Gainesville Renewable Energy Center Site Certification Application

Gainesville Renewable Energy Center
An American Renewables Company

Prepared by:

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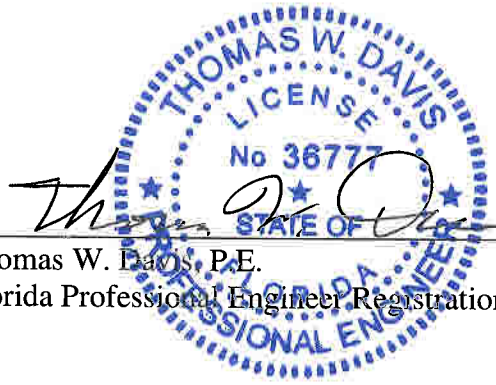
SITE CERTIFICATION APPLICATION

GAINESVILLE RENEWABLE ENERGY CENTER

Submitted by:

Gainesville Renewable Energy Center
An American Renewables Company



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LIST OF ACRONYMS AND ABBREVIATIONS

°	degree
°C	degree Celsius
°F	degree Fahrenheit
µg/m^2/yr	microgram per square meter per year
µg/m^3	microgram per cubic meter
µS/cm	microSiemen per centimeter
AAQS	ambient air quality standard
ACEPD	Alachua County Environmental Protection Department
ACFM	actual cubic foot per minute
ACSB	Alachua County School Board
ACSR	aluminum conductor, steel-reinforced
ADT	average daily traffic
AERMOD	AMS/EPA regulatory model
American Renewables	American Renewables, LLC
AMS	American Meteorological Society
ANSI	American National Standards Institute
AQI	air quality index
AQRV	air quality-related value
ASCE	American Society of Civil Engineers
ASME	American Society of Mechanical Engineers
AST	aboveground storage tank
BACT	best available control technology
BayCorp	BayCorp Holdings, Ltd.
BEA	U.S. Department of Commerce Bureau of Economic Analysis
BEBR	Bureau of Economic and Business Research
BFB	bubbling fluidized bed
BMP	best management practice
Btu/ft^3	British thermal units per cubic foot
Btu/gal	British thermal unit per gallon
Btu/hr	British thermal units per hour
Btu/lb	British thermal unit per pound
CAA	Clean Air Act
CadnaA	Computer Aided Noise Abatement
CAIR	Clean Air Interstate Rule
CCS	carbon capture and sequestration
CEC	Clay Electric Cooperative, Inc.
CEMS	continuous emissions monitoring system
CFB	circulating fluidized bed
CFR	Code of Federal Regulations
cfs	cubic foot per second
CGP	generic permit for stormwater discharge from large and small construction activities
CHP	combined heat and power
CO	carbon monoxide

LIST OF ACRONYMS AND ABBREVIATIONS
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CO_2	carbon dioxide
col/100 mL	colony per 100 milliliters
CR	County Road
CSX	CSX Transportation, Inc.
dB	decibel
dBA	A-weighted decibel
dBC	C-weighted decibel
dBZ	flat-frequency-weighted decibel
DGS	Deerhaven Generating Station
DSI	dry sorbent injection
DSM	demand-side management
ECT	Environmental Consulting & Technology, Inc.
EGEAS	Electrical Generation Expansion Analysis System
EMI	Energy Management, Inc.
EMS	emergency medical service
EPA	U.S. Environmental Protection Agency
EPC	engineer, procure, and construct
EPRI	Electric Power Research Institute
ERP	environmental resource permit
ET	evapotranspiration
F.A.C.	Florida Administrative Code
F.S.	Florida Statutes
FAS	Floridan aquifer system
FBC	fluidized bed combustion
FDACS	Florida Department of Agriculture and Consumer Services
FDEP	Florida Department of Environmental Protection
FDHR	Florida Division of Historical Resources
FDLES	Florida Department of Labor and Employment Security
FDOT	Florida Department of Transportation
FEMA	Federal Emergency Management Agency
FGS	Florida Geological Survey
FIRM	flood insurance rate map
FIT	feed-in tariff
FLAG	Federal Land Managers' Air Quality Related Values Workgroup
Florida Greenbook	FDOT's Manual of Uniform Minimum Standards for Design, Construction, and Maintenance for Streets and Highways
FLUCFCS	Florida Land Use, Cover, and Forms Classification System
FNAI	Florida Natural Areas Inventory
FPL	Florida Power & Light Company
FPSC	Florida Public Service Commission
ft	foot

LIST OF ACRONYMS AND ABBREVIATIONS
(Continued, Page 3 of 7)

ft bls	foot below land surface
ft/day	foot per day
ft/ft	foot per foot
ft/yr	foot per year
ft^2	square foot
ft^2/day	square feet per day
ft-msl	foot above mean sea level
ft-NGVD	foot National Geodetic Vertical Datum of 1929
FWC	Florida Fish and Wildlife Conservation Commission
G/ACRESUB	Gainesville/Alachua County Regional Electric and Sewer Utilities Board
g/s	gram per second
GAQM	Guideline on Air Quality Models
GB	gigabyte
GCTL	groundwater cleanup target level
GDS	GDS Associates
GE	General Electric
GEAC	Gainesville Energy Advisory Committee
Genesis	Genesis Group
GHG	greenhouse gas
GMA	Gainesville Metropolitan Area
gpd	gallon per day
gpm	gallon per minute
gr/100 dscf	grain per 100 dry standard cubic foot
gr/dscf	grain per dry standard cubic foot
GRA	Gainesville Regional Airport
GRA	Gainesville Regional Airport
GREC	Gainesville Renewable Energy Center
GREC LLC	Gainesville Renewable Energy Center, LLC
GRU	Gainesville Regional Utilities
GSE	GSE Engineering & Consulting, Inc.
H_2SO_4	sulfuric acid
HAP	hazardous air pollutant
HCREC	Hamilton County Renewable Energy Center
Hg^0	elemental mercury
Hg^{2+}	compounds of oxidized mercury
Hg_p	particle-bound mercury
HHV	higher heating value
hp	horsepower
hr/yr	hour per year
Hz	Hertz
i	hydraulic gradient
I-75	Interstate 75

LIST OF ACRONYMS AND ABBREVIATIONS
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IAS	intermediate aquifer system and intermediate confining unit
ICF	ICF Consulting
IGCC	integrated gasification combined-cycle
IRP	integrated resource planning
ISO	International Organization for Standardization
JIA	Jacksonville International Airport
K	hydraulic conductivity
kcmil	thousand circular mil
kV	kilovolt
Kv	vertical hydraulic conductivity
kV/m	kilovolt per meter
kW	kilowatt
lb/hr	pound per hour
lb/MMBtu	pound per million British thermal units
lb/MWh	pound per megawatt-hour
lb/yr	pound per year
LCOE	levelized cost of energy
LDC	land development code
LDC	land development code
L_{eq}	equivalent continuous sound level
$L_{eq}(1)$	1-hour equivalent sound level
$L_{eq}(24)$	24-hour equivalent sound level
LFA	Lower Floridan aquifer
L_{max}	maximum sound level
L_{min}	minimum sound level
LOS	level of service
L_{wA}	overall sound power level
m/s	meter per second
MCR	maximum current rating
MDN	Mercury Deposition Network
MFL	minimum flows and levels
mG	milliGauss
mg/L	microgram per liter
MGD	million gallons per day
mi^2	square mile
mi^2	square mile
MMBtu/hr	million British thermal units per hour
MODFLOW	Modular Three-Dimensional Finite Difference Groundwater Flow Model
mph	mile per hour
MSDS	material safety data sheet
MSGP	multisector generic permit for stormwater discharge associated with industrial activity

LIST OF ACRONYMS AND ABBREVIATIONS
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MTPO	Metropolitan Transportation Planning Organization
MW	megawatt
MWh	megawatt-hour
n	effective porosity
NAAQS	national ambient air quality standard
NAD	North American Datum 1983
NADP	National Atmospheric Deposition Program
NADSC	natural attenuation default source concentration
NCFRPC	North Central Florida Regional Planning Council
NESC	National Electrical Safety Code
ng/m^3	nanogram per cubic meter
NH_3	ammonia gas
NO_2	nitrogen dioxide
NOI	notice of intent
NO_x	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NPV	net present value
NREL	National Renewable Energy Laboratory
NRHP	National Register of Historic Places
NSPS	New Source Performance Standards
NSR	New Source Review
NSSCOU	nonsteady or steady state coupled
NWA	National Wilderness Area
NWI	National Wetlands Inventory
NWR	National Wildlife Refuge
OSHA	Occupational Safety and Health Administration
PC	pulverized coal
PEF	Progress Energy Florida
Petition	petition filed by GRU and GREC LLC for a FPSC determination of need for the proposed GREC
PF	Public Facilities zoning district
PM	particulate matter
PM_{10}	particulate matter less than or equal to 10 micrometers
$PM_{2.5}$	particulate matter less than or equal to 2.5 micrometers
PPA	power purchase agreement
ppm	part per million
ppmw	part per million by weight
PPSA	Florida Electrical Power Plant Siting Act
PS	Public Services and Operations zoning district
PSD	Prevention of Significant Deterioration
psig	pound per square inch gauge
PV	photovoltaic
RARE	Roadless area review and evaluation

LIST OF ACRONYMS AND ABBREVIATIONS
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RCP	reinforced concrete pipe
RDF	refuse-derived fuel
RFP	request for biomass proposal
RGM	reactive gaseous divalent mercury
RO	reverse osmosis
RUC	Regional Utilities Committee
s.u.	standard unit
s.u.	standard unit
SAS	surficial aquifer system
SCA	site certification application
SCR	selective catalytic reduction
SFCU	sub-Floridan confining unit
SIL	significant impact level
Site	approximately 131 acres where GREC will be located
SJRWMD	St. Johns River Water Management District
SO_2	sulfur dioxide
SO_x	sulfur oxides
SPL	sound pressure level
SR	State Road
SRCC	Southeast Regional Climate Center
SRPP	strategic regional policy plan
SRWMD	Suwannee River Florida Water Management District
SWPPP	stormwater pollution prevention plan
TDS	total dissolved solid
the City	the City of Gainesville
TIITF	Trustees of the Internal Improvement Trust Fund
TMDL	total maximum daily load
tpd	ton per day
tph	ton per hour
tpy	ton per year
TRC	total resource cost
TSS	total suspended solid
Tyr Energy	Tyr Energy, Inc.
U.S. 441	U.S. Highway 441
UFA	Upper Floridan aquifer
UIC	Underground Injection Control
ULSD	ultra-low sulfur diesel
UMAM	Uniform Mitigation Assessment Methodology
USDA	U. S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
v	linear flow velocity

LIST OF ACRONYMS AND ABBREVIATIONS
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VISTAS	Visibility Improvement State and Tribal Association of the Southeast
VMT	vehicle-mile traveled
VOC	volatile organic compound
WBAN	Weather-Bureau-Army-Navy
WBID	water body identification
WMD	water management district
WTE	waste-to-energy
WUP	water use permit
yd^3	cubic yard
ZLD	zero liquid discharge

EXECUTIVE SUMMARY

Gainesville Renewable Energy Center, LLC (GREC LLC) is filing this site certification application (SCA) for the construction and operation of the Gainesville Renewable Energy Center (GREC), a new electrical power plant and associated facilities located within the City of Gainesville in Alachua County, Florida. GREC will consist of a nominal net 100-megwatt (MW) electrical generating plant that will use clean, woody biomass material as fuel and will employ state-of-the-art air emissions and environmental control systems to provide reliable, renewable energy at a reasonable cost.

This SCA has been prepared in accordance with the requirements of: (a) the Florida Electrical Power Plant Siting Act (PPSA), Sections 403.501 through 403.518, Florida Statutes (F.S.); and (b) the rules implementing the PPSA, which have been adopted by the Florida Department of Environmental Protection (FDEP) and codified in Chapter 62-17, Part I, Florida Administrative Code (F.A.C.). This SCA follows the prescribed format and informational requirements of the FDEP Application Instruction Guide: Electrical Power Plant Sites and Associated Facilities Electrical Transmission Lines (revised September 1, 2009).

This executive summary highlights the key features of GREC. More detailed information on GREC is provided in this SCA as required pursuant to the PPSA.

GAINESVILLE RENEWABLE ENERGY CENTER, LLC

GREC LLC is the Applicant for the proposed GREC SCA. GREC LLC is a subsidiary of American Renewables, LLC (American Renewables). GREC LLC was specifically established by American Renewables to develop, construct, own, and operate the proposed GREC in Gainesville, Florida.

American Renewables is a private, for-profit renewable power producer. American Renewables develops, builds, and operates renewable energy facilities that use biomass materials as fuel. American Renewables is jointly owned by affiliates of three companies: BayCorp Holdings, Ltd. (BayCorp); Energy Management, Inc. (EMI); and Tyr Energy, Inc. (Tyr Energy). These entities bring together successful experience and expertise in energy-related project development, operations, investment, and management.

In addition to GREC, American Renewables has other biomass energy facilities of similar 100-MW size and design in various stages of development, including the Nacogdoches Power project in eastern Texas, which was recently sold to Southern Power, a subsidiary of Southern Company, and the Hamilton County Renewable Energy Center in Hamilton County, Florida.

NEED FOR GREC

The electrical output of GREC will be purchased by Gainesville Regional Utilities (GRU) under a 30-year power purchase agreement (PPA) between the City of Gainesville (d/b/a GRU) and GREC LLC. The PPA was unanimously approved by the Gainesville City Commission on May 7, 2009. The City's decision to select GREC to meet its future energy supply needs and enter into the PPA was the result of an extensive integrated resource planning process including an extensive public participation/public outreach program. An open competitive procurement process was used to identify the most cost-effective proposal that satisfied the City's goals and objectives. A key element in this process was the Gainesville City Commission's decision to only pursue renewable energy for its future energy supply needs. The selection of GREC as the best option for meeting GRU's electrical supply needs was based on: (a) the need for electric system reliability and integrity, (b) the need for fuel diversity and supply reliability, and (c) the need for electricity at a reasonable cost.

GREC LLC and GRU jointly filed a petition for determination of need for GREC with the Florida Public Service Commission (PSC) on September 18, 2009 (Florida PSC Docket No. 090451-EM). At the time of this SCA filing, the petition is under review by Florida PSC and the Florida PSC hearing for consideration of the petition is scheduled for

December 16, 2009. The docket indicates that the Florida PSC will issue its order on the determination of need for GREC on March 1, 2010.

GREC SITE

GREC will be located on an approximately 131-acre Site in northwest Gainesville that GREC LLC will lease from the City of Gainesville (d/b/a GRU). The GREC Site is located within the boundaries of the approximately 1,146-acre previously certified site for GRU's existing Deerhaven Generation Station (DGS). The GREC Site area is currently not actively used by GRU and does not contain any facilities associated with DGS. Based on consultations with FDEP's Siting Coordination Office, it is GREC LLC's understanding that FDEP will either amend the SCA for DGS or modify the conditions of certification for DGS as appropriate to delineate between the GREC Site and the certified site for DGS.

The GREC Site is presently undeveloped and has historically been used for agriculture and pine silviculture. Most of the Site currently is actively managed for timber production and has been altered by land preparation (furrowing) and periodic harvesting of timber. The Site is transected by numerous unpaved roads/trails and is surrounded by manmade swales/ditches. The current land use and vegetation types on the Site consist primarily of forested communities, including pine plantations, mixed pine and hardwoods, and several wetland types. Nonforested communities include manmade swales, trails/roads, open land, and herbaceous dry prairie.

The property adjacent to and east of the GREC Site is part of the GRU DGS property. The Alachua County Public Works Department has facilities on the land adjacent to the Site's western border. A radio tower and undeveloped land also are situated west of the Site. Northwest 128th Lane is adjacent to the north side of the Site. Undeveloped, wooded land is located north of Northwest 128th Lane. South of the Site is U.S. Highway 441 (U.S. 441), the CSX rail line and spur, and several properties that are used for commercial and retail sales. The closest residential development to the Site is the Turkey Creek subdivision located approximately 0.8 mile to the southwest of the proposed area for the power plant facilities on the Site.

GREC POWER PLANT AND ASSOCIATED FACILITIES

GREC will involve the construction and operation of a nominal net 100-MW (nominal gross 116-MW) biomass-fired electrical power plant and associated facilities on the approximately 131-acre Site. In addition, GREC will involve the development of four associated linear facilities, which will extend off the GREC Site onto GRU's DGS property. These linear facilities will include the main access road, a natural gas pipeline, a sanitary sewer force main pipeline, and a 138-kilovolt (kV) transmission line and switchyard. The main access road will also run a short distance off the DGS property across the existing CSX Transportation, Inc. (CSX) railroad line corridor and Florida Department of Transportation (FDOT) right-of-way along U.S. Highway 441 (U.S. 441). Further, during construction, an approximately 8-acre area on the DGS property will be temporarily used for construction laydown and an existing DGS maintenance road will be temporarily used for access to the laydown area. GREC LLC is seeking certification of the electrical power plant and all associated facilities within the PPSA proceeding.

POWER PLANT FACILITIES

The main electrical generating facilities for GREC will consist of a bubbling fluidized bed (BFB) boiler and conventional steam turbine generator. The BFB boiler will be capable of accommodating a wide range of clean, woody biomass fuels. In the BFB boiler, combustion of the woody biomass will take place in the dense, fluidized sand bed located at the bottom of the furnace as well as above the bed.

Flue gas from the BFB boiler will pass through air emission control equipment and exhaust to the atmosphere through one 230-foot (ft) tall stack. Other facilities in the main power block area will include an administration building; warehouse; water and wastewater treatment facilities; sand and fly and bottom ash handling and storage facilities; emergency diesel generator and firewater pump; a switchyard; and biomass fuel delivery, handling, and storage facilities.

BIOMASS FUEL PROCUREMENT

GREC will use clean, chipped/ground, woody biomass material as its primary fuel. The biomass material will consist of logging residue, mill residue, and urban wood waste. Urban wood waste typically consists of woody tree trimmings created by land clearing, right-of-way maintenance, and other nonforestry sources of woody debris. GREC will not use as fuel any form of treated, painted, or coated wood; municipal solid wastes; construction or demolition debris; coal; petroleum coke; or tires.

GREC LLC will enter into contracts with local and regional landowners and suppliers for the procurement of approximately 1 million tons per year (tpy) of biomass fuel. The biomass fuel will typically be procured from areas within a 75-mile radius of the Site. The fuel suppliers will be required to follow strict standards that were established by GRU and GREC LLC in the PPA to protect the sustainability of regional forests. The fuel suppliers also will be given the opportunity to benefit from a forest stewardship incentive program if they exceed the minimum standards established by GRU and GREC LLC.

The biomass fuel will be prepared and chipped/ground at offsite locations to meet the design specifications established by GREC LLC for the BFB. The chipped/ground wood will be delivered to the GREC Site by truck. When the truck arrives at the Site, the truck will be weighed, and then the biomass fuel will be unloaded. The biomass will be stacked in storage piles and then reclaimed as needed. The onsite biomass fuel handling and storage systems will include truck scales, truck dumpers, screens and wood hogs, automatic and manual stacker/reclaim systems, and fuel storage piles.

STATE-OF-THE-ART AIR EMISSION CONTROLS

GREC will use advanced BFB boiler technology and clean burning biomass fuel to minimize its airborne emissions. Using renewable biomass fuel also will help ensure that GREC's emissions are *carbon neutral* with regard to carbon dioxide (CO_2) and other greenhouse gases (GHGs).

GREC will also use state-of-the-art air emission control systems, which represent the best available control technology (BACT) to effectively minimize regulated air emissions. These control systems include:

- BFB boiler technology to minimize NO_x production via combustion staging.
- SCR system to control NO_x emissions.
- BFB boiler technology combined with dry sorbent injection (DSI), low-sulfur biomass fuel, and naturally occurring calcium in the wood ash to control SO_2, H_2SO_4 mist, hydrogen chloride, and hydrogen fluoride emissions.
- Fabric filter baghouse for control of particulate matter.

Through the use of these effective emission control systems, GREC's impacts on ambient air quality in Alachua County and the region will be minimal and significantly less than all ambient air quality standards established by the U.S. Environmental Protection Agency (EPA) and FDEP to protect human health and the environment.

WATER USE MINIMIZATION AND ZERO LIQUID DISCHARGE SYSTEM

GREC will be equipped with a zero liquid discharge (ZLD) system, which will allow GREC to eliminate any discharges of industrial wastewater from the facility. The ZLD system also will allow GREC to maximize the recycling and reuse of water. The ZLD system and other water conservation measures will be used to minimize the amount of water used by GREC. Nonetheless, GREC will need approximately 1.4 millions gallons per day (gpd) of water (annual average), primarily to replace the water lost through evaporation in GREC's mechanical draft cooling tower. This need will be satisfied by using groundwater withdrawn from the Upper Floridan aquifer (UFA) through two new onsite wells. To support the approval of this water use by the Suwannee River Water Management District (SRWMD) as part of this SCA process, detailed modeling and analyses of GREC's proposed groundwater withdrawals have been conducted to assess potential impacts. The results of these efforts show that the proposed water use will not harm nor adversely impact groundwater levels and quality, surface waters, wetlands, existing legal users, or other environmental resources on or in the vicinity of the Site. In addition, to offset this groundwater use, GRU has agreed to reduce the approved groundwater allocation for the GRU DGS by 1.4 million gallons per day (MGD) prior to the start of com-

mercial operations of GREC. GREC LLC also conducted a reclaimed water feasibility analysis. Though this analysis concluded that it is not currently feasible to use reclaimed water, GREC LLC has agreed to consider the use of reclaimed water in the future if it becomes reasonably available and economically feasible for GREC.

STORMWATER MANAGEMENT

GREC will have onsite drainage systems designed to manage, treat, and control stormwater runoff and minimize potential erosion and sedimentation impacts during construction and operation. These drainage facilities will be designed in accordance with all applicable requirements of FDEP, the Suwannee River Water Management District (SRWMD), and local agencies, if required. Only stormwater runoff from areas with no contact with industrial activities will be discharged from the Site.

WETLAND MITIGATION AND PROTECTION

The proposed arrangement of facilities on the GREC Site is designed to minimize impacts to wetlands. Key considerations in designing the proposed Site layout included: (1) avoiding areas with extensive, high-quality wetlands; (2) locating facilities in areas with lower quality wetlands where wetland impacts cannot be avoided; and (3) providing an average 50-ft setback buffer around all nonimpacted wetlands.

To compensate for unavoidable, permanent impacts to 0.44 acre of lower quality wetlands, GREC LLC is proposing a mitigation plan that consists of placing a permanent preservation and conservation easement on approximately 10.25 acres of high-quality wetland habitat and 12.33 acres of upland buffer surrounding the wetland.

ECONOMIC BENEFITS

The construction and operation of GREC will provide economic benefits to the City of Gainesville, Alachua County, the region, and the state. These benefits include the creation of an average of 168 and a peak of 426 jobs during the 34-month construction period, as well as an additional 44 fulltime jobs at the GREC facility once the unit begins operation. Further, during GREC operations, it is estimated that an additional 450 to 500 jobs will be created in the north Florida region, primarily in support of the biomass fuel supply activities. Construction and operation of GREC will generate significant sales

tax revenues from purchases of goods and services directly for the plant and indirectly by workers and employees. Also, GREC will provide significant ad valorem tax revenues to the City of Gainesville, Alachua County, and other taxing authorities.

GREC SCHEDULE

Currently, construction of GREC is scheduled to begin in December 2010, and commercial operation is scheduled for December 2013. Achieving this schedule has significant economic consequences for GRU and its power customers. If the biomass facility begins commercial operation by January 1, 2014, GREC will be eligible to obtain the renewable energy grant from the federal government that is contained in H.R. 1 (the American Recovery and Reinvestment Act of 2009). The savings in GRU's cost of power resulting from GREC obtaining the renewable energy grant is $8.10 per megawatt-hour (MWh), which equates to a savings of $6.4 million per year.

ENVIRONMENTAL PROTECTION AND BENEFITS

In summary, GREC LLC has selected and implemented designs for GREC that will avoid or minimize environmental impacts in Alachua County and the north-central Florida region, while reliably and cost-effectively meeting the future energy needs of GRU's customers. GREC LLC's and GRU's selection of the existing DGS property for GREC offers many benefits and minimizes environmental, land use, and other impacts compared to development of a generation facility at a greenfield site. GREC LLC's use of renewable biomass energy technology with state-of-the-art air emission control systems and the water-conserving water use plan will also minimize potential environmental impacts. Further, GREC will provide numerous positive direct and indirect economic benefits in Gainesville, Alachua County and the region.