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Bill Jacobs, Ph.D., P.E. - VP - Marietta, GA

The renaissance of nuclear power is under way in Georgia at the existing Vogtle nuclear power plant. Vogtle is one of two nuclear power plants under construction in the United States for the first time in 30 years.

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Ryan Johnson, P.E. - Project Engineer - GDS - Marietta, GA

Renewable energy developers, specifically for solar and wind projects, are always looking for buyers and are quick to target electric cooperatives and municipal utilities for these projects. *What factors should a utility consider when purchasing power from renewable projects?*

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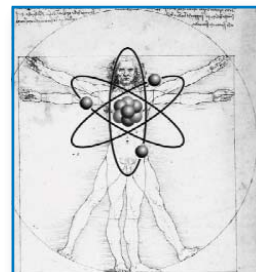
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## The Nuclear Power Renaissance Begins In Georgia

### Nuclear Power in the News

As most of you are aware, Japan's devastating earthquake and tsunami combination in March 2011 took the lives of thousands of Japanese citizens and caused billions of dollars in damages. In addition, Japan's Fukushima Daiichi nuclear power plant was damaged and as a result there was a nuclear radiation release, the first major nuclear radiation release from a power plant since the Chernobyl plant exploded in 1986. For six weeks, Japanese officials worked endlessly to resolve the issues at the Fukushima plant and today, clean-up efforts are still underway. No sooner was this event out of the news cycle when Virginia experienced a 5.8 (Richter scale) earthquake and the North Anna nuclear power plant had to initiate an emergency shut-down. The **Nuclear Regulatory Commission (NRC)** released some results of a preliminary investigation that suggested 27 nuclear reactors, including North Anna, may need upgrades because of potential earthquake activity that could exceed the design specifications.



Events such as these have a way of capturing the public's interest and also tend to expose the public's worst fears with regards to nuclear power. However, nuclear power provides approximately 20 percent of the total energy requirements in the United States and has been a highly reliable source of power for the past 50 years. Nuclear energy has no air pollution emissions, including no CO<sub>2</sub> emissions, has high generation availability, and extremely low, stable generation cost. *So, why have no new nuclear power plants come on line in over 15 years since Watts Bar Unit 1 came on line in June 1996?*

There are several reasons, with the most notable being the Three Mile Island accident that occurred in March 1979 and the ensuing **NRC** regulations that resulted in enormous escalation of construction cost. Combinations of operator errors and equipment failures have led to some nuclear power plants being shut-down for months, even years. In addition, the Federal government has failed to build a permanent spent fuel repository to relieve the interim storage facilities at nuclear power plants across the country. So for over 25 years there was no interest in constructing new nuclear power plants in the United States. Then, in 2002, the Department of Energy unveiled its "**Nuclear Power 2010**" program which included three regulatory initiatives designed to encourage construction of advanced nuclear reactors: **(1) the design certification process, (2) early site permits (ESPs) and (3) the combined construction and operating license (COL) process** [described in additional detail later in this article]. In addition, Congress passed the **2005 Energy Policy Act**, which in part, encourages new nuclear construction by reimbursing nuclear owners for cost overruns due to regulatory delays, providing a production tax credit for nuclear generation, and providing loan guarantees. While a number of parties applied for **ESPs** and **COLs**, to date, only two plants have taken the bold step of proceeding with construction.

### Nuclear Renaissance is Underway at Plant Vogtle

The renaissance of nuclear power is under way in Georgia at the existing Vogtle nuclear power plant. **Georgia Power Company** received project approval from the **Georgia Public Service Commission (GPSC)** in March 2009 to construct

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**Vogtle Units 3 and 4.** The **NRC** issued an **ESP** in August 2009 that allowed excavation work to proceed at the plant site. In 2010 the project was approved for U.S. Department of Energy loan guarantee and then in August 2011 the project received its Final Safety Evaluation Report. For the **Vogtle co-owners** there are many issues and details to contend with since this is the first new nuclear plant to begin construction in over 30 years in the United States. Since the Three Mile Island accident many senior utility executives said “**never again**” would they commit their company to the construction of a new nuclear power plant because of their experience with massive cost overruns, schedule delays and lengthy regulatory hearings after completion of construction.

The technology used for the **Vogtle 3** and **4** units are two 1,100 MW Westinghouse AP1000 nuclear units. The AP1000 is a generation III passive reactor design that relies on natural forces such as gravity and natural circulation rather than active components to cool the reactor in the event of an accident. The AP1000 is a simplified design requiring 50 percent fewer safety-related valves, 80 percent less safety-related piping and 35 percent fewer pumps while being 100 times safer than the current generation of nuclear plants.



Artist rendering of the Vogtle Project.

**What is Different Now?**

A logical question is, “*What has changed that allows the Vogtle co-owners to build a new nuclear power plant for the first time in 30 years?*” The short answer – **nearly everything.** As mentioned earlier in the article, a combination of regulatory initiatives and Federal legislation has encouraged utilities to pursue nuclear construction, but more specifically, the items are:

- **Design Certification Process** – For several years the **NRC** worked with various government and industry sectors to design a certification process that allows a specific nuclear reactor design to be pre-approved and essentially built anywhere in the United States. Once a nuclear reactor design has been approved, then the project developer only has to obtain site-specific licensing procedures and a **COL** before construction could begin. As mentioned earlier, **Vogtle 3** and **4** are using the AP1000 reactor design, which is a simplified, pre-certified design that incorporates modular construction to expedite the project schedule and minimize design changes during construction. The current **Vogtle 3** and **4** schedule calls for 48 months of construction from initial safety-related concrete start-up.
- **Licensing** – **Vogtle 3** and **4** are being licensed under a new licensing process defined in 10 CFR 52 of the code of federal regulations. Under Part 52, a combined license is issued that permits construction and operation of a

nuclear plant design that has been certified by the **NRC**. Prior to the combined license system, a nuclear developer had to go through a lengthy construction permit process that could require changes during the construction process and then a separate operation license permitting process. The new combined license process provides certainty that design changes during construction will be limited and that the plant will be allowed to operate when construction is complete.

- **Contracting** – One major difference in the new generation of nuclear projects is the type of design and construction contract that is employed. Rather than a cost plus contract in which the plant owner is responsible for all cost increases, the EPC contract for **Vogtle 3** and **4** is a firm price contract in which the EPC consortium is responsible for design and construction of the project.
- **Cost Recovery** – Certainty of cost recovery was required for utility executives to consider nuclear power. The **GPSC** approved a certified cost for the **Vogtle 3** and **4 Project** so **Georgia Power** is assured of recovering the cost in the project without a lengthy prudency hearing if the project is completed at or below the certified cost of \$6.113B for its share of the project.

**Looking Ahead for the Vogtle 3 and 4 Project**

The existing **Vogtle units 1** and **2** were completed years behind schedule and at a cost that was 10 times the original estimate. After the completion of construction, the **GPSC** had to review the 15 year construction history to determine the reasons and responsibility for the cost overrun. Needless to say, this was a very daunting task. To prevent a recurrence of this situation and as a part of the certification process for the **Vogtle 3** and **4 Project**, the **GPSC** required that an independent construction monitor be selected to monitor all aspects of the project on a real time basis and to keep the Commission informed during twice-a-year hearings on the project. The **GPSC** selected Bill Jacobs, from **GDS Associates**, as the independent construction monitor for the **Vogtle 3** and **4 Project**. The independent monitor’s role is to visit the project site regularly, to attend meetings and inspect the construction activities, monitor project budgets and expenditures, review the status of licensing and file testimony at the **GPSC** twice each year. Currently, the **Vogtle co-owners** are waiting on **NRC’s** approval for the final **COL** and anticipate receiving the approval in late 2011 or early 2012. The **co-owners** expect Unit 3 to be operational in 2016 and Unit 4 in 2017. ■

For more information or to comment on this article, contact Bill Jacobs at GDS @ 770.425.8100 or email: [bill.jacobs@gdsassociates.com](mailto:bill.jacobs@gdsassociates.com)



# GDS...Transition to the Future

The last **TransActions** issue (July 2011) led off with an article titled “*GDS...a 25-year Perspective*” that looked back at the growth and diversification of **GDS Associates** since its formation. In short, since 1986 our firm has grown from a nucleus of 22 employees who focused primarily on power supply transactions and regulatory matters, to more than 160 consultants and support staff currently providing a wide range of services to clients throughout the country. Those changes may have been evident to many of our longtime clients and business associates. Much less generally known, however, are the many changes internally at GDS that have occurred during the past 5 years, as the firm’s top leadership positions have been transitioned from its founders to those who will carry on the GDS mission and key core values.

In January 2007 **Richard F. (Dick) Spellman** became GDS’ second President, as **Bob Gross** retired from his administrative duties, after serving in that position since the firm’s inception. About that same time, **Steve Daniel** handed over the Executive Vice President responsibilities to **Steve Shurbutt**. In December 2008 **Butch Solomon** stepped down from his position as Treasurer and was replaced by **David Brian**. Two years prior to that, **Jim Daniel** succeeded **Jim McGaughy** as the firm’s Secretary. In addition to the changes at these leadership positions, **Kevin Mara**, **Rob Smith**, **Jack Madden**, and **David Brian** were elected to the GDS Board of Directors, taking seats vacated by some of the founding board members.

Throughout this transition period, which included a major decline in the national economy, GDS continued to grow and prosper, thus commending both previous and current management of the firm, as well as its stockholders and employees. That smooth transition was achieved primarily by GDS maintaining its focus on the firm’s mission statement, which is “*To help our clients succeed by anticipating and understanding their needs, and by efficiently delivering quality services with confidence and integrity.*” All the individuals named above have been with GDS for 10 or more years. They have supported that mission and are keenly aware of their responsibility to uphold it going forward.

The **GDS mission statement** is first and foremost client-focused, recognizing that the firm’s success is a direct result of our contributions to the success of our clients. Anticipating client needs requires an in depth knowledge of their business environment and the client’s role in it, including their obligations and responsibilities. Understanding client needs means possessing not only the requisite knowledge and experience to deal with complex issues, but the ability to empathize and share the client’s perspective. The efficient



**The GDS mission statement is first and foremost client-focused, recognizing that the firm’s success is a direct result of our contributions to the success of our clients.**

delivery of quality services is achieved by diligent project management and cost-effective support from information technology and administrative services. Lastly, the firm endeavors to fulfill this mission with confidence in our work product based on proven skills and sound judgment, while maintaining the highest level of integrity in our dealings with clients, employees, and business associates.

The **key core values** of GDS provided another stabilizing influence during our rapid growth and leadership transition. The key core values define our corporate culture and state the principles on which GDS stands. Summarized below, they reflect our most important beliefs and ideals that

are maintained over the long-term, regardless of changing markets and business strategies:

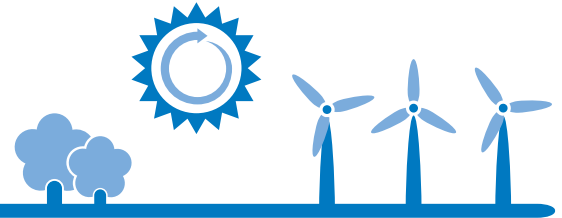
## GDS Associates’ Key Core Values

- **We endeavor to identify, then meet or exceed our clients’ needs.**
- **We gauge our overall success in terms of our clients’ success, by promoting a partnership perspective.**
- **We will conduct our practice at all times with honesty and integrity.**
- **Our consulting staff will possess the requisite knowledge and experience to solve our clients’ problems.**
- **Our services will be competently performed and our work product will be presented in a professional, understandable manner.**
- **Our financial success is founded on long-term client relationships, proficient project management and efficient infrastructure.**
- **We encourage professional development of our employees by providing opportunities for challenging work.**
- **We promote a working environment of mutual respect and cooperation among our employees.**

Those are the key core values that were conceived by our founders, are believed by our employees, and are hopefully perceived by our clients. They have served us well for the past 25 years and we are confident they will continue to do so for many years to come.

The future will always be fraught with uncertainty. That was most certainly the case during the birth of our great country, when in 1776 founding father John Adams (among others) is credited with stating “*The events of war are uncertain. We cannot insure success, but we can deserve it.*” Similarly, in 1986 when GDS was founded, we had the hope, but no assurance of the longevity or the blessings that our firm has experienced. Going forward, we realize that given the uncertainty of economic, political and environmental events affecting GDS and its clients, we cannot insure our future success, but by following our mission and remaining true to our key core values, we will endeavor to continue to deserve it. ■

# Managing “Unsolicited” Renewable Energy Projects



**Across the United States**, electric cooperatives, municipal utilities and other government entities are seeking alternatives to conventional energy sources. Whether they want to diversify their power supply portfolio, meet the region’s **Renewable Portfolio Standard (RPS)**, hedge against fuel costs, cut carbon emissions, or provide local jobs, there are an increasing number of opportunities to consider renewable energy projects. Advances in solar and wind technology, an increase in federal and state tax incentives, and creative new financing models have made these projects more financially and technically feasible. Properly evaluating the economic and technical attributes of renewable energy projects can be a critical effort for any entity as it could have a considerable impact on the utility’s cost for years to come. Balancing the need for renewable generation, reliability, and cost to the retail customer should be the primary goal even when receiving renewable energy proposals, solicited or unsolicited.

## Definition

An “**unsolicited proposal**” is a written proposal for a new or innovative idea that is submitted to an agency on the initiative of the offeror for the purpose of obtaining a contract with that agency and that is **NOT** in response to a Request for Proposals, official announcement, or public program.

Most electric utilities have received unsolicited renewable proposals and have to evaluate the economic feasibility and the technical viability of those projects based on information and representations provided by the project developer. These renewable projects offer a variety of resource types: **solar, wind, biomass, landfill gas, and biofuels**. Renewable energy developers are more focused on industry costs (silicon, land leases, wind turbines), manufacturing, and profits for stockholders so it is up to each individual utility to determine if the project is appropriate for them. Depending on the **Geographic Area**, the **Financing Structure**, and **Project Feasibility** results, even a viable renewable project may not gain any traction if one of these factors is not thoughtfully evaluated and managed.

## Geographic Area

As with all real estate, location, location, location is critical to the viability of any power project. Depending on the site and its corresponding regional attributes, different RPS goals, wildlife considerations, and transmission interconnection requirements could be critical factors.

### • RPS Requirements

Electric cooperatives and municipals are not subject to most state RPS guidelines, but that should not be a deterrent from exploring the potential benefits of renewable resources. At least thirty states have adopted mandatory RPSs, and another seven states have adopted non-mandatory RPS

goals, so the general public is aware of, and generally supports, RPS programs. President Obama, in his State of the Union address, gave a bold call to generate 80% of U.S. electricity from clean sources by 2035, allowing for production from renewable sources, nuclear, natural gas, and coal with carbon capture and sequestration, although Congress has backed away from implementing a Federal Clean Energy Standard.

### • Wildlife Studies

Wildlife studies, especially studies to determine impact on endangered species, can take time and the uncertain outcome creates a project permitting risk and may impact a timely completion. Generally speaking, any potential project is much more viable if these types of studies have already been completed and any necessary mitigation plans have been accepted. No resource is insulated from wildlife issues, for example, bird migratory patterns can be a problem for wind developers and solar projects run into problems when the project footprint is so large that it takes away from the natural habitat of the surrounding wildlife.

### • Transmission Interconnection

Project developers understand that delivering the power to where the end users are located is one of the biggest priorities and they are usually familiar with the transmission interconnection study process. Even modest interconnection costs can cause a project to become unfeasible. It is worthwhile to see the results of any interconnection facilities study and/or system impact study, and if there are any adjustments to the project’s overall capital cost. Also, it may be necessary to construct interconnection facilities and the construction time needs to be such that the project can achieve its commercial operation date.

## Financing Structure

Financing arrangements are paramount to a successful renewables project and typically are in conjunction with **purchased power agreements (PPA)** or equity options for project participants.

### • PPA or Ownership

Most renewable projects offer a **PPA** proposal with an escalating rate over a certain time frame. Operations and maintenance is typically provided by the project developer. It is essential to evaluate the counterparties experience and creditworthiness for **PPA** arrangements. Under ownership options, coops and municipals will have to acquire long-term financing from the Rural Utilities Service, Cooperative Finance Cooperation, or by issuing municipal bonds at attractive financing rates. By taking advantage of this low cost of capital, public entities can have an ownership position at a much lower cost, albeit with more risk, than a **PPA** arrangement.

## Managing “Unsolicited” Renewable Energy Projects - continued

### • Government Incentives

Currently, a project developer's ability to use government incentives and/or tax credits will depend on the specific resource's development timeline. The **American Recovery and Reinvestment Act of 2009** created the Federal Renewable Energy Grant program which gives up to 30% of the total capital cost for qualified renewable construction projects, but expires at the end of 2011. Renewable projects can also benefit from federal tax incentives, like the **Production Tax Credit** which provides either a 1.1¢/kWh or 2.2¢/kWh benefit (depending on technology) for the first ten years of a renewable energy facility's operation.

### • Renewable Energy Credits

Proposals for renewable projects often go silent when discussing ownership of RECs, carbon offsets, or any associated environmental attributes. The inclusion of RECs in a PPA arrangement can significantly lower the overall cost depending on the specific REC market in which the project is located. Project developers should be asked to provide pricing with and without RECs.

### Project Feasibility

Specific project details can alter the long-term economic feasibility. At a minimum, it is necessary to evaluate the renewables expected generation profile and **capacity factor (CF)**, capacity credits, operational flexibility and the ability to integrate the project into the existing generation portfolio over the life of the project.

### • Generation Profile

Each renewable project's generation output is dependent on the technology. For solar projects, the generation profile peaks in the middle of the day and is subject to weather patterns. Using a fixed tilt solar system, the CF can range from **18%-20%**. Wind projects' CF can vary widely based on location, but generally will not achieve a CF greater than **40%**. Coastal winds can provide favorable on-peak production, which is atypical of most inland wind projects where peak generation occurs at night.

### • Capacity Credit and other Cost Offsets

Because of the low CF and high variability for both solar and wind projects, only a small percentage of the full nameplate capacity is typically credited to the utility's demand reserves for planning purposes. The **Southwest Power Pool**, for instance, uses a methodology that provides capacity credit in the **3%-8% range of nameplate capacity**. Additional cost offsets and benefits should be considered when evaluating a renewables project. For example, it is common for most utilities to incur a summer coincident peak demand in the evening time between 4 and 6 pm when solar and wind projects generally are **not producing generation** which

reduces the economic feasibility since the generation does not offset the utility's peak demand. Additional items to consider would be the impact on auxiliary power cost items such as ancillary services, congestion, and FTRs.

### • Operational Flexibility

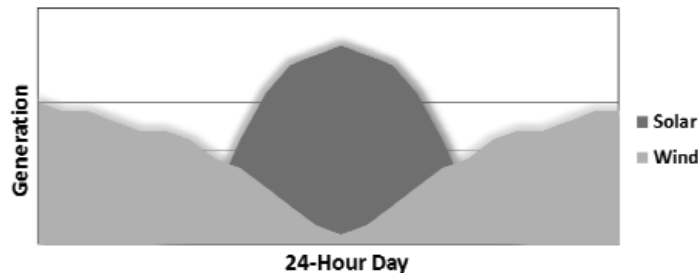
When evaluating a renewables project dispatch flexibility is key for a projects' technical viability along with the ability to integrate the resource into the existing/future generation portfolio of the utility. *How long and when do the maintenance and scheduled outages occur? What backup power arrangements are available to increase reliability? For wind energy projects, are there advanced energy storage options that would allow the resource to be scheduled in blocks?* Operational flexibility helps reduce a utility's need for additional reserves.

**As a consumer-owned utility or municipal, it is important to have these criteria addressed when evaluating proposals from renewable project developers.** Some utilities have found it helpful to provide project development guides in order to assist project developers with the critical information that is necessary for utilities to evaluate the generation project. These guides can

provide utility interconnection information and procedures, utility contact information, the necessary state/local approvals or pertinent regulations for generation projects, and provide insights into the utility's requirements before any power purchase contracts will be discussed. These guides can be very effective for providing pertinent

information to project developers and allowing utilities to focus on other issues until the project achieves critical milestones and becomes more viable ■

Typical Solar and Wind Generation Profile



If you have any questions about Renewable Energy Project Development, contact Ryan Johnson at GDS: 770.425.8100 or [ryan.johnson@gdsassociates.com](mailto:ryan.johnson@gdsassociates.com)



## CONGRATULATIONS!

**Congratulations** to Dan Wittliff, P.E., DEE for his recent election as **President** of the **National Society of Professional Engineers**. Dan has been a member of **NSPE** for almost 40 years and his term as President will be effective beginning July 2012. **NSPE** has over 38,000 members in the United States and its primary mission is to ensure that public health and safety are protected while maintaining the quality of engineering services at the highest level. Dan is a Managing Director of Environmental Services with **GDS** in Austin, TX.

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**GDS Associates, Inc.**  
Engineers and Consultants

### Mission Statement:

*To help our clients succeed by anticipating and understanding their needs, and by efficiently delivering quality services with confidence and integrity.*

**GDS Associates, Inc.** is a multi-service consulting and engineering firm formed in 1986 and now employs a staff of over 100 in five locations across the U.S. Our broad range of expertise focuses on clients associated with, or affected by, electric, gas, and water utilities. In addition, we offer information technology, market research, and statistical services to a diverse client base. The size and depth of our firm permits us to offer clients multiple sources of assistance, ensuring complete, competent, and timely service. Some of the consulting areas in which **GDS** has specialized skills are:

1. Power Supply Planning Services
2. Financial Analysis and Rate Services
3. Generation Services
4. Environmental Services and Permitting Assistance
5. Regulatory and Restructuring Services
6. Transmission Services
7. Renewable Energy Resources, Dist. Generation, & CHP
8. Energy Efficiency and Demand-Side Mgmt. Services
9. NERC/ERO Compliance Services
10. Electric Planning and Design Services (Hi-Line Engineering)
11. Environmental Management Services (GreenLine Environmental)
12. Deregulation and Retail Energy Procurement Services
13. Utility Privatization Services
14. Water and Wastewater Utility Consulting Services
15. Natural Gas Consulting Services
16. Statistics and Market Research Services
17. Information Technology Services
18. Carbon Compliance Services

**GDS** consultants are recognized leaders in their respective fields, dedicated to their clients, innovative in their approach to meeting unique challenges, and known for consistently being available when needed. **GDS** strives to develop long-term client relationships. Our goal is to be a wise investment in consulting services for our clients.

**Hi-Line Engineering**, a **GDS Company**, specializes in providing safe, reliable, and efficient planning and design for electric cooperatives, investor owned utilities, municipal electric systems, and the military in all types of terrain and all three NESC loading districts. Hi-Line's areas of expertise include:

1. Overhead Distribution Line Design and Staking
2. Underground Distribution System Design
3. Inspection and Inventory
4. Contract Administration
5. System Planning and Analysis
6. Right-of-Way Vegetation Management
7. GIS/GPS Mapping and Inventory
8. Training Services
9. Specialized Design Services

**Hi-Line** uses the latest technology to increase efficiency and accuracy. Our commitment to client satisfaction and diversity of expertise ensures that we provide the highest quality of service.

**GreenLine Environmental**, a **GDS Company**, provides environmental services specially geared to the electric utility industry. GreenLine's staff is composed of registered foresters and ISA certified arborists. Our experience in both power line design and operation complement our expertise in vegetation management on right-of-ways. GreenLine offers the following services to utilities, municipals, developers, industry, and the military:

1. Right-of-Way Vegetation Management
2. GIS/GPS Mapping and Inventory
3. Environmental Assessments
4. Urban Forestry Consulting

Our goal is to use our technology and experience to provide efficient long-term control of trees and brush in harmony with the biological ecosystem.

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