 2) the construction of the first combined power, steam, and chilled water facility to serve a major hospital complex in Florida; and 3) negotiating the contracts for the largest biomass fueled power plant in Florida.

-Sensitive to community planning, economic development, and other special interest concerns. Able to listen carefully and communicate effectively with employees, elected officials, regulators, customers, and other individuals with a diverse range of expertise, backgrounds and interests.

-Successful at introducing innovative new products and services based on cross-departmental core competencies and customer needs.

-Adept at collaborative efforts to assure favorable bond ratings, issue bonds, and manage financial and commodity risk. Experienced with the use of financial tools such as NYMEX market options and contracts to hedge fuel costs, and the potential for strategic alliances with other utilities to protect financial strength.

EMPLOYMENT HISTORY

Gainesville Regional Utilities in North Central Florida
(unless stated otherwise)

2002 to Present

Assistant General Manager for Strategic Planning
-Electric, Water, Wastewater, and Natural Gas System Planning
a. Power supply planning, including demand side management

b. Load and Revenue Forecasting
c. Cost of Service and Rate Design
d. Permitting and Regulatory Compliance
e. Financial Planning
f. Community, Legislative, and Regulatory Affairs

-Generation Dispatch Operations
-Retail Telecommunications Networks and Services P&L (through 2005)
-Operations and Settlement Committee, The Energy Authority™ (TEA)
-GRU's Risk Oversight Committee
-Combined heat and power services

1990-2002 **Strategic Planning Director**
-Retail Telecommunications Networks and Services (GRUCom)
-Electric, Water, Wastewater, and Natural Gas System Planning (see above)

1987-1990 **Senior Utility Engineer**
-Major Facilities Design and Permitting
-Process Design and Network Analysis
-Community Outreach
-Reclaimed Water Services Start-Up

1984-1987 **Utility Engineer II**
-Water/Wastewater Master Planning

1981-1984 **Utility Analyst**
-Integrated Resource Planning
-Demand Side Program Design
-Small Area Forecasting and GIS
-Commercial Lighting Services Start-Up

1979-1981 **Technical Energy Management Coordinator**
-Energy Conservation Program Creation, Training and Delivery

1977-1979 **Regional Environmental Planner**
-North Central Florida Regional Planning Council
-Water and Wastewater Supply and Treatment Plans
-Surface Hydrology, Soils, Flood Maps
-Land Management and Conservation

EDUCATION, CERTIFICATIONS, TRAINING
-**Bachelor's of Behavioral Psychology**, UF, Gainesville, Florida. 1974
-**Master's of Environmental Sciences**, UF, Gainesville, Florida 1977
-**Registered Professional Engineer**, Florida License 41166
-Certified Energy Auditor
-Word processors, spreadsheets, SAS, SPSS, Fortran IV, PL1
-Engineering Simulation Systems
-Self directed work teams, Balanced Scorecard

ASSOCIATIONS
President Florida Municipal Electric Association
Board Member TEA Settlement and Operating Committee
Prior Board Member Florida Reliability Coordinating Council
Prior Board Member Florida Municipal Electric Agency

DSM Programs Offered to Residential Consumers in 2009	
1	High Efficiency Central Air Conditioning (Rebates)
2	High Efficiency Room Air Conditioning (Rebates)
3	Central Air Conditioner Maintenance (Rebates)
4	Reflect Roof Coating for Mobile Homes (Rebates)
5	Solar Water Heating (Rebates)
6	Solar Photovoltaic (Rebates with Net Metering)
7	Natural Gas Appliance (Rebates)
8	Home Performance with the Federal Energy Star Program (Rebates)
9	Energy Star Building Practices of the EPA (Incentives)
10	Green Building Practices (Incentives)
11	Heating/Cooling Duct Repair (Rebates)
12	Variable Speed Pool Pumps (Rebates)
13	Energy Efficiency for Low-Income Households (Grants)
14	Attic and Raised-Floor Insulation (Rebates)
15	Refrigerator Buy Back (Rebates)
16	Compact Fluorescent Light Bulbs (Giveaways)
17	Energy Efficiency Low-Interest Loans (Interest Buy Down)

DSM Programs Offered to Non-Residential Customers in 2009	
1	Solar Water Heating (Rebates)
2	Solar Photovoltaic (Net Metering)
3	Natural Gas for Water Heating and Space Heating (Rebates)
4	Vending Machine Motion Sensors (Giveaways)
5	Efficient Exit Lighting (Rebates)
6	Custom Business Rebates for Energy Efficiency Retrofits (Rebates)

Gainesville Regional Utilities History of Retail Electric Rate Structures, Base Rate Prices, and Fuel Adjustment

Rate Class/Billing Element/Tier		Effective Date And Fiscal Year														
		10/1/1996	10/1/1997	10/1/1998	10/1/1999	10/1/2000	10/1/2001	6/1/2002	10/1/2002	10/1/2003	10/1/2004	10/1/2005	10/1/2006	10/1/2007	10/1/2008	10/1/2009
		1997	1998	1999	2000	2001	2002	2002	2003	2004	2005	2006	2007	2008	2009	2010
Residential Service																
Customer Charge	per month	$ 4.90	$ 4.90	$ 4.90	$ 4.90	$ 4.90	$ 4.90	$ 4.66	$ 4.66	$ 4.66	$ 4.66	$ 4.89	$ 5.17	$ 5.54	$ 7.60	$ 8.45
Energy Charge	per kWh															
0-250 kWh		$ 0.05020	$ 0.04980	$ 0.04980	$ 0.04980	$ 0.04980	$ 0.05020	$ 0.04731	$ 0.04613	$ 0.04613	$ 0.04613	$ 0.04613	$ 0.04982	$ 0.025	$ 0.026	$ 0.028
251-750 kWh		$ 0.05020	$ 0.04980	$ 0.04980	$ 0.04980	$ 0.04980	$ 0.05020	$ 0.04731	$ 0.04613	$ 0.04613	$ 0.04613	$ 0.04613	$ 0.04982	$ 0.065	$ 0.066	$ 0.067
over 750 kWh		$ 0.05440	$ 0.05440	$ 0.05440	$ 0.05440	$ 0.05440	$ 0.05440	$ 0.05576	$ 0.05576	$ 0.05576	$ 0.05576	$ 0.05966	$ 0.07398	$ 0.095	$ 0.098	$ 0.102
Residential Service - Time of Use																
Customer Charge	per month	$ 8.27	$ 8.27	$ 8.27	$ 8.27	$ 8.27	$ 8.27	$ 7.86	$ 7.86	$ 7.86	$ 7.86	$ 8.25	$ 8.75	$ 9.36	$ 17.60	$ 17.60
Energy Charge	per kWh															
On-Peak		$ 0.1052	$ 0.1047	$ 0.1047	$ 0.1047	$ 0.1047	$ 0.1052	$ 0.09880	$ 0.09880	$ 0.09880	$ 0.09880	$ 0.09880	$ 0.12251	$ 0.1100	$ 0.1390	$ 0.1390
Off-Peak		$ 0.0307	$ 0.0305	$ 0.0305	$ 0.0305	$ 0.0305	$ 0.0307	$ 0.02900	$ 0.02900	$ 0.02900	$ 0.02900	$ 0.03100	$ 0.03351	$ 0.0325	$ 0.0350	$ 0.0350
General Service Non-Demand & Demand < 50 kW																
Customer Charge	per month	$ 9.13	$ 9.13	$ 9.13	$ 9.13	$ 9.13	$ 9.13	$ 8.37	$ 8.37	$ 8.37	$ 8.37	$ 8.79	$ 15.18	$ 16.00	$ 16.00	$ 25.50
Energy Charge	per kWh															
0-1500 kWh		$ 0.05550	$ 0.05550	$ 0.05550	$ 0.05550	$ 0.05550	$ 0.05550	$ 0.05090	$ 0.05090	$ 0.05090	$ 0.05090	$ 0.05090	$ 0.05548	$ 0.0620	$ 0.0680	$ 0.0700
over 1500 kWh		$ 0.05550	$ 0.05550	$ 0.05550	$ 0.05550	$ 0.05550	$ 0.05550	$ 0.05770	$ 0.05770	$ 0.05770	$ 0.05770	$ 0.06087	$ 0.07183	$ 0.0800	$ 0.0950	$ 0.1030
Business Partner Discount Rate									7%	7%	7%	7%	7%	7%	7%	7%
General Service Demand - 50kW < Demand < 1000 kW																
Customer Charge	per month	$ 15.82	$ 15.82	$ 15.82	$ 15.82	$ 15.82	$ 15.82	$ 15.82	$ 15.82	$ 15.82	$ 15.82	$ 16.61	$ 30.92	$ 33.00	$ 45.00	$ 45.00
Demand Charge	per kW	$ 4.66	$ 4.66	$ 4.66	$ 4.66	$ 4.66	$ 4.66	$ 5.35	$ 5.75	$ 5.75	$ 5.75	$ 6.33	$ 7.56	$ 9.00	$ 9.20	$ 9.25
Energy Charge	per kWh	$ 0.03400	$ 0.03400	$ 0.03400	$ 0.03400	$ 0.03400	$ 0.03400	$ 0.02800	$ 0.02400	$ 0.02400	$ 0.02400	$ 0.02400	$ 0.02633	$ 0.0290	$ 0.0320	$ 0.0420
Business Partner Discount Rate									10%	10%	10%	10%	10%	10%	10%	10%
Large Power Service - Demand > 1000 kW																
Customer Charge	per month	$ 60.84	$ 60.84	$ 60.84	$ 60.84	$ 60.84	$ 60.84	$ 60.84	$ 60.84	$ 60.84	$ 60.84	$ 63.88	$ 245.05	$ 265.00	$ 300.00	$ 300.00
Demand Charge	per kW	$ 4.00	$ 4.00	$ 4.00	$ 4.00	$ 4.00	$ 4.00	$ 5.25	$ 5.25	$ 5.25	$ 5.25	$ 5.85	$ 7.08	$ 9.00	$ 9.20	$ 9.25
Energy Charge	per kWh	$ 0.02710	$ 0.02710	$ 0.02710	$ 0.02710	$ 0.02710	$ 0.02710	$ 0.02350	$ 0.02350	$ 0.02350	$ 0.02350	$ 0.02350	$ 0.02597	$ 0.027	$ 0.031	$ 0.039
Business Partner Discount Rate									13%	13%	13%	13%	13%	13%	13%	13%
Annual Average Fuel Adjustment - Applied Uniformly to All Retail Kilowatt-Hours																
	per kWh	0.02031	0.01858	0.01839	0.02104	0.02903	0.02158	0.02158	0.02916	0.03017	0.03550	0.04950	0.05000	0.05000	0.06000	0.05700

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

DIRECT TESTIMONY OF TODD KAMHOOT

ON BEHALF OF

GAINESVILLE REGIONAL UTILITIES AND

GAINESVILLE RENEWABLE ENERGY CENTER, LLC

DOCKET NO. _____

SEPTEMBER 18, 2009

Q. Please state your name and business address.

A. My name is Todd Kamhoot. 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 Lead Utility Analyst.

Q. Please describe your responsibilities in that position.

A. My responsibilities include developing customer, sales, demand, and revenue forecasts for electric, natural gas, water, and wastewater systems; providing rate design support and pricing maintenance for billing system software; providing training and support for use of customer relationship management and business information warehouse software and data systems within GRU's Strategic Planning Department; preparing fuel price forecasts for fuels used by power systems and the natural gas system; developing monthly billing summaries; maintaining billing history databases used for forecasting; research to facilitate

management decision making; providing statistical consultation to projects including customer satisfaction surveys, electric field inventory, load research surveys, coal pile inventory; providing analytical support for projects conducted in conjunction with the City of Gainesville general government including Affirmative Action Plan development and annexation analyses; coordination of annual preparation of GRU's Ten Year Site Plan and presenting conclusions to the Florida Public Service Commission and the Florida Reliability Coordinating Council; submission of responses to data requests to government and industry associations including the US Department of Energy – Energy Information Administration; Florida Public Service Commission; and Florida Reliability Coordinating Council; and active participation in the Florida Reliability Coordinating Council - Load Forecast Working Group since 1987.

Q. Please state your educational background and professional experience.

A. I received my Bachelor of Science degree in Statistics from the University of Florida. I have nearly 25 years of experience in the utility industry within GRU's Strategic Planning Department.

Q. What is the purpose of your testimony in this proceeding?

A. The purpose of my testimony in this proceeding is to present GRU's forecast of electrical power demand and energy consumption.

Q. Are you sponsoring any exhibits to your testimony?

A. Yes. Exhibit No. __ [TK-1] is a copy of my resume. Exhibit No. __ [TK-2] summarizes GRU's current load forecast.

Q. Are you sponsoring any sections of Exhibit No. __ [GREC-1], the Gainesville Renewable Energy Center Need for Power Application?

A. Yes. I am sponsoring Section 4.0, which was prepared under my direct supervision.

Q. Please briefly describe the methodology used to develop the load forecasts for GRU.

A. GRU developed forecasts for the number of customers, energy sales, and seasonal peak demands for 2009 through 2044. Separate energy sales forecasts were developed for each of the following customer segments: residential, general service non-demand, general service demand, large power, outdoor lighting, sales to Seminole for Clay Electric Cooperative (Clay), and sales to City of Alachua (Alachua). Separate forecasts of the number of customers were developed for residential, general service non-demand, general service demand, and large power retail rate classifications. The basis for these independent forecasts originated with the development of least-squares regression models. The data used by these models is a combination of historical energy usage and customer information from GRU's records and independent third-party forecasts

of population and economic indicators, such as income and employment. I performed all modeling using the Statistical Analysis System (SAS)[1].

The forecast of total system energy sales was derived by summing energy sales projections for each customer class: residential, general service non-demand, general service demand, large power, outdoor lighting, sales to Clay, and sales to Alachua. Net energy for load was then forecast by applying a delivered efficiency factor for the GRU system to total energy sales. The projected delivered efficiency factor used in this forecast is 0.96. Historical delivered efficiency factors were examined from the past 25 years to make this determination. The impact of energy savings from conservation programs was accounted for in energy sales to each customer class, prior to calculating net energy for load.

The forecasts of seasonal peak demands were derived from forecasts of annual net energy for load. Winter peak demands are projected to occur in January of each year, and summer peak demands are projected to occur in August of each year, although historical data suggests the summer peak is nearly as likely to occur in July. The average ratio of the most recent 25 years' monthly net energy for load for January and August, as a portion of annual net energy for load, was applied to projected annual net energy for load to obtain estimates of January and August net energy for load over the forecast horizon. The medians of the past 25 years' load factors for January and August were applied to January

[1] SAS is the registered trademark of SAS Institute, Inc., Cary, NC.

and August net energy for load projections, yielding seasonal peak demand projections. Forecast seasonal peak demands include the net impacts from planned conservation programs.

Q. How are the energy and demand reductions associated with demand-side management (DSM) and conservation programs reflected in the load forecast?

A. Historical energy and demand reductions from GRU's DSM and conservation programs are implicitly included in the historical loads used in the regression models. Future energy and demand savings projected to result from GRU's conservation and energy efficiency programs are subtracted from the econometric forecast of retail sales used to develop the net energy for load and summer peak demand forecasts.

Q. Please summarize the base case net energy for load forecast.

A. The forecast annual net energy for load is projected to increase from 2,045 GWh in 2009 to 2,620 GWh in 2044. This represents an average annual growth rate of approximately 0.71 percent. The base case net energy for load forecast is presented in Exhibit No. __ [TK-2].

Q. Please summarize the base case summer peak demand forecast.

A. The forecast annual summer peak demand is projected to increase from 441 MW in 2009 to 503 MW in 2044. This represents an average annual growth rate of

approximately 0.38 percent. The base case summer peak demand forecast is presented in Exhibit No. __ [TK-2].

Q. Were any alternative load forecasts developed?

A. Yes. In addition to the base case forecast that I just described, probabilistic bands around the base case forecasts of net energy for load and summer peak demand were also developed. Historical forecast error from 1992 through 2008 was analyzed to determine both the standard deviation of historical forecast error and the trajectory of forecast error over time. The results of these additional load forecasts are presented in Exhibit No. __ [TK-2].

Q. In your opinion, is the process used for developing the demand and energy forecasts reasonable for planning purposes?

A. Yes. The process used in developing the demand and energy forecasts is appropriate for planning purposes.

Q. Does this conclude your testimony?

A. Yes.

TODD KAMHOOT

(352) 393-1280 · 301 SE 4th Avenue, Gainesville, FL 32601 · kamhootnt@gru.com

Utility Work Experience
Lead Utility Analyst, January 2005 to present
Utility Analyst II, June 1990 - January 2005
Utility Analyst I, March 1987 - June 1990
Senior Engineering Assistant, July 1985 - March 1987
Gainesville Regional Utilities - Strategic Planning Department, Gainesville, Florida

Responsibilities and Duties
Annual and periodic development of customer, sales, demand, and revenue forecasts for electric, natural gas, water, and wastewater systems. Present results to executive staff, City Commission, and industry organizations.

Provide rate design support and pricing maintenance for SAP billing system software. Provide training and support for use of Customer Relationship Management and Business Information Warehouse within Strategic Planning Department.

Prepare fuel price forecast for fuels used by power systems and the natural gas system.

Develop monthly billing summary. Maintain billing history databases used for forecasting and a wide variety of research to facilitate management decision making.

Provide statistical consultation to projects including customer satisfaction surveys, electric field inventory, load research surveys, and coal pile inventory.

Provide analytical support for projects conducted in conjunction with General Government including Affirmative Action Plan development and annexation analyses.

Conducted a cost of service and rate design study for the Cross Creek water treatment and distribution system.

Coordinate annual preparation of Ten Year Site Plan. Present conclusions to Florida Public Service Commission and Florida Reliability Coordinating Council.

Submit data requests to government and industry associations including: U.S. Department of Energy – Energy Information Administration; Florida Public Service Commission; and Florida Reliability Coordinating Council.

Actively participate in Florida Reliability Coordinating Council - Load Forecast Working Group from 1987 to present. Served as Chairman in 1992.

Member of Electric Utility Forecaster's Forum.

Continuing Education and Training
Emergency Management Institute, IS-100, IS-200, IS-700, IS-800, 2009
Demographic Analysis Using the 2000 U.S. Census, 2008
Mutual Gains/Interest Based Bargaining, 2001
Leading and Facilitating Teams at GRU, 1998
Business Partner's Sales Training, 1997
Retail Rate Design, American Public Power Association, 1994
Legal Issues in Litigation, 1991
Model-Netics, 1991
Demand Forecasting for Electric Power & Energy, Center for Professional Advancement, 1987

Non-Utility Professional Work Experience
Labor Market Analyst, State of Florida, 1984 - 1985
Employment Interviewer, State of Florida, 1985

Education
Bachelor of Science, Statistics, University of Florida, April, 1984

Software Proficiency
SAS (Statistical Analysis System)
SAP Billing Software:
- Industry Solutions for Utilities for rate configuration;
- Customer Relationship Management customer accounts interface;
- Business Information Warehouse data query tool.

Microsoft Office (Excel, Word, Power Point, Outlook).

Other
Served as staff liaison to Gainesville Energy Advisory Committee from 1990 - 1995.

GRU Forecast Net Energy for Load (GWh)					
Year	Lower (95% CI)	Lower (68% CI)	Base	Upper (68% CI)	Upper (95% CI)
2009	1,903	1,985	2,045	2,106	2,187
2010	1,897	1,978	2,044	2,109	2,190
2011	1,908	1,990	2,061	2,133	2,214
2012	1,925	2,008	2,085	2,162	2,245
2013	1,943	2,026	2,110	2,193	2,277
2014	1,961	2,045	2,135	2,224	2,309
2015	1,979	2,064	2,160	2,256	2,342
2016	1,994	2,081	2,183	2,285	2,372
2017	2,009	2,097	2,205	2,314	2,401
2018	2,025	2,113	2,228	2,344	2,432
2019	2,038	2,127	2,249	2,370	2,459
2020	2,047	2,137	2,265	2,394	2,483
2021	2,055	2,146	2,280	2,415	2,505
2022	2,063	2,154	2,295	2,436	2,527
2023	2,071	2,162	2,310	2,457	2,549
2024	2,078	2,170	2,325	2,479	2,571
2025	2,087	2,180	2,341	2,502	2,594
2026	2,095	2,188	2,356	2,524	2,617
2027	2,103	2,197	2,372	2,546	2,640
2028	2,111	2,205	2,387	2,569	2,663
2029	2,118	2,213	2,402	2,591	2,686
2030	2,125	2,221	2,417	2,612	2,708
2031	2,132	2,229	2,431	2,634	2,731
2032	2,139	2,236	2,446	2,656	2,753
2033	2,146	2,243	2,460	2,678	2,775
2034	2,152	2,250	2,475	2,700	2,798
2035	2,158	2,257	2,489	2,721	2,820
2036	2,165	2,264	2,503	2,743	2,842
2037	2,171	2,271	2,518	2,765	2,865
2038	2,178	2,279	2,533	2,788	2,889
2039	2,184	2,285	2,547	2,810	2,911
2040	2,190	2,291	2,561	2,831	2,933
2041	2,196	2,298	2,576	2,854	2,956
2042	2,202	2,305	2,590	2,876	2,979
2043	2,208	2,311	2,605	2,899	3,002
2044	2,215	2,318	2,620	2,922	3,026

GRU Forecast Summer Peak Demand (MW)					
Year	Lower (95% CI)	Lower (68% CI)	Base	Upper (68% CI)	Upper (95% CI)
2009	406	425	441	458	477
2010	403	422	439	456	475
2011	403	422	441	459	478
2012	404	424	443	462	482
2013	405	425	445	466	485
2014	407	426	448	469	489
2015	408	427	450	473	492
2016	410	430	453	477	497
2017	412	432	457	482	502
2018	414	434	460	486	506
2019	415	435	463	490	510
2020	416	436	465	493	514
2021	416	437	466	496	517
2022	416	437	468	499	519
2023	417	437	469	502	522
2024	417	438	471	504	525
2025	418	438	473	507	528
2026	418	439	475	510	531
2027	419	439	476	513	534
2028	419	440	478	516	537
2029	419	440	480	519	540
2030	420	441	481	522	543
2031	420	441	483	524	546
2032	420	441	484	527	549
2033	420	442	486	530	551
2034	421	442	487	533	554
2035	421	442	489	535	557
2036	421	442	490	538	560
2037	421	443	492	541	563
2038	421	443	493	544	566
2039	421	443	495	547	568
2040	422	443	496	549	571
2041	422	444	498	552	574
2042	422	444	499	555	577
2043	422	444	501	558	580
2044	422	444	503	561	583

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

DIRECT TESTIMONY OF RICHARD D. BACHMEIER

ON BEHALF OF

GAINESVILLE REGIONAL UTILITIES AND

GAINESVILLE RENEWABLE ENERGY CENTER, LLC

DOCKET NO. _____

SEPTEMBER 18, 2009

Q. Please state your name and business address.

A. My name is Richard D. Bachmeier. 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 the Electric System Planning Director.

Q. Please describe your responsibilities in that position.

A. My responsibilities include the planning and execution of GRU's long-term electric supply and transmission strategies, oversight of GRU's long-range production cost projections, structuring and pricing long-term wholesale power contracts, and coordinating GRU's NERC Reliability Compliance program. I have authored requests for proposals (RFPs) and developed the methodology for evaluating biomass generation projects. I have also participated in contract

negotiations for the Gainesville Renewable Energy Center (GREC) biomass facility.

Q. Please state your educational background and professional experience.

A. I received my Bachelor of Science degree in Mathematics and a Bachelor of Arts degree in Economics from the University of North Dakota. I have a Master of Applied Geography degree from Texas State University (formerly Southwest Texas State University) and am a Ph.D. Candidate in Economics from the University of Texas at Austin.

Prior to joining GRU in 2007, I held positions with the Orlando Utilities Commission (OUC), TXU Energy, Enron Corporation, the Public Utility Commission of Texas, and the University of Texas at Austin. I have nearly 25 years of professional experience in the electric power industry encompassing competitive issues, utility risk management, product structuring, retail pricing, and system planning. Specific areas of expertise include utility resource planning; environmental economics and policy; risk management; utility regulation, policy, and ratemaking; financial modeling and analysis; and product development and pricing.

I have presented expert testimony in more than 20 regulatory proceedings at the Public Utility Commission of Texas, and have been involved in 7 different research papers or publications.

Q. What is the purpose of your testimony in this proceeding?

A. The purpose of my testimony in this proceeding is to discuss the process used by GRU in selecting the proposed GREC biomass facility and to discuss the studies that indicate the GREC biomass facility will not negatively impact the electric transmission system in the Florida Reliability Coordinating Council, Inc. (FRCC) Region.

Q. Are you sponsoring any exhibits to your testimony?

A. Yes. Exhibit No. __ [RDB-1] is a copy of my resume. Exhibit No. __ [RDB-2] presents the initial recommendations made to the Gainesville City Commission (City Commission) by GRU evaluation staff and the final approved factor weights for use in evaluating biomass proposals. Exhibit No. __ [RDB-3] is a copy of the FRCC's letter approving interconnection of the GREC.

Q. Are you sponsoring any sections of Exhibit No. __ [GREC-1], the Gainesville Renewable Energy Center Need for Power Application?

A. Yes. I am sponsoring Sections 8.5 and 14.0, which were prepared either directly by me or under my direct supervision.

Q. When did GRU begin to specifically consider biomass generation through a formal competitive solicitation?

A. GRU's two step process to solicit biomass generation began with the issuance of an RFP in October 2007.

Q. Please describe the two step process.

A. The first step of the process allowed non-binding proposals with indicative pricing to be submitted by potential bidders. This step was taken to ensure maximum competitive participation in the solicitation and submittal of the widest range of business plans and technologies. Responses to the RFP were ranked based on factors including price, risk control, environmental emissions, applicant qualifications, and technical merit.

The next step of the RFP process was to invite the three top-ranked bidders to submit binding proposals. Prior to the due date for binding proposals, GRU evaluation staff presented a proposed evaluation methodology to the Gainesville City Commission. The City Commission approved the 14 overall factors and associated factor weights to be applied in the evaluation of the binding biomass proposals. Exhibit No. __ [RDB-2] presents the initial recommendations made to the City Commission by GRU evaluation staff, and also presents the final factor weights approved by the City Commission. In general, the City Commission's final approved factor weights modified GRU staff's recommendations by emphasizing unit efficiency out of concern for resource requirements. The three broad criteria that the 14 factors constituted, along with their weights, included environmental considerations (30 percent), economic considerations (37 percent), and risk and reliability considerations (33 percent).

Q. Please summarize the binding proposals received by GRU in response to the second step of the process.

A. GRU received three binding proposals, presenting a total of 8 options, all of which were fueled with 100 percent biomass. The 8 options are summarized as follows:

- Covanta Energy (all facilities at GRU's Deerhaven site):
  - 50 MW net power purchase agreement (PPA)
  - 50 MW net GRU financed and owned (engineer, procure, and construct [EPC])
  - 58 MW gross PPA with auxiliary power purchase
  - 58 MW gross GRU EPC with auxiliary power purchase
- Nacogdoches (all now American Renewables):
  - PPA for 50 percent of 100 MW net facility at Deerhaven site
  - PPA for 100 percent of 100 MW net facility at an alternative (undisclosed) site
  - PPA for 100 percent of 100 MW net facility at Deerhaven
- Sterling Planet, Inc
  - PPA for 30 MW net facility at Deerhaven

Q. What were the results of GRU's evaluation of the 8 binding proposal options?

A. GRU's evaluation team determined that the 100 MW PPA with American Renewables (which is the PPA with GREC LLC) for 100 percent of the output from a biomass facility at Deerhaven was the best long-term option for GRU.

Final results and recommendations were presented to the City Commission at open meetings on April 28 and May 12, 2008. At the May 12, 2008 meeting, the City Commission voted unanimously to authorize GRU to negotiate a PPA with GREC LLC for 100 percent of the output of a 100 MW net biomass facility to be constructed and operated by GREC LLC at the Deerhaven site.

Q. Has the FRCC reviewed the GREC biomass facility with respect to the Peninsular Florida bulk electric transmission system?

A. Yes. The GREC facility will be interconnected to the existing GRU system. The FRCC Transmission Working Group (TWG) and Stability Working Group (SWG) evaluated the proposed interconnection and determined that the proposed interconnection of the GREC facility to serve GRU's load is reliable, adequate, and does not adversely impact the FRCC Region.

The findings of the TWG and SWG indicated that the transmission system remained within all required thermal and voltage limits; all fault currents remained within the capability limits of all circuit breakers; and the regional system was stable with controlled load loss as allowed by NERC Reliability Standards. The FRCC Planning Committee approved the interconnection of the GREC facility on September 8, 2009. Exhibit No. __ [RDB-3] presents a copy of the FRCC's letter approving the interconnection of the GREC facility.

Q. Does this conclude your testimony?

A. Yes.

Richard D. Bachmeier
301 S.E. 4th Avenue, Gainesville, FL 32610
Office: (352) 393-1284 Email: bachmeierrd@gru.com

EXPERTISE

- Utility Resource Planning
- Environmental Economics and Policy
- Risk Management
- Utility Regulation, Policy, and Ratemaking
- Financial Modeling and Analysis
- Product Development and Pricing

EXPERIENCE

GAINESVILLE REGIONAL UTILITIES (GRU). GAINESVILLE, FLORIDA. 2007 – PRESENT

Electric System Planning Director, GRU Strategic Planning

- Responsibilities include:
  - Planning and execution of GRU's long-term electric supply strategy
  - Oversight of GRU's long-range production cost projections
  - Structuring and pricing long-term wholesale power contracts
  - Coordinating GRU's NERC Reliability Compliance program
- Authored Request for Proposals (RFP) and developed evaluation methodology for biomass generation project.
- Participated in successful contract negotiations for the Gainesville Renewable Energy Center biomass facility.

ORLANDO UTILITIES COMMISSION (OUC). ORLANDO, FLORIDA. 2003 – 2007

Planning Analyst, OUC Power Marketing – 2005 to 2007

- Developed electricity production cost projections for OUC's long-term supply planning, retail fuel rates, and wholesale power contracts.
- Implemented OUC's long-term planning version of GenTrader, a utility planning optimization model developed by Power Costs, Inc.
- Developed OUC's Standard Offer Contract for capacity and energy purchases from Renewable Energy Facilities.
- Member of the Florida Municipal Power Pool Planning Committee.

Senior Retail Pricing Coordinator, OUC Customer Connection, Commercial Markets – 2003 to 2005

- Developed electric cost-of-service studies and rate design for OUC's regulated retail customers.
- Developed pricing and business plans for new competitive retail products and business ventures.
- Performed financial analyses and contributed to business plan for OUC's Retail Renewable Energy product.

TXU ENERGY. DALLAS, TEXAS. 2002 – 2003

Manager of Product Structuring, Retail Commodity Management

- Facilitated transactions among TXU Energy's marketing, sales, and trading groups.
- Produced financial and market analyses for out-of-territory customer acquisitions.
- Developed competitive retail energy products consistent with TXU Energy's risk profile.

ENRON CORPORATION. HOUSTON, TEXAS. 1997 – 2001

Director, Utility Risk Management

- Supervised teams responsible for managing risk in energy markets throughout the United States.
- Developed and implemented hedging strategies for fuel, commodity, and regulated elements of the Enron retail energy portfolio.
- Created and implemented a system for producing Enron's daily retail electric position reports.
- Developed models to generate and manage forward price curves for utility tariffs.
- Represented Enron in electric deregulation proceedings in Texas, New York, Nevada, and Arizona.

PUBLIC UTILITY COMMISSION OF TEXAS. AUSTIN, TEXAS. 1985 – 1997

Assistant Director, Competitive Issues Division

- Supervised Commission staff in the areas of utility load forecasting and resource planning, environmental issues, and energy and telecommunications pricing and policy.
- Testified as an expert witness in proceedings before the Commission and the Texas State Legislature.
- Headed task force that developed the Commission's Integrated Resource Planning policy on the valuation of environmental externalities for power plant certification and operation; authored report on findings and recommendations.
- Reviewed and provided recommendations on energy industry legislation proposed by the Texas State Legislature.
- Authored research reports and working papers on energy forecasting, conservation, and environmental policy.

UNIVERSITY OF TEXAS AT AUSTIN. AUSTIN, TEXAS. 1982 – 1985

Instructor, Department of Economics

- Instructor of university level microeconomics and macroeconomics courses.
- Developed and administered lectures and examinations; assigned final grades.

EDUCATION

PH.D. CANDIDATE (ABD) - ECONOMICS

University of Texas at Austin. Austin, Texas.

- Completed all coursework and examination requirements for the Ph.D.
- Coursework included graduate level microeconomics, macroeconomics, and econometrics.

MASTER OF APPLIED GEOGRAPHY

Texas State University - San Marcos (formerly Southwest Texas State University). San Marcos, Texas.

- Major: Resource and Environmental Studies
- Directed Research: "Spatial Variation in Electric Utility Customer Valuation of Environmental Externalities in Texas."
- Coursework included environmental planning and regulation, quantitative methods and research design, air quality management, land use planning, computer cartography, and Geographic Information Systems (GIS).

BACHELOR OF ARTS - ECONOMICS

University of North Dakota. Grand Forks, North Dakota.

BACHELOR OF SCIENCE - MATHEMATICS

University of North Dakota. Grand Forks, North Dakota.

EXPERT WITNESS TESTIMONY

Filed In Regulatory Proceedings at the Public Utility Commission of Texas:

- Docket No. 14965, SOAH Docket No. 473-95-1563, Application of Central Power and Light Company for Authority to Change Rates, May and August 1996.
- Docket No. 14435, SOAH Docket No. 473-95-1206, Application of Southwestern Electric Power Company for Approval of Agreement for Electric Service to Eastman Chemical Company, November 1995.
- Docket No. 13575, Application of Texas Utilities Electric Company for Approval of Notices of Intent, February 1995.
- Docket No. 12820, Petition of the General Counsel for an Inquiry into the Reasonableness of the Rates and Services of Central Power and Light Company, October 1994.
- Docket No. 12700, Application of El Paso Electric Company for Authority to Change Rates and of Central and South West Corporation and El Paso Electric for Approval of Acquisition, June 1994.
- Docket No. 12138, Notice of Intent of Houston Lighting & Power Company for a Certificate of Convenience and Necessity for Advanced Gas Turbine Projects, September 1993.
- Docket No. 11735, Application of Texas Utilities Electric Company for Authority to Change Rates, July 1993.
- Docket No. 11520, Petition of the General Counsel for an Inquiry into the Reasonableness of the Rates and Services of Southwestern Public Service Company, July 1993.
- Docket No. 11292, Application of Entergy Corporation and Gulf States Utilities Company for Sale, Transfer, or Merger, January 1993.
- Docket No. 11000, Application of Houston Lighting & Power Company for a Certificate of Convenience and Necessity for the DuPont Project, October 1992.
- Docket No. 10894, Application of Gulf States Utilities Company to Reconcile Fuel Costs, Establish New Fixed Fuel Factor and Recover Its Under-Recovered Fuel Expense, August 1992.
- Docket No. 10883, Application of Brazos Electric Power Cooperative, Inc. for a Certificate of Convenience and Necessity for Proposed Generating Facilities, July 1992.
- Docket No. 10400, Application of Texas Utilities Electric Company for Approval of Its Notice of Intent, August 1991.
- Docket No. 10059, Notice of Intent by Brazos Electric Power Cooperative, Inc. to Apply for Certificate of Convenience and Necessity for Proposed Generating Facilities, May 1991.
- Docket No. 9850, Application of Houston Lighting and Power Company for Authority to Change Rates, February 1991.
- Docket No. 9491, Application of Texas-New Mexico Power Company for Authority to Change Rates, July 1990.
- Docket No. 9165, Application of El Paso Electric Company for Authority to Change Rates, February 1990.
- Docket No. 9119, Appeal of the Office of Public Utility Counsel of the City of Kerrville Municipal Utility Rate Action, August 1990.
- Docket No. 8868, Application of Brazos Electric Power Cooperative, Inc. to Change (Reduce) Rates, September 1989.
- Docket No. 8702, Application of Gulf States Utilities for Authority to Change Rates, July 1989.
- Docket No. 8425, Application of Houston Lighting and Power Company for Authority to Change Rates, May 1989.

Testimony Before the Texas Legislature:

- Testified as a resource witness before the Texas State House of Representatives Energy Resources Interim Committee on Environmental Externalities, February 21, 1996.

RESEARCH PAPERS AND PUBLICATIONS

- "Spatial Variation in Electric Utility Customer Valuation of Environmental Externalities in Texas." Directed Research for completion of Master's degree, Texas State University-San Marcos, December 1996.
- "Public Participation as an Alternative to Monetization of Environmental Externalities in Electric Utility Resource Selection." Public Utility Commission of Texas Working Paper, September 1995.
- "Report of the Integrated Resource Planning Team on Externalities." Team leader and principal author of Public Utility Commission of Texas Report, January 1994.
- "A Conditional Demand Analysis of Residential Appliance Use in the Southwest U.S.," with Michael D. Robinson. Public Utility Commission of Texas Working Paper, February 1988. Presented for the program of the Southwestern Society of Economists, March 2-5, 1988 in San Antonio, TX.
- "Impacts of Texas-New Mexico Power's Conservation Information Programs," with Michael D. Robinson and Jeffrey I. Rosenblum. Published in EPRI EM-5452, *Proceedings Third National Conference on Utility Demand-Side Management Programs: Strategies in Transition*, June 16-18, 1987 in Houston, TX.
- "A Texas Study of the Effects of the National Appliance Energy Conservation Act of 1987." Public Utility Commission of Texas Working Paper, November 1986. Also published in the proceedings of *The Fourth Annual Symposium on Improving Energy Efficiency in Hot and Humid Climates*, September 15-16, 1987 in Houston, TX.
- "An Eight-Zone REEPS Model of the State of Texas with Conservation Analysis." Public Utility Commission of Texas Working Paper, April 1986.

Initial GRU Evaluation Staff Recommendations and Final Gainesville City Commission Approved Factor Weights for Binding Responses to GRU Biomass RFP		
	Weighted Percentage	
Criteria / Factor	**Initial GRU Recommendation**	**Final City Commission Approved**
(1) Environmental: Environmental Attributes Consistent with the Gainesville Community	**31.00**	**30.00**
Environmental Emissions	10.00	10.00
Project Commitment to Sustainable Forest Resource Management	8.00	7.00
By-product/Waste Production and Disposition	8.00	8.00
Project Site Requirements	5.00	5.00
(2) Economics: Cost Effective Renewable Capacity and/or Energy Benefits	**34.00**	**37.00**
Project All-in Production Cost	25.00	25.00
Project Variable Production Costs (Scored in the Final City Commission Approved version as a function of the proposed facility's Full Load Heat Rate)	0.00	5.00
Anticipated Project In-Service Date and/or Energy Delivery	4.00	4.00
Local Economic Impact	5.00	3.00
(3) Risk & Reliability: Enhanced and Reliable Energy Supply	**35.00**	**33.00**
Proposed Contractual Terms and Conditions	10.00	10.00
Technology Readiness and Project Reliability	5.00	5.00
Fuel Requirements and Sources	5.00	3.00
Project Size and Design	5.00	5.00
Experience and Resources of Project Developer/Sponsor	5.00	5.00
Proposer's Financial Strength	5.00	5.00
Grand Total	**100.00**	**100.00**
Note: Each of the above Factors was given a raw numerical score from 1 - 5.		

FLORIDA RELIABILITY COORDINATING COUNCIL, INC.
1408 N. WESTSHORE BLVD., SUITE 1002
TAMPA, FLORIDA 33607-4512
PHONE 813.289.5644 • FAX 813.289.5646
WWW.FRCC.COM

September 11, 2009

Mr. Robert E. Hunzinger
General Manager
Gainesville Regional Utility
P.O. BOX 147117
Gainesville, Florida 32614-7117

Re: FRCC Review of the Gainesville Renewable Energy Center proposed interconnection and integration

Mr. Robert E. Hunzinger:

Florida Reliability Coordinating Council's (FRCC) Transmission Working Group (TWG) and Stability Working Group (SWG) have evaluated the proposed interconnection and integration of the Gainesville Renewable Energy Center (GREC) to serve Gainesville Regional Utilities' (GRU) native load. Based upon the information provided by GRU, the TWG and SWG have determined that the proposed interconnection and integration of the GREC is reliable, adequate and does not adversely impact the transmission system within the FRCC.

GREC is a woody waste biomass fuelled facility with a net output of 116 MW located on the site of GRU's existing Deerhaven plant in Alachua County, Florida. GREC will be interconnected to GRU's 138kV looped transmission system and is scheduled to be in-service by July 1, 2013.

The TWG reviewed the results of the steady state single contingency analysis. The results did not identify any single (Category B) contingency event potentially causing limitations within the FRCC.

In addition to the steady state analysis, the SWG reviewed the dynamic simulations showing a stable response at peak load levels for normally cleared and delayed cleared three-phase faults in the vicinity of GREC. The results indicate that there are no grid stability concerns with the addition of the GREC.

A review of the short circuit analysis has shown that there are no short circuit concerns with the addition of the GREC.

Based upon the above review and analysis conducted by the TWG and SWG, the FRCC Planning Committee has determined that the proposed interconnection and

integration of the GREC to serve GRU's native load is reliable, adequate and does not adversely impact the reliability of FRCC transmission system.

Sincerely,

Vicente Ordax

Vicente Ordax, Jr., P.E.
Manager of Planning

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

DIRECT TESTIMONY OF JOSHUA H. LEVINE

ON BEHALF OF

GAINESVILLE REGIONAL UTILITIES AND

GAINESVILLE RENEWABLE ENERGY CENTER, LLC

DOCKET NO. _____

SEPTEMBER 18, 2009

Q. Please state your name and business address.

A. My name is Josh Levine. My business address is 75 Arlington Street, Fifth Floor, Boston, MA 02116.

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

A. I am employed by American Renewables, LLC (American Renewables) as Director of Project Development.

Q. Please describe your responsibilities in that position.

A. As Director of Project Development, I oversee all American Renewables' biomass project developments in Florida. I am the project manager and primary developer on the Gainesville Renewable Energy Center (GREC) biomass project, and I am involved in business development activities for American Renewables ranging from identifying new project opportunities to partnership development and acquisition identification.

Q. Please state your educational background and professional experience.

A. I received my Bachelor of Arts in Economics degree from Connecticut College, and I have a Master of Environmental Management degree from the Yale University School of Forestry and Environmental Studies and a Master of Business Administration degree from the Yale University School of Management.

Prior to joining American Renewables, I held positions researching impacts to natural resources from natural and man-made disasters, environmental management consulting, energy analysis, and energy project development.

Q. What is the purpose of your testimony in this proceeding?

A. The purpose of my testimony in this proceeding is to discuss the proposed GREC biomass project. I will discuss the developers of the proposed project, provide a description of the major components of the facility, discuss the fuel handling and supply for the facility, and provide a summary of the project schedule. I will also discuss the ability of the project developers to finance the proposed GREC biomass project.

Q. Are you sponsoring any exhibits to your testimony?

A. Yes. Exhibit No. __ [JHL-1] is a copy of my resume.

Q. Are you sponsoring any sections of Exhibit No. __ [GREC-1], the Gainesville Renewable Energy Center Need for Power Application?

A. Yes. I am sponsoring Section 9.0 (with the exception of Sections 9.3 and 9.5) and Sections 17.0 and 17.1, all of which were prepared either by me or under my direct supervision.

Q. What is the relationship between American Renewables and GREC LLC?

A. American Renewables is the sole owner of GREC LLC.

Q. Has GREC LLC executed a power purchase agreement (PPA) with Gainesville Regional Utilities (GRU)?

A. Yes. GREC LLC executed a PPA with GRU on April 29, 2009, which provides GRU with the full output of the facility along with all of the associated environmental attributes such as renewable energy credits. The Gainesville City Commission approved the PPA on May 7, 2009.

Q. Please describe how the developers of the GREC biomass facility are structured.

A. The GREC facility will be designed, constructed, owned, and operated by GREC LLC, which is a subsidiary of American Renewables, a private renewable power producer. American Renewables is jointly owned by affiliates of BayCorp Holdings, LTD, Energy Management, Inc., and Tyr Energy. These entities are discussed in more detail in Section 9.1 of the GREC Need for Power Application, Exhibit No. __ [GREC-1].

Q. Where will the GREC biomass facility be located?

A. The GREC biomass facility will be located within the confines of GRU's existing Deerhaven site. GREC LLC will lease an approximately 130 acre parcel from the City of Gainesville (doing business as GRU) under a long-term lease agreement.

Q. Will GRU be entitled to all of the output from the proposed GREC biomass facility?

A. Yes. GRU will have title to 100 percent of the plant's output, including all energy and all existing and future environmental attributes (i.e. renewable energy credits, carbon offsets, etc.).

Q. Please provide a brief overview of the proposed GREC biomass facility.

A. The proposed GREC biomass facility will be nominally rated at 100 MW net (116 MW gross) and will be fueled entirely by clean, woody biomass. Major aspects of the facility include the biomass fuel handling system, the biomass-fired boiler, a condensing steam turbine generator with evaporative cooling towers, and auxiliary support equipment.

The GREC facility will utilize a zero liquid discharge system to eliminate industrial wastewater discharges, in accordance with the Deerhaven site's current restrictions pursuant to its current certification. The facility will be

designed such that, with standard operating and maintenance practices, the GREC biomass facility will provide full service over its 42 year design life.

The GREC biomass facility will utilize a fluidized bed boiler to produce superheated steam. The boiler will be equipped with a bag house to control particulate matter, and an aqueous ammonia injection selective non-catalytic reduction (SNCR) or selective catalytic reduction (SCR) system will be provided to control NO_x emissions. Superheated steam from the boiler will be admitted to a single steam turbine with four extractions for feed water heating. The steam turbine will generate electricity before exhausting axially into the condenser with cooling water provided from the wet evaporative cooling tower.

Electric power will be produced in the steam turbine generator at the nominal generator voltage. The facility will increase the voltage at an on-site substation and transmit the power through aerial transmission lines to the interconnection point with GRU's looped 138 kV transmission system. GRU's transmission system is interconnected with Progress Energy Florida and Florida Power & Light. When the steam turbine generator is off-line, station service power will be served by GRU's system.

Q. Will the GREC biomass facility be capable of running at less than full rated load?

A. Yes. The unit can be operated anywhere between 70 percent to 100 percent of its maximum output in order to meet operational or economic requirements. In

addition, the PPA between GRU and GREC LLC allows GRU the ability to take the unit completely off-line.

Q. Is GREC LLC guaranteeing the availability of the GREC biomass facility?

A. Yes. In the four summer months, the overall guaranteed availability is 95 percent and on an annual basis, it is 90 percent.

Q. Will the GREC biomass facility be capable of burning multiple forms of biomass?

A. Yes. The primary fuels for GREC will be forest residue, mill residue, pre-commercial tree thinnings, used pallets, and urban wood waste which includes woody tree trimmings that are generated by landscaping contractors, power line clearance contractors, and other non-forestry related sources of woody debris. Supplementary fuels could include herbaceous plant matter, agricultural residues, diseased trees, woody storm debris, whole tree chips, and pulpwood chips. The facility is not designed to use any form of treated wood, municipal solid waste, coal, petroleum coke, oil, or tires.

Q. Please discuss how biomass fuel will be handled on-site.

A. The biomass fuel handling system will consist of three truck tippers, two sets of screens and hogs, an automatic stacker/reclaimer system and a manual stacker/reclaimer system. Biomass fuel will be transported in a processed-form (i.e. chipped or ground) to the GREC by truck. This fuel will be transported into and out of on-site storage via a series of conveyors. The GREC will have two

100 percent capacity conveyors leading from the storage piles to the boiler metering bins. From the metering bins, the fuel will be gravity fed into air swept distribution feeders and then blown by combustion air into the boiler.

Q. Has a reliable, long-term supply of fuel been identified for the GREC biomass facility?

A. Yes. GREC LLC has spent significant resources working with the forestry industry and urban wood waste suppliers in north central Florida, sometimes accompanied by GRU staff. GREC LLC is in a position to enter into a number of long term contracts with favorable pricing, with put and call options exceeding 100 percent of the fuel required for the facility.

Q. How will the cost of obtaining fuel for the GREC biomass facility be structured?

A. GREC LLC does not intend to fix the price for 100 percent of the fuel in order to take advantage of opportunity fuels from storms, land development, etc. The cost drivers for forest derived fuel are the grower's premium (i.e., stumpage), diesel fuel, equipment costs, and labor. GREC LLC may be able to extract a tipping fee for some of the fuel, which is credited to the GREC's production cost. Experience around the state suggests that this form of fuel supply is relatively stable with projected cost escalation below CPI and will provide an excellent hedge against gas price volatility. GRU will have full audit review of all aspects of fuel procurement and cost.

Q. When will the GREC biomass facility begin commercial operation?

A. The GREC biomass facility is planned for commercial operation beginning December 1, 2013. Commercial operation prior to January 1, 2014 allows the GREC project to take advantage of the Renewable Energy Grant contained in H.R. 1 (the American Recovery and Reinvestment Act of 2009) Sec. 1603. The Renewable Energy Grant allows for a reduction in the cost of energy of $8.10/MWh for the entire 30 year term of the PPA.

Q. Will project financing be in place for GREC LLC to support this commercial operation date?

A. Yes. GREC LLC is currently planning on completing project financing by November 30, 2010. Construction of the GREC biomass facility is scheduled to begin December 1, 2010, which allows for 36 months of construction prior to commercial operation of the facility.

Q. How does GREC LLC intend to finance the GREC biomass facility?

A. GREC LLC is planning on pursing a traditional project financing approach involving senior long-term debt and additional equity as necessary. Senior bank debt will be secured by first priority liens on substantially all of the assets and commercial agreements associated with, as well as a pledge of equity in, the GREC biomass facility. Additional equity will flow into the project as needed from both strategic and tax motivated equity investors.

Q. What elements are critical for the successful project financing of the GREC facility?

A. Successful project financing will depend on many factors including: the experience and financial capability of the project developers who will own, operate, and maintain the plant; the strength and quality of the PPA; the credit quality of the PPA counterparty (i.e., GRU); and the experience of construction contractors and the strength and quality of the construction contracts.

Q. Does American Renewables have experience developing and financing energy generation projects?

A. The parent companies of American Renewables have a long and successful track-record of energy and power asset development and operation having successfully developed, financed, and operated over 1,000 MW of energy generation facilities, including biomass-fueled facilities as well as conventional and other renewable energy generation facilities. They also have a pipeline or deployment budget of $2.5 billion for US renewable power plants over the next five years. In addition to the GREC facility, American Renewables is currently developing identical biomass energy facilities in Sacul, Texas and Hamilton County, Florida. For American Renewables' Texas facility, a 20 year PPA has been executed with Austin Energy, a municipally-owned utility. American Renewables is about to close the financing of the Texas facility and construction is anticipated to begin in October 2009.

Q. Does this conclude your testimony?

A. Yes.

JOSHUA H. LEVINE

75 Arlington Street, Fifth Floor
Boston, MA 02116

617.482.6150, x117
jlevine@amrenewables.com

EXPERIENCE

2008-Present **AMERICAN RENEWABLES, LLC. (AR)** **Boston, MA**
Director of Project Development

- Oversee all AR biomass project developments in FL.
- Project manager and primary developer on 100 MW biomass development project in Gainesville, FL; responsibilities include negotiating with utility offtaker and potential biomass fuel suppliers, overseeing permitting efforts, managing community relations, conducting analysis of fuel supply and developing fuel procurement strategy.
- Develop and maintain financial pro forma models to assess project viability and return potential.
- Involved in business development activities for AR ranging from identifying new project opportunities to partnership development and acquisition identification.

2005-2008 **TAMARACK ENERGY, INC. (TEI)** **Essex, CT / Manchester, NH**
Project Developer

- Created business plan and prepared initial financial projections for TEI; presented company concept to Haley & Aldrich Board of Directors.
- Constructed financial pro forma models to assess project viability and return potential for solar and biomass energy development projects; refined existing pro forma for wind energy projects.
- Served as project manager and primary developer on 70 MW biomass development opportunity in Northern NH; responsibilities included identifying strategic site location, negotiating with land owners, managing community relations, conducting analysis of fuel supply, electrical transmission and permitting requirements.
- Managed project finance activities for 30 MW biomass project in CT, 70 MW biomass project in FL and 50 MW biomass project in MA; responsibilities include creating/managing financial model, working with project equity sponsors, developing relationships with potential debt providers, participating in power purchase agreement negotiations.
- Assisted in developing wind energy projects in Upstate NY and Northern New England

2003-2005 **HALEY & ALDRICH, INC.** **East Hartford, CT**
Energy Analyst – *Energy & Utilities practice area*

2005
- Conducted market analysis on renewable energy sector which ultimately served as basis for formation of Tamarack Energy, a start-up renewable energy development company.

Environmental Management Consultant – *Infrastructure /Industrial Environmental practice areas*

Summer 2004
- Researched new business opportunities in U.S. Energy Sector; developed and presented a business plan to CEO and SVP of Marketing identifying specialty niches for future investments.
- Drafted successful proposal of $1-3MM contract to conduct Federal Energy Regulatory Commission (FERC) permitting and environmental support of client's 83-mile natural gas pipeline in NY.

Summer 2003
- Reviewed and edited private client's Environmental Impact Assessment (EIA) for proposed $650MM liquid natural gas re-gasification facility in Bahamas and associated pipeline to Broward County, FL.
- Developed responses for Bahamas Environment Science and Technology Commission to resolve issues raised during review of EIA.
- Coordinated and participated in town meetings held in Bahamas with Government Ministries, Affected Parties, and Energy Project Developers.

JOSHUA H. LEVINE (CONTINUED)

EXPERIENCE (CONTINUED)

1998-2002 **INDUSTRIAL ECONOMICS, INC. (IEc)** **Cambridge, MA**

Research Analyst *- Natural Resource Damage Assessment and Litigation Support practice areas*

- Analyzed natural resource damages for National Oceanic & Atmospheric Administration; provided litigation support to U.S. Department of Justice (DOJ).
- Provided UNCC secretariat with evaluations on technical appropriateness and cost reasonableness of over 30 environmental damage claims seeking over $300MM from Iraq's invasion and occupation of Kuwait.
- Analyzed defense expert's scientific reports related to fate and transport of DDT/PCB in sediments, leading to awarding of $73MM (largest payment for natural resource damages since Exxon Valdez case).
- Developed timber usage models and analyzed expert witness reports for a $1B contract litigation case against the United States by long-term timber contract holder.

EDUCATION

YALE UNIVERSITY, School of Management **New Haven, CT**

Master of Business Administration (MBA), 2005.

- Focus in Strategy and Economics; Academic Distinction (Top 10%) in six classes.

YALE UNIVERSITY, School of Forestry and Environmental Studies **New Haven, CT**

Master of Environmental Management (MEM), 2005.

- Concentration in Policy, Economics, and Law.

CONNECTICUT COLLEGE **New London, CT**

Bachelor of Arts (BA), Cum Laude, Economics, 1995.

- Distinction in Economics; National Political Science Honor Society.
- London School of Economics (Study Abroad – Spring 1994)

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

In re: Joint petition to determine need for the Gainesville Renewable Energy Center in Alachua County by Gainesville Regional Utilities and Gainesville Renewable Energy Center, LLC.	Docket No. _____ Filed: September 18, 2009

NOTICE OF INTENT TO REQUEST CONFIDENTIAL CLASSIFICATION

Gainesville Renewable Energy Center, LLC (GREC LLC), pursuant to Section 366.093, Florida Statutes, and Rule 25-22.006, Florida Administrative Code (FAC), files this Notice of Intent to Request Confidential Classification of certain exhibits to be filed with the testimony of Bradley E. Kushner. These exhibits contain proprietary confidential business information relating to GREC LLC's competitive interests, the release of which would harm GREC LLC's competitive business interests. For these reasons, GREC LLC requests that the Commission afford the exhibits referenced in the testimony of Bradley E. Kushner as Confidential Exhibit No. __ [BEK-2] through Confidential Exhibit No. __ [BEK-6] confidential classification. We are providing a CD containing the confidential information in question, which is attached as Exhibit A.

Pursuant to Rule 25-22.006(3)(a)(1) FAC, GREC LLC will file its Request for Confidential Classification for all confidential information contained therein within 21 days of filing this request.

RESPECTFULLY SUBMITTED this 18th day of September, 2009.

Young van Assenderp, P.A.

By: _____

Roy C. Young
Florida Bar No. 098428
Schef Wright
Florida Bar No. 966721
225 South Adams Street- Suite 200
P.O. Box 1833
Tallahassee, Florida 32302-1833
(850) 222-7206
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Attorneys for GRU and GREC LLC

CERTIFICATE OF SERVICE

I hereby certify that a copy of the foregoing Petition for Determination of Need for An Electrical Power Plant in Alachua County was served upon the following by hand delivery on this 18th day of September, 2009:

Jennifer Brubaker, Esq.
Supervising Attorney
Office of General Counsel
Florida Public Service Commission
2540 Shumard Oak Blvd.
Tallahassee, FL 32399-0850

_____
Attorney

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

DIRECT TESTIMONY OF BRADLEY E. KUSHNER

ON BEHALF OF

GAINESVILLE REGIONAL UTILITIES AND

GAINESVILLE RENEWABLE ENERGY CENTER, LLC

DOCKET NO. _____

SEPTEMBER 18, 2009

Q. Please state your name and business address.

A. My name is Bradley E. Kushner. My business mailing address is 11401 Lamar Avenue, Overland Park, Kansas 66211.

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

A. I am employed by Black & Veatch Corporation where I am currently a Manager.

Q. Please describe your responsibilities in that position.

A. I am responsible for the management of various projects for utility and non-utility clients. These projects include production cost modeling associated with power system expansion planning, feasibility studies, and demand-side management (DSM) evaluations. I also have involvement in the issuance of requests for proposals (RFPs) and evaluation of proposals received in response to RFPs.

Q. Please describe Black & Veatch.

A. Black & Veatch Corporation has provided comprehensive engineering, consulting, and management services to utility, industrial, and governmental clients since 1915. Black & Veatch specializes in engineering, consulting, and construction associated with utility services including electric, gas, water, wastewater, telecommunications, and waste disposal. Service engagements consist principally of investigations and reports, design and construction, feasibility analyses, rate and financial reports, appraisals, reports on operations, management studies, and general consulting services. Present engagements include work throughout the United States and numerous foreign countries.

Q. Please state your educational background and professional experience.

A. I received my Bachelors of Science in Mechanical Engineering from the University of Missouri – Columbia in 2000. I have more than 9 years of experience in the engineering and consulting industry. I have experience in the development of Need for Power Applications, integrated resource plans, Ten Year Site Plans, demand-side management (DSM) plans, and other capacity planning studies for clients throughout the United States. Utilities in Florida besides Gainesville Regional Utilities (GRU) for which I have worked include Florida Municipal Power Agency, JEA, Kissimmee Utility Authority, Orlando Utilities Commission, Lakeland Electric, Reedy Creek Improvement District, Tampa Electric Company, and the City of Tallahassee. I have performed production cost modeling and economic analysis, and otherwise participated in five previous Need for Power Applications that have been filed on behalf of

Florida utilities and approved by the Florida Public Service Commission (Commission). I have also testified before the Commission in previous Need for Power and other Commission proceedings.

Q. What is the purpose of your testimony in this proceeding?

A. The purpose of my testimony is to discuss the fuel and carbon dioxide (CO_2) emissions allowance price forecasts and supply-side alternatives used in the economic analysis of the proposed Gainesville Renewable Energy Center (GREC) biomass facility. I will also discuss the methodology utilized in the economic evaluations, as well as the results of the economic evaluations that were performed.

Q. Have you prepared any exhibits to your testimony?

A. Yes. I am sponsoring the following exhibits:

- Exhibit No. __[BEK-1], which is a copy of my resume;
- Confidential Exhibit No. __[BEK-2], which summarizes the economics of the GRU power purchase agreement (PPA) with GREC LLC compared to supply-side alternatives. Table 2 of this exhibit is identical to Table 12-1 of the GREC Need for Power Application, Exhibit No. __ [GREC-1].
- Confidential Exhibit No. __ [BEK-3], which summarizes the economics of the GRU PPA with GREC LLC compared to supply-side alternatives at higher capacity factors than represented in Confidential Exhibit No. __ [BEK-2].

- Confidential Exhibit No. __ [BEK-4], which compares the economics of the GRU PPA with GREC LLC to supply-side alternatives across a range of capacity factors.
- Confidential Exhibit No. __ [BEK-5], which summarizes the economics of the GRU PPA with GREC LLC compared to supply-side alternatives over a shorter evaluation period than represented in Confidential Exhibit No. __ [BEK-2].
- Confidential Exhibit No. __ [BEK-6], which presents the results of all of the economic evaluations represented in Confidential Exhibit No. __ [BEK-2] through Confidential Exhibit No. __ [BEK-5].

Q. Are you sponsoring any sections of Exhibit No. __ [GREC-1], the Gainesville Renewable Energy Center Need for Power Application?

A. Yes. I am sponsoring Sections 7.0, 10.0, 11.0, and 12.0, all of which were prepared by me or under my direct supervision.

Q. Please describe the basis for the fuel price projections used in the GREC Need for Power Application, Exhibit No. __ [GREC-1].

A. The fuel price projections for natural gas and coal used for the economic evaluations presented in Exhibit No. __ [GREC-1] were based on those presented in the April 2009 release of the US Energy Information Administration's (EIA) Annual Energy Outlook 2009 (AEO2009). The April 2009 release of the AEO2009 was developed by the EIA as an update to its

March 2009 Reference Case to reflect provisions of the American Recovery and Reinvestment Act (ARRA) as well as other changes to the economic outlook.

The AEO2009 presents projections of energy supply, demand, and prices through the year 2030. The projections presented within the AEO2009 are based on results from the EIA's National Energy Modeling System (NEMS). NEMS is a computer-based, energy-economy modeling system of US energy markets and projects the production, imports, conversion, consumption, and prices of energy, subject to a variety of assumptions related to macroeconomic and financial factors, world energy markets, resource availability and costs, behavioral and technological choice criteria, technology characteristics, and demographics.

Q. How are state and federal legislation and regulations reflected in AEO2009?

A. Analyses developed by the EIA are required to be policy neutral. Therefore, the projections in the AEO2009 are based on federal and state laws and regulations in effect as of November 2008, with the exception of reflecting the provisions of ARRA discussed previously. As stated in the AEO2009, the potential impacts of pending or proposed legislation, regulations, and standards – and sections of existing legislation that require implementing regulations or funds that have not been appropriated – are not reflected in the projections.

Q. Does AEO2009 provide projections of fuel prices for fuel delivered to the Florida region?

A. Yes. The April 2009 version of the AEO2009 Reference Case includes fuel price projections for delivered fuel to numerous geographic areas throughout the US. The natural gas and coal price projections used in the economic evaluations presented in Exhibit No. __ [GREC-1] were based on AEO2009 price projections for natural gas and coal delivered to the Florida Reliability Coordinating Council (FRCC).

The Reference Case fuel price projections considered throughout Exhibit No. __ [GREC-1] reflect the FRCC-specific fuel price projections for use in the electric power sector.

Q. Were any adjustments made to the AEO2009 FRCC-specific Reference Case fuel price projections?

A. Yes. The AEO2009 fuel price projections were developed in real 2007 dollars. For purposes of the economic evaluations presented in Exhibit No. __[GREC-1], these projections were converted to nominal dollars using the general inflation rate of 2.5 percent discussed in the testimony of Mr. Ed Regan.

Q. Why were the FRCC-specific natural gas price projections used in your analysis?

A. The FRCC-specific natural gas price projections were selected for use because they are consistent with the overall assumptions used throughout the AEO2009. Analysis of the AEO2009 projections of prices for natural gas delivered to electric utilities compared to the AEO2009 average wellhead natural gas price

projections indicates that the difference between the two sets of projections is in line with GRU's observed historical transportation costs. Differences between the transportation costs embedded in the FRCC-specific natural gas price projections and those that may actually be realized by GRU are easily captured by the fuel price sensitivities performed as part of my analyses.

Q. Did the economic analyses consider the costs associated with CO_2 emissions allowances?

A. Yes. Several cases considered in the economic analyses reflected hypothetical sensitivity evaluations in which emissions of CO_2 would be regulated in the US.

Q. How were the emissions prices for CO_2 derived, given that CO_2 emissions are not currently regulated?

A. Although CO_2 emissions are not currently regulated, the EIA developed an analysis entitled *Energy Market and Economic Impacts of H.R. 2454, the American Clean Energy and Security Act of 2009.* The EIA's analysis of H.R. 2454 (which EIA refers to as ACESA [American Clean Energy and Security Act]) includes 11 different cases related to the proposed H.R. 2454. Sensitivity evaluations presented in the GREC Need for Power Application reflect two of these 11 cases – the *ACESA Basic Case* and the *ACESA No International/Limited Case.* In general, the CO_2 emissions allowance prices and natural gas prices are higher in the ACESA No International/Limited Case than in the ACESA Basic Case.

Q. What supply-side alternatives was GRU's PPA with GREC LLC compared to?

A. Supply side alternatives included the following:

- General Electric (GE) LMS100 Simple Cycle
- GE 1x1 7EA Combined Cycle
- 125 MW (net) Pulverized Coal
- 125 MW (net) Pulverized Coal with Carbon Capture and Sequestration (CCS)

Q. Why were these supply-side alternatives selected for comparison to the GREC LLC PPA?

A. The supply-side alternatives were selected as they represent alternatives of similar size to the GREC LLC PPA, and encompass generating alternatives that are designed for peaking, intermediate, and baseload operation.

Q. Why were two pulverized coal alternatives considered?

A. Currently, it is uncertain whether a new coal unit of any type could be permitted in Florida, and certainly, recent experience has indicated that new coal units cannot be permitted in Florida. In spite of this uncertainty, my analyses included a pulverized coal unit for purposes of evaluating its cost compared to the GREC LLC PPA.

Because of the uncertainty relating to permitting requirements, two versions of the pulverized coal unit were considered. The first is the 125 MW pulverized

coal unit with emissions controls to reduce the emission of sulfur dioxide (SO_2), nitrogen oxides (NO_x), mercury (Hg), and particulates to the lowest reasonable levels. The second version is the same 125 MW coal unit with CCS. It should be noted that the addition of CCS reduces the net output from 125 MW to 94 MW, while increasing the net plant heat rate of the units by approximately 30 percent.

Q. How were the economic analyses conducted?

A. The economics of GRU's PPA with GREC LLC were compared to the cost of the supply-side alternatives using a levelized cost of energy (LCOE) approach. The LCOE provides for a calculation of the all-in (capital, fixed and variable operating and maintenance [O&M], and fuel costs) levelized cents/kWh cost of alternatives based on assumed capacity factors and the cost and performance characteristics of the alternatives. The LCOE analyses of the GREC LLC PPA assume that the GREC project receives the Renewable Energy Grants as discussed in the testimony of Mr. Edward Regan.

Q. What capacity factors were assumed in your analyses?

A. The simple cycle LMS100 was assumed to operate as a peaking unit at a 10 percent capacity factor, while the 1x1 7EA combined cycle was assumed to operate as an intermediate unit at a 65 percent capacity factor. The pulverized coal alternatives were assumed to operate as baseload units at an 85 percent capacity factor. The GREC LLC PPA was modeled as operating at its guaranteed annual availability of 90 percent.

Q. How many years were used in the LCOE calculations?

A. All alternatives were evaluated over the term 2014 through 2043 period, which is consistent with the 30 year term of GRU's PPA with GREC LLC.

Q. Why were levelized costs calculated?

A. The process of levelization produces a cents/kWh cost for each alternative that has the same present value as the stream of variable, year-by-year costs. Alternatives can, therefore, be compared to one another based on the levelized costs.

Q. Please describe the cases evaluated in the GREC Need for Power Application, Exhibit No. __ [GREC-1].

A. Seven distinct cases were considered in the economic evaluations presented in the GREC Need for Power Application (Exhibit No. __ [GREC-1]). The seven cases are described as follows:

- The *No CO_2* case considers the reference case fuel price projections as well as the reference case generating unit alternative cost and performance estimates.
- The *No CO_2 – High Fuel Price* case considers high fuel price projections summarized as well as the reference case generating unit alternative cost and performance estimates.

- The *No CO_2 – Low Fuel Price* case considers low fuel price projections as well as the reference case generating unit alternative cost and performance estimates.
- The *No CO_2 – High Capital Cost* case considers the reference case fuel price projections as well as a 20 percent increase to the reference case generating unit alternative capital cost estimates.
- The *No CO_2 – Low Capital Cost* case considers the reference case fuel price projections as well a 20 percent decrease to the reference case generating unit alternative capital cost estimates.
- The *HR 2454 Basic CO_2* case considers the CO_2 emissions allowance and fuel price projections corresponding to the EIA's analysis of HR 2454 for the *Basic* case as well as the reference case generating unit alternative cost and performance estimates.
- The *HR 2454 High CO_2* case considers the CO_2 emissions allowance and fuel price projections corresponding to the EIA's analysis of HR 2454 for the *Limited Technology/No International Offsets* case as well as the reference case generating unit alternative cost and performance estimates.

Q. What were the results of the economic analysis?

A. The LCOE of the GREC LLC PPA was compared to the LCOE of the four supply-side alternatives for each of the seven cases discussed previously in my testimony. Overall, the LCOE of the GREC LLC PPA was compared to a total of 28 combinations of cases and alternatives (seven cases times four supply-side

alternatives equals 28 comparisons). The GREC LLC PPA is lower in cost than the natural gas and coal alternatives for 23 of the 28 comparisons.

The LCOE of the GREC LLC PPA is lower than all of the natural gas cases. The LCOE of the GREC LLC PPA is higher than that of the coal alternative without CCS only for cases that do not consider regulation of CO_2 emissions. As discussed previously, there is uncertainty regarding whether a new coal unit of any type could be permitted in the State of Florida. The LCOE of the GREC LLC PPA is lower than that of the coal alternative including CCS for all cases considered, and is also lower in cost than the coal alternative that does not include CCS for cases in which CO_2 emissions are regulated.

The table presented in Confidential Exhibit No. __ [BEK-2] summarizes the results of the 30 year LCOE analyses using the capacity factors for the various alternatives discussed previously in my testimony.

Q. How would the economics of the GREC LLC PPA compared to the supply-side alternatives be affected by changes to your assumptions regarding capacity factors?

A. LCOE analyses have been performed for each of the alternatives for all cases assuming a 90 percent capacity factor (the same assumption as used for the LCOE analysis of the GREC LLC PPA, which has a guaranteed annual availability of 90 percent). The results, which are summarized in Confidential

Exhibit No. __ [BEK-3], show that the GREC LLC PPA is lower in cost than the natural gas and coal alternatives for 22 of the 28 comparisons.

LCOE analyses have also been performed across a range of capacity factors for all supply-side alternatives for the No CO_2 case. Confidential Exhibit No. __ [BEK-4] presents a graph showing the LCOE of the supply-side alternatives, including the GREC LLC PPA, versus capacity factors ranging from 10 to 90 percent, in 10 percent increments. Analysis of the graph shows that the LCOE of the GREC LLC PPA is lower than all of the supply-side alternatives for all capacity factors less than 65 percent. It is only at a capacity factor above approximately 65 percent that the LCOE of the pulverized coal alternative without CCS becomes lower in cost than the GREC LLC PPA.

Q. How would the economics of the GREC LLC PPA compared to the supply-side alternatives be affected by changes to your assumptions regarding the term of your evaluation?

A. LCOE analyses have been performed for each of the alternatives and the GREC LLC PPA for all cases over the first 15 years of the evaluation period. The results, which are summarized in Confidential Exhibit No. __ [BEK-5], show that the GREC LLC PPA is lower in cost than the natural gas and coal alternatives for 18 of the 28 comparisons. The only alternatives that are lower in cost than the GREC LLC PPA over the first 15 years of the evaluation period are the cases that do not consider CO_2 regulation for the combined cycle and coal unit without CCS.

Q. For the No CO_2 Case, at what year does the GREC LLC PPA become lower in cost than the 1x1 7EA combined cycle alternative?

A. The annual cost of energy from the GREC LLC PPA becomes lower in cost than that of the 1x1 7EA combined cycle alternative beginning in 2022, or the ninth year of the analysis. The annual cost of energy from the GREC LLC PPA remains lower in cost than the 1x1 7EA combined cycle alternative for all subsequent years.

Q. How would the economics of the GREC LLC PPA compared to the supply-side alternatives be affected by the project not receiving the Renewable Energy Grants mentioned previously in your testimony?

A. The LCOE of the GREC LLC PPA (evaluated at a 90 percent capacity factor over a 30 year term) would increase by approximately 6 percent if the project does not receive the Renewable Energy Grants. The LCOE of the GREC LLC PPA remains lower in cost than the natural gas and coal alternatives for 22 of the 28 comparisons if Renewable Energy Grants are not considered (assuming the capacity factors for the simple cycle, combined cycle, and pulverized coal alternatives discussed previously and a 30 year term for the LCOE calculations).

Q. Does this conclude your testimony?

A. Yes.

Manager

Utility System Planning, Production Costing, Economic Analysis, and Demand-Side Management

Education
B.S., Mechanical Engineering, University of Missouri – Columbia, 2000

Experience
9 Years

Joined Black & Veatch
2000

Resume of Bradley E. Kushner Black & Veatch

Mr. Kushner is responsible for production costing associated with utility system expansion planning, as well as feasibility studies and economic analysis. He also provides demand-side management evaluation. Mr. Kushner has been involved in the issuance and evaluation of requests for proposals (RFPs) and portfolio evaluations. Mr. Kushner has also presented expert testimony and prepared other experts for testimony related to determination of need proceedings and has also testified under cross examination by intervening parties.

Representative Project Experience

Numeric Conservation Goals Filing, Florida Public Utilities Company, JEA, and Orlando Utilities Commission, Fla.
2009

Mr. Kushner was responsible for coordinating the demand-side management (DSM) cost-effectiveness analysis performed by a third party consultant for Florida Public utilities Company (FPUC), JEA, and Orlando Utilities Commission (OUC). Results of the DSM cost-effectiveness analysis were used as the basis for the proposed numeric conservation goals for each of the three utilities, which were filed with the Florida Public Service Commission (FPSC) as part of a statewide DSM collaborative effort in line with the requirements of Section 366.82, Florida Statutes. My Kushner provided expert direct and rebuttal testimony on behalf of each of the three utilities and was responsible for coordinating responses to nearly 300 discovery (interrogatory and production of documents) requests from the FPSC and intervening parties.

Federal Loan Guarantee Application Support, Confidential Client
2009
Serving in the role of Study Manager, Mr. Kushner provided support to facilitate completion of Part II of the Application to the US Department of Energy's Federal Loan Guarantee Program Office. The Part II Application submittal was structured to be consistent with the requirements set forth in the US Department of Energy solicitation number DE-FOA-0000008. The Part II Application consisted of a detailed project description, technical information related to the proposed project, the proposed project's business plan, and the proposed project's financial plan. Mr. Kushner's responsibilities included interfacing directly with the client and other consultants, working to coordinate the day-to-day activities of other Black & Veatch experts providing inputs for the Application, and drafting various sections of the submittal.

Siting and Capacity Expansion Planning Study, Western Farmers Electric Cooperative, Anadarko, Okla.
2008-2009
Serving in the role of Study Manager, Mr. Kushner provided production costing, economic analysis and various other support to facilitate completion of the

Western Farmers Electric Cooperative (WFEC) Siting and Capacity Expansion Planning Study. The Study considered construction of three different combined cycle technologies at various sites as well as construction of coal fired capacity or purchase of nuclear power. The findings of the Study were presented to WFEC staff and will be presented to the WFEC Board of Directors in March 2009.

Greenland Energy Center Combined Cycle Conversion Need for Power Application, JEA, Jacksonville, Fla.
2008-2009
As Study Manager, Mr. Kushner provided production costing, economic analysis and various other support to facilitate the completion and filing of the Greenland Energy Center Need for Power Application (NFP). His work also included preparation of testimony related to the project to the Florida Public Service Commission (FPSC) as well as responding to interrogatories and production of documents requests throughout the discovery process. The NFP provides a determination of the most cost-effective capacity addition to satisfy forecasted capacity requirements. The analysis considered self-build and purchase-power alternatives, including renewable energy technologies, and demand-side management. The project received approval from the FPSC in February 2009.

Supply-Side Technologies Characterization, Tampa Electric Company, Tampa, Fla.
2007-2009
As Study Manager, Mr. Kushner provided cost and performance estimates for various renewable, conventional and other generating technologies for client consideration in support of its determination of need filing. Technologies considered included approximately 20 renewable technologies, such as biomass, biogas, waste-to-energy, wind, solar, geothermal, hydroelectric and ocean energy; numerous conventional technologies, including simple and combined cycles; and two emerging technologies, both nuclear. Mr. Kushner also considered advanced, energy storage and distributed generation technologies.

Cane Island 4 Need for Power Application, Florida Municipal Power Agency, Orlando, Fla.
2007-2008
As Study Manager, Mr. Kushner provided production costing, economic analysis and various other support to facilitate the completion and filing of the Cane Island 4 Need for Power Application (NFP). His work also included preparation of testimony related to the project to the Florida Public Service Commission (FPSC) as well as responding to interrogatories and production of documents requests throughout the discovery process. The NFP provides a determination of the most cost-effective capacity addition to satisfy forecasted capacity requirements. The analysis considered self-build and purchase-power alternatives, including renewable energy technologies, and demand-side management. The FPSC approved the Cane Island 4 NFP in August 2008.

Valuation of Generating Unit Portfolio, Confidential Client
2008
As Study Manager, Mr. Kushner provided oversight on modeling and evaluation of purchase power contracts related to the Client's portfolio of generation assets throughout North America. The purchase power contracts were modeled to assess a monetary value to be used as guidance for valuation of the overall generation portfolio.

The portfolio of assets and associated purchase power contracts includes more than 50 models. Mr. Kushner was involved in the modeling of the contracts and quality assurance/quality control related to the entire portfolio prior to delivering evaluations to the Client.

Characterization and Selection of Nuclear Generating Technologies, AmerenUE, Missouri
2007-2008
As Project Analysis Engineer, Mr. Kushner provided assistance in the characterization and screening of various nuclear generating technologies for consideration by AmerenUE. The nuclear technology selected for further evaluation will be evaluated as part of the Client's Integrated Resource Plan (IRP) study.

The characterization included consideration of provisions of the Energy Policy Act of 2005 related to new qualifying nuclear plant capacity as well as relative comparisons of competing nuclear generating technologies. Client deliverables included two separate presentations to AmerenUE's Stakeholders.

Power Supply Study, Western Farmers Electric Cooperative, Anadarko, Okla.
2007
Serving in the role of Study Manager, Mr. Kushner provided production costing, economic analysis and various other support to facilitate completion of the Western Farmers Electric Cooperative (WFEC) Power Supply Study. The WFEC Power Supply Study was an update to previous capacity planning studies

that evaluated the economics of various supply-side alternatives to satisfy forecast capacity requirements.

Integrated Resource Plan, Village of Rockville Centre, N.Y.
2007
As Study Manager, Mr. Kushner provided analysis and preparation related to the Village of Rockville Centre (RVC) Integrated Resource Plan (IRP). The IRP included consideration of RVC's existing generating system and strategic planning to satisfy forecasted system requirements. The strategic planning process included consideration of conventional supply-side options, interaction with the purchase power market, demand-side management measures, renewable supply-side alternatives and possible future environmental impacts.

Taylor Energy Center Need for Power Application, Various Clients, Florida
2005-2006
As Study Manager, Mr. Kushner provided production costing, economic analysis and various other support to facilitate the completion and filing of the Taylor Energy Center (TEC) Need for Power Application (NFP). His work also included preparation of testimony related to the project to the Florida Public Service Commission (FPSC). The NFP provides a determination of the most cost-effective capacity addition to satisfy forecasted capacity requirements for the four separate utilities participating in the project. The analysis considered self-build and purchase-power alternatives.

Integrated Resource Plan, City of Tallahassee, Tallahassee, Fla.
2005-2008
Serving as Study Manager, Mr. Kushner provided analysis and preparation related to the City of Tallahassee's (the City's) Integrated Resource Plan (IRP). The IRP included consideration of the City's existing generating system and strategic planning to satisfy forecasted system requirements. The strategic planning process included consideration of conventional supply-side options, demand-side management measures, renewable supply-side alternatives and possible future environmental impacts.

Integrated Resource Plan, Brazos Electric Power Cooperative, Texas
2006
Mr. Kushner, Project Analysis Engineer, provided assistance to Brazos Electric Power Cooperative (Brazos) in developing its Integrated Resource Plan (IRP). His work on this project included drafting a request for power supply proposals (RFP), analysis of responses to the RFP, review of Brazos production costing analysis and documentation of the final report. The IRP will provide strategic direction to Brazos, which is currently experiencing and is forecasted to continue to experience robust system growth.

Stanton Energy Center Unit B Need for Power Application, Orlando Utilities Commission, Orlando, Fla.
2005
As Study Manager, Mr. Kushner provided production costing, economic analysis and various other support to facilitate completion and filing of the Stanton

Energy Center Unit B (Stanton B) Need for Power Application (NFP). His work also included preparation of testimony related to the project to the Florida Public Service Commission (FPSC).

The NFP provided a determination of the most cost-effective capacity addition to satisfy forecasted capacity requirements for the Orlando Utilities Commission. The FPSC approved the Stanton B NFP Application in May 2006, which represents the first coal-fired power plant approved in the State of Florida since 1991.

RFP Issuance and Evaluation, Western Farmers Electric Cooperative, Anadarko, Okla.
2005
As Project Analysis Engineer, Mr. Kushner coordinated with Western Farmers Electric Cooperative (WFEC) to draft, issue and evaluate a capacity solicitation (RFP) to secure forecast capacity requirements in the most cost-effective and reliable manner. The RFP process was undertaken through coordination with Rural Utilities Services (RUS) in an effort to obtain low-cost RUS project financing. This involved evaluation of numerous conventional as well as renewable technology proposals and culminated in the issuance of a short list and presentation to the WFEC Board of Directors.

Saint Johns River Power Park Annual Review, JEA, Jacksonville, Fla.
Annually 2003 - Present
As Engineering Manager, Mr. Kushner was responsible for the preparation of the annual report, which documented the previous year's operations of the St. Johns River Power Park. This included a summary of the findings of field activities, staff interviews, observations and document review associated with the Power Park.

10-Year Site Plan, FRCC Forms, EIA-860 and Annual Conservation Report Filings, Orlando Utilities Commission, Orlando, Fla.
Annually 2000 - Present
As Engineering Manager, Mr. Kushner was responsible for production costing and the economic analysis necessary to complete the Orlando Utilities Commission's 2006 10-Year Site Plan, which was submitted to the Florida Public Service Commission (FPSC).

Related to the 10-Year Site Plan were the Florida Reliability Coordinating Council (FRCC) filings, which were submitted to the FRCC via electronic database and forwarded to the Energy Information Administration (EIA) by the FRCC. The EIA-860 collects data related to the specific utility's existing and planned generating units. The Annual Conservation Report was prepared and submitted to the FPSC in order to summarize the utility's conservation and demand-side management efforts.

RFP Issuance and Evaluation, City of Columbia, Water & Light Department, Columbia, Mo.
2005
Serving as Study Manager, Mr. Kushner coordinated with the City of Columbia, Water & Light Department (the City) to draft, issue and evaluate a capacity solicitation (RFP) to secure forecast capacity requirements in the most cost-effective and reliable manner. This involved evaluation of numerous conventional capacity options under consideration by the City, as well as options proposed by respondents to the RFP. Mr. Kushner provided continuous communication with City staff as well as presentations to the City's planning committee.

Treasure Coast Energy Center Need for Power Application, Florida Municipal Power Agency, Orlando, Fla.
2005
In the capacity of Project Analysis Engineer, Mr. Kushner provided production costing, economic analysis and various other support to facilitate completion and filing of the Florida Municipal Power Agency's (FMPA) Need for Power Application (NFP). He also provided testimony related to the project to the Florida Public Service Commission (FPSC).

The NFP provided a determination of the most cost-effective capacity addition to satisfy forecasted capacity requirements. The analysis performed for FMPA considered self-build and purchase-power alternatives. The NFP Application was approved by the FPSC in July 2005, representing a critical step in the permitting and licensing process in the state of Florida.

Stock Island Combustion Turbine Evaluation, Florida Municipal Power Agency, Orlando, Fla.
2004
Serving in the role of Project Analysis Engineer, Mr. Kushner performed production costing and economic analysis to determine the most cost-effective capacity additions to be located at the Stock Island site. The analysis considered two different generating units from specific manufacturers who responded to FMPA's request for bids.

Generation Expansion Study, Oman
2004
As Project Analysis Engineer, Mr. Kushner performed production costing and economic analysis to determine the most cost-effective capacity additions to satisfy forecast capacity requirements in the country of Oman. The analysis considered seven different generating technologies.

Integrated Resource Plan, Golden Valley Electric Association, Fairbanks, Alaska
2004
As Project Analysis Engineer, Mr. Kushner provided economic analysis in support of the Golden Valley Electric Association's (GVEA) Integrated Resource

Plan (IRP). The IRP provided GVEA with recommendations of capacity additions that would satisfy forecasted capacity requirements in the most cost-effective manner.

10-Year Site Plan and FRCC Forms, Florida Municipal Power Agency, Orlando, Fla.
2005
Serving as Engineering Manager, Mr. Kushner provided assistance and support to the Florida Municipal Power Agency (FMPA) related to its 2005 10-Year Site Plan and subsequent submission to the Florida Public Service Commission (FPSC). Related to the 10-Year Site Plan were the Florida Reliability Coordinating Council (FRCC) filings, which were submitted to the FRCC via electronic database and forwarded to the Energy Information Administration (EIA) by the FRCC.

Due Diligence and Economic Analysis, Dairyland Power Cooperative, La Crosse, Wis.
2003
Serving as the Project Analysis Engineer, Mr. Kushner performed a due diligence review of the power supply planning efforts undertaken by Dairyland Power Cooperative (DPC). His work included development of numerous capacity expansion plans and associated system production costing.

The analysis was done in compliance with the requirements of the Rural Utilities Services (RUS) to potentially obtain low-cost RUS project financing. This project also included a presentation of the study's findings to the DPC Board of Directors. Following the issuance of a request for proposals (RFP) for capacity supplies, Black & Veatch was released to perform additional production costing and evaluations of the bids and self-build options were completed. The results were then presented to DPC project personnel as well as RUS staff.

Numeric Conservation Goals Filing, JEA, Jacksonville, Fla.
2004
Serving in the role of Project Analysis Engineer, Mr. Kushner provided analysis related to and preparation of the JEA 2004 Petition for Approval of Numeric Conservation Goals, as required by the Florida Public Service Commission (FPSC).

The submittal included analysis of numerous demand-side management (DSM) measures to be considered by JEA in order to determine their cost-effectiveness. The process was required to be completed by JEA every five years, culminating in the eventual determination by the FPSC of the conservation goals JEA must satisfy each year.

Numeric Conservation Goals Filing, Orlando Utilities Commission, Orlando, Fla.
2004
As Project Analysis Engineer, Mr. Kushner was responsible for analysis related to and preparation of the Orlando Utilities Commission's (OUC) 2004 Petition

for Approval of Numeric Conservation Goals, as required by the Florida Public Service Commission (FPSC).

The submittal included analysis of numerous demand-side management (DSM) measures to be considered by OUC in order to determine their cost-effectiveness. The process was required to be completed by OUC every five years, culminating in the eventual determination by the FPSC of the conservation goals OUC must satisfy each year.

Site Selection Study, Florida Municipal Power Agency, Orlando, Fla.
2003
As Project Analysis Engineer, Mr. Kushner coordinated and prepared a site selection study related to the potential construction of a new combined-cycle unit to be installed by the Florida Municipal Power Agency.

10-Year Site Plan, Florida Municipal Power Agency, Orlando, Fla.
2004
Serving as Engineering Manager, Mr. Kushner provided assistance and support to the Florida Municipal Power Agency (FMPA) related to its 2004 10-Year Site Plan and subsequent submission to the Florida Public Service Commission (FPSC).

Due Diligence, City Utilities, Springfield, Mo.
2003
As Project Analysis Engineer, Mr. Kushner provided due diligence and economic analysis to determine the most cost-effective capacity additions to satisfy forecasted system requirements for City Utilities – Springfield. Two options were considered, which consisted of constructing a second unit at an existing site and an independent developer's proposed construction of a unit at a new site.

Participation Agreement, Kissimmee Utility Authority, Orlando, Fla.
2002
In the role of Engineering Manager, Mr. Kushner led the development of a Participation Agreement between client (KUA) and another Florida utility governing ownership, construction and operation of a new generating unit at a KUA site. Mr. Kushner was active in meetings, coordinated with clients and incorporated various requirements to sufficiently complete the Agreement.

Capacity Planning Study, Western Farmers Electric Cooperative, Anadarko, Okla.
2002
Serving as the Project Analysis Engineer, Mr. Kushner handled the production costing and economic analysis to determine WFEC's most cost-effective expansion options to meet forecast capacity requirements. The capacity planning study was performed in support of the RFP issuance described above.

Feasibility Study, Kissimmee Utility Authority, Kissimmee, Fla.
2002
In the role of Engineering Manager, Mr. Kushner assisted in the coordination and preparation of a preliminary study to evaluate the feasibility of constructing a new generating unit at an existing Kissimmee Utility Authority site.

Capacity Planning Study, Braintree Electric Light Department, Braintree, Mass.
2002
Serving as the Project Analysis Engineer, Mr. Kushner provided the production costing and economic analysis to determine Braintree Electric Light Department's most cost-effective expansion options to meet forecast capacity requirements.

Integrated Resource Plan, City of Tallahassee, Tallahassee, Fla.
2001
As Project Analysis Engineer, Mr. Kushner assisted in the completion of the City of Tallahassee's Integrated Resource Plan (IRP), including evaluation of the City's demand-side management program alternatives.

Capacity Planning Study, Basin Electric Power Cooperative, Bismarck, N.D.
2001
Serving in the role of Project Analysis Engineer, Mr. Kushner managed the production costing and economic analysis necessary to provide Basin Electric Power Cooperative with recommendations as to which capacity additions would be most cost-effective to satisfy system requirements.

10-Year Site Plan, Lakeland Electric, Lakeland, Fla.
2001
As Project Analysis Engineer, Mr. Kushner assisted in the completion of Lakeland Electric's 2001 10-Year Site Plan, including consideration of Lakeland's capacity addition options.

Stanton Energy Center A Need for Power Application, Various Clients, Florida
2000
As Project Analysis Engineer, Mr. Kushner provided the production costing and economic analysis required in support of the determination of the most cost-effective expansion options to meet the individual needs of the Orlando Utilities Commission, Kissimmee Utility Authority and Florida Municipal Power Agency. His work also included preparation of a corresponding application to be presented to the Florida Public Service Commission, as well as written testimony in support of the application.

Table 1 30 Year LCOE Matrix (cents/kWh)					
	Generating Unit Alternative				
Case	GREC LLC PPA	Simple Cycle LMS100	1x1 7EA Combined Cycle	Pulverized Coal (No CCS)	Pulverized Coal (with CCS)
No CO_2	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
No CO_2 – High Fuel Price	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
No CO_2 – Low Fuel Price	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
No CO_2 – High Capital Cost	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
No CO_2 – Low Capital Cost	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
HB 2454 Basic CO_2	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
HB 2454 High CO_2	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

Table 2 30 Year LCOE Matrix (Percent Differences)					
	Generating Unit Alternative				
Case	GREC LLC PPA	Simple Cycle LMS100	1x1 7EA Combined Cycle	Pulverized Coal (No CCS)	Pulverized Coal (with CCS)
No CO_2	Base	103%	11%	-14%	48%
No CO_2 – High Fuel Price	Base	108%	16%	-14%	49%
No CO_2 – Low Fuel Price	Base	96%	5%	-15%	47%
No CO_2 – High Capital Cost	Base	118%	15%	-6%	66%
No CO_2 – Low Capital Cost	Base	88%	8%	-22%	31%
HB 2454 Basic CO_2	Base	125%	31%	56%	81%
HB 2454 High CO_2	Base	210%	103%	196%	104%

Table 1
30 Year LCOE Matrix
(cents/kWh)

Case	Generating Unit Alternative (all alternatives at 90% capacity factor)				
	GREC LLC PPA	Simple Cycle LMS100	1x1 7EA Combined Cycle	Pulverized Coal (No CCS)	Pulverized Coal (with CCS)
No CO_2	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
No CO_2 – High Fuel Price	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
No CO_2 – Low Fuel Price	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
No CO_2 – High Capital Cost	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
No CO_2 – Low Capital Cost	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
HB 2454 Basic CO_2	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
HB 2454 High CO_2	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

Table 1
15 Year LCOE Matrix
(cents/kWh)

Case	Generating Unit Alternative				
	GREC LLC PPA	Simple Cycle LMS100	1x1 7EA Combined Cycle	Pulverized Coal (No CCS)	Pulverized Coal (with CCS)
No CO_2	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
No CO_2 – High Fuel Price	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
No CO_2 – Low Fuel Price	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
No CO_2 – High Capital Cost	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
No CO_2 – Low Capital Cost	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
HB 2454 Basic CO_2	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
HB 2454 High CO_2	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

ALL PAGES OF CONFIDENTIAL EXHIBIT NO. __ [BEK-6] ARE REDACTED