



## SMART GRID SYSTEM AND INNOVATION INSTITUTE

October 2011

### **Introduction to Need**

Much of our country's existing electrical infrastructure is weak, outdated, and ripe for replacement, built when demand was significantly lower and had significantly less applications. Already stretched, we can see the resulting threats to our current grid in service interruptions, production inefficiencies, cost fluctuations, significant waste, environmental impact, and even security threats. Without expanded capacity, our electrical system will become increasingly insecure as it responds to a projected demand increase of 40 percent in the next 25 years.

Over the past decade, technologies have developed in response to the current systemic crisis. Defined as a "Smart Grid," such a system would both quantitatively and qualitatively modernize the current electrical infrastructure. The Smart Grid adds monitoring, analysis, control and communication capabilities to the national power generation and distribution infrastructure. Real-time information on costs, demands, and supply of power provide control at every level of the system. Since any energy consumer would be able to both receive and contribute power to the Smart Grid, the system has a long-term and a long-range sustainability impact.

With its inherent isolation as an island network, the Sea Islands region is particularly vulnerable to the currently unsustainable system, yet also has the resources to actively contribute to a Smart Grid solution. Uniquely positioned to contribute to 4 major renewable sources (solar, tidal, wind, and thermal energies), facilitation of the Smart Grid initiative offers impact to the renewable energy systems, local economic expansion, and educational innovation within the greater Sea Islands community as an integral part of the developing national energy technologies (ET) revolution.

### **Goals and Objectives**

The implementation of a Smart Grid system and an Institute supportive of the Smart Grid innovation will directly contribute to the modernization of the energy delivery system of the Sea Islands region, helping to realize the Sea Islands 2050 goal of a clean energy system and a sustainable power grid sourced by renewable energy sources. The development within the Sea Islands region of Smart Grid technologies and production will also position our community to be a leading contributor to a national need, securing a sustainable industry for our local economy.

The main objectives of the Smart Grid initiative are:

- **Providing Public Education and Value-Building:** The project will advance the cause of the Smart Grid, for general public knowledge and as a valuable vehicle of investment for academic and public service institutions. The greater Sea Islands community will have a familiarity with the terminology, potential benefits, involved partners, and desired outcomes of a smart grid, and there will be collective buy-in on the value of such a system to our community's sustainability.
- **Contributing to a Skilled Workforce:** The project will contribute to the establishment of a new source of industry for our community, providing both a need for skill- and knowledge-building at academic institutions as well as an outlet and job market for those workers when trained. Influence through education institutions and their prepared graduates will foster rapid design, prototyping, and commercialization of innovative renewable energy, energy efficiency, and smart grid systems and system components within the Sea Islands business community.
- **Drawing on Local Resources to Lead Innovation:** The project will respond to the renewable natural resources of our region, utilizing them in ways that promote the value of our community and directly contribute toward its national leadership in an emerging industry. A Sea Islands Smart Grid System will lead to productivity improvements, economic growth, and a transition to electricity technologies that harvest the unique opportunities of our environment while still preserving those opportunities for future generations to enjoy and benefit from.

The Smart Grid initiative serves as a joint effort between industry, government, and academia for the public good. It supports Sea Islands 2050's relationship with the National Sustainability Network, providing a local contribution to the national-scale effort to ensure that the country's electrical grid becomes resistant to failure, more secure, more efficient and delivering power across the system at a lower cost to producers and consumers as a truly "smart" grid.

### **Target Population**

Multiple groups will be impacted by this project. In general, implementation of a Smart Grid will reach all of the greater Sea Islands community as it provides energy consumers with a secure and sustainable energy system well into the future.

More specifically, the initiative will serve the local industries that would be supportive to or develop as a result of a Smart Grid system. Utilities in particular will receive direct impact, but other ancillary industries will stand to receive "ripple-effect" benefits, including manufacturing, software and technologies, home building, and more.

Additionally, local and state educational institutions will be targeted through this project, as a platform for outreach but more so as a resource for research and expertise in Smart Grid innovation. Local public and private K-12 schools and leadership will be targeted for additional outreach and as a way to promote awareness at a junior level, in anticipation of programs at higher-level educational institutions. Furthermore, through the training received at local and state educational institutions, the local workforce will also be a population impacted by the Smart Grid initiative.

## **Project Strategies**

There are escalating stages of implementation for the Smart Grid project:

- Smart Grid Consortium: Sea Islands 2050 Fellows will introduce the Smart Grid project to leadership from local utilities, academia, and municipalities in order to establish a formal consortium specifically developed to champion a Sea Islands Smart Grid System.
- Smart Grid Speaker Series: Experts from contributing industries (IBM, GE, Siemens, etc.) will be invited to academic institution(s) of all levels for an ongoing speaker series. This will contribute to the local discourse and will enhance the public and academic awareness, of both the need for a Smart Grid and of developments being made in the technologies. Partnerships between institutions and local utilities will contribute to the funding for this stage of the project.
- Smart Grid Technologies Course of Study: A fully-developed undergraduate course in Smart Grid Technologies in any of the local and/or state academic institutions will be developed, in conjunction with experts from contributing industries and in response to increased demand for an educated and skilled workforce capable of contributing to the Smart Grid cause locally.
- Smart Grid Innovation Institute: Upon successful realization of the Speaker Series and Smart Grid Technologies Course of Study, the formation of a formal institute dedicated to Smart Grid innovation is a natural conclusion to the project. The formation of such an institute in the Sea Islands region would not only attract students and faculty, but would be a draw for private development seeking to work in conjunction with the academic research being done.

## **Chief Participants**

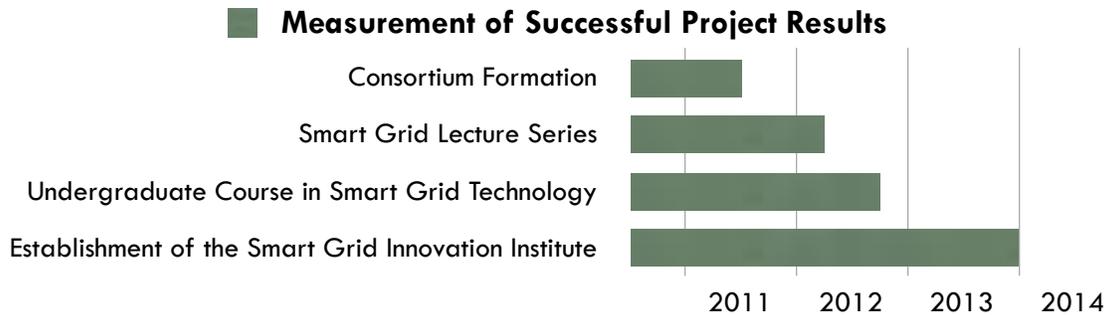
The Sea Island 2050 Fellows chairing the Smart Grid project are:

- Fred Leyda, Director of Beaufort County Human Services
- Chris Petry, Treatment Director at Beaufort-Jasper Water & Sewer Authority
- Perminder Bindra, retired IBM Executive

Additionally, participation by Sea Islands 2050 staff will be necessary for coordination of some project activities, and expert consultants will be sought, in collaboration with local institutions, to implement project activities at the academic level. Sea Islands 2050 will also collaborate with parallel initiatives throughout the country, seeking to contribute to best practices and coordinate a unified approach to the Smart Grid system.

## Measurement of Results

The Smart Grid project results will be measured sequentially through its implementation.



Preliminarily, a positive reception and established partnerships with targeted populations (academic institutions, local utilities, supportive industries) will serve as indicator for potential receptiveness to the Smart Grid solution at all levels. Success in this effort will be achieved with coordination of a consortium, inclusive of local utilities (water/sewer and power) and academia (technical college and university) providing formal memorandums of understanding of their participation, prior to the end of the 2011 calendar year.

Establishing funding for the Speaker Series and relevant activities, through sponsorship and endowments, will solidify the potential success of this project for the greater Sea Islands community, and implementation of a full-scale speaker series during the 2012 calendar year will serve as measurement of success for this public outreach effort. Subsequent indication of success includes the development of the Speaker Series as an annual event or permanent series, offering ongoing public education on Smart Grid, specifically indicated by funding for and permanent implementation of the Speaker Series during the 2013 calendar year onward.

Additionally, meaningful contribution by Sea Islands 2050 toward a formal Smart Grid Course of Study at local academic institution(s) will reinforce the value of effort toward the Smart Grid cause. Success in this effort will be indicated by implementation of a Smart Grid Course of Study for the 2012 Fall Semester at one or more colleges and/or universities.

The eventual establishment of a Smart Grid Innovation Institute will serve to provide long-term contribution toward the project's goal of modernizing the energy system of the Sea Islands region, for the benefit of the entire community. Through implementation of the Smart Grid Institute, the Sea Islands community will gain a permanent source of both innovation and commitment to the Smart Grid cause and to sustainable energy provision for our region. Success in this effort will be indicated by establishment of the Institute prior to the end of the 2013 calendar year.

Ultimate success of the Smart Grid System and Innovation Institute Project will come with the full implementation of a Smart Grid throughout the Sea Islands community.