

Improving the Bottom Line: Alternative Energy and Conservation at The Island Golf Club



Solar cells on the cart barn. Courtesy of Gulf South Solar

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The Island is a privately owned 18-hole championship course located near Baton Rouge, within the Iberville Parish, and is part of Louisiana's Audubon Golf Trail. Located on a 400-acre residential and recreational development, the golf course is 7,010 yards from the professional tees and includes 160-acres of Tif-Eagle grass and 9 man-made lakes. The main clubhouse and associated veranda cover 8,000 square feet and incorporates a restaurant, banquet and conference

facilities. Other features and structures at the club include the golf shop, cart barn, maintenance shop, swimming pool, and tennis courts. All operations at The Island require a significant budget and like many golf facilities, efficient and economical operations at the club are important – specifically improving the “bottom line.”

The Island underwent significant review, analysis, and implementation processes to cut costs and improve efficiencies to improve our bottom line. Most of the low hanging fruit within our operations was targeted and improved. One key area that stood out was our electricity use and specifically the “demand charges.” Our average electricity cost for non-demand use was \$.09 to \$.12 per kilowatt hour (kWh) and for demand periods it was \$5.12 per kWh as supplied by the municipal utility. We attempted to analyze our energy use and limit high consumption activities during the “demand charge” period, but soon learned that this was a difficult and challenging process.

In January 2008, Mr. Klein Kirby, Chairman of our board for our parent company, A.

Local Climate

Climate data in conjunction with the energy analysis is important in determining what practical alternative energy projects are feasible for any location.

Climate for the Baton Rouge area includes:

- Baton Rouge is located within the sub-tropical area east of the Mississippi River.
- The average reported annual rainfall is 55 to 60 inches per year.
- The average annual snowfall is 0.1 to 0.2 inches per year.
- The average winter temperature is 51 degrees F.
- The average summer temperature is 80 degrees F.
- The average number of clear days is 99 and the average number of partly cloudy days is 119.

Wilbert's Sons, LLC, began oversight of The Island. When reviewing our energy use, we discussed the potential for alternate energy sources at the club and Mr. Kirby, who is an engineer, was very interested. From this point we embarked upon the investigation to implement alternative energy at The Island.

We contacted Gulf South Solar, a solar energy company that had installed the nationally recognized solar projects in New Orleans for the Green Rebuilding of New Orleans project funded in part by actor Brad Pitt, to review our needs and make a proposal. With their help we decided to initially focus on two primary projects. The first would be the installation of solar panels on the cart barn that would power the cart barn, main clubhouse, and golf shop as well as the tennis and pool clubhouse. The second project entails a geothermal unit for the main clubhouse, which incorporated a second solar unit for the groundwater pump associated with the geo-thermal unit. Facilities not yet covered by our alternative energy projects, include the maintenance facility and irrigation system.

Solar Cell Basics

How do solar cells work?

A solar cell contains a semi-conductor, like silicon, that collects the sun's energy that flows through the cell's circuitry.

What are solar cells made of?

Solar cells may consist of crystalline silicone like microprocessors and/or gallium arsenide, which is found in the highly efficient cells.

How effective are solar cells?

The efficiency or amount of power that solar cells produce depends in part upon their construction materials, their quality, technology used in construction, their location, and the amount of time they have been in service.

At the time of construction, the main solar project would be the largest in the state and would include the installation of 160 solar panels, which are arrays of photovoltaic cells that actively collect the sun's energy and convert it to energy.



Solar cells on the cart barn at The Island. Courtesy of Gulf South Solar

Installation of the solar cells began in August 2008 and was completed in October 2008. The main solar project consisted of solid or fixed solar cells configured to produce up to 31,680 watts. The cells installed have a 20-year life expectancy and will provide a minimum 95% production as compared to new cells during this period. The cells are also capable of generating energy at a reduced rate during periods of cloud cover. Three power inverters were installed for our needs. An alternative energy resource, like solar cells or wind generators, may be connected

to the power grid coming into your facility or it can be a “stand-alone” system not connected to the grid. In addition, your system may have a battery back-up that can be charged by the solar cells for days that the power generated is insufficient for your demands. The Island Club’s system was connected to the grid and does not have a battery system.

Connection to the grid will vary by the system involved, your utility provider, insurance company, and any pertinent regulations. The cells are connected to inverters that provide the energy to our facilities and the city had to install the back flow meters to measure the energy generated by our system and that is not used. Energy not used is measured through these meters and our electricity bill is credited accordingly. During our first year we did not generate many credits due to our weather, but expect to next year with the energy demands associated with the weather change.

Solar systems can be monitored for energy produced and our system uses an online monitoring system from Solrenview™. We are able to monitor the energy generated on a daily and lifetime basis. In addition, a nice feature that we have is the ability to monitor the lifetime carbon dioxide (CO₂) emission offset. As of November 15, 2009 our system had generated more than 50,000 kW with more than 63,000 pounds of CO₂ emission offset. This equates to an emission offset rate of 1.25 pounds of CO₂ per kWh.

SOLRENVIEW **SOLECTRIA RENEWABLES**

The Island Clubhouse [Refresh in 13:36]

System Info

Location: 23550 Myrtle Grove Road, Plaquemine, LA 70764
 Monitoring Started: Mon Oct 27, 2008
 Installer:

Inverter Models	Inverter WAC	Qty.	Total Capacity (WAC)
Solectria PVI 15kW-208VAC	15000	2	30000

Panel Modules	Module WDC	Qty.	Total Capacity (WDC)
Sharp 198	198	160	31680

System Power - Past 7 days (Inverter-Direct)

System Status Now (2009-11-18 09:24:19 CST)

Online (last update: 2009-11-18 09:18:29 CST)

System Status, **Inverter-Direct**: Active

Energy generated today: 32.6 kWh

Lifetime energy generated: 50436.5 kWh

Lifetime CO₂ emission offset: 63046 lbs

System AC power now: 21406.3 W

[View Inverter-Direct](#)

Capture of screen view of the online monitoring system for primary solar cell system.

The second solar system includes 14 of the solar cells and powers the ground water pump for the new geothermal unit at the main clubhouse. This similar system is mounted on the ground, utilizes one inverter, and has a power capacity of 14,198 kW. As of November 2009, more than 29,000 kWh has been generated since its launch with a CO₂ offset of 3,745 pounds. The system is not hooked up to the grid and does not have a battery back-up system associated with it either. This system came online in March 2009.



*Second solar system for groundwater pump.
Courtesy of Gulf South Solar*

The water pumped from this system is used for the main clubhouse's new geothermal unit, but any excess water is directed to one of the irrigation lakes. This lake had a fountain in use, but we removed the fountain and incorporated a similar spray by using this excess water flow through a system utilizing a nozzle. It works well and eliminated the additional pump for the fountain.

We were fortunate to have the opportunity to change the fountain and incorporate the second solar system with our geothermal project. The main clubhouse had an air conditioning system equivalent to approximately 35 tons. This geothermal system uses the groundwater to both heat and cool the main clubhouse. Our unit is rated at 2,722 kWh.

Geothermal units utilize a system that incorporates the constant temperature of the earth in lieu of the air temperature. Water that is either pumped from the ground or cycled underground below the frost line is maintained at a constant temperature. Three components are generally involved consisting of piping into the ground, heat exchange unit (heat pump) and air flow unit. This allows for the exchange of warmer temperatures within the facility during cold days and cooler temperatures in the facility during warmer days.

Electricity Use and Carbon Dioxide Generation Comparison to Households

“The average household's "typical" annual CO₂ emissions are 14,796 pounds per household, assuming approximately 900 kWh per month. That is a calculated emission rate of 1.37 lb of CO₂ per kWh.”

Source:

http://www.epa.gov/climatechange/emissions/ind_assumptions.html

Using this data we can estimate that the CO₂ emissions offset from our solar projects is equivalent to 4.5 typical household's annual CO₂ emissions – as of November 2009. This environmental benefit will only increase over time as our system remains in use.



The life expectancy for the unit above ground can be up to 10-years and below ground almost 50-years. Efficiency and effectiveness of a geothermal system depends in-part upon location, climate, etc. This unit was a good choice for The Island.

The geothermal and solar projects are a significant change for The Island and are intended to improve the “bottom line” as well as provide for environmental stewardship. As of November 2009 there has been an estimated 54% reduction in utility costs at the club house. That is

approximately \$5,000 per month. The investment for these projects was approximately \$252,000 for the solar cell projects and \$90,000 for the geothermal unit project.

Many tax incentives exist for alternative projects like these. We were able to use a federal tax incentive of 30% for both projects. The state offers a 50% tax incentive as well. The allowed depreciation period for these units is approximately 5-years as well. These incentives help with the projects. The projected return on investment (ROI) for these projects is less than 8-years for the solar project and 6-years for the geothermal unit. The ROI for an alternative energy project will depend upon many factors such as location, climate, technology used etc.

Communications with the golfers was important for these projects. During construction we received lots of questions and everyone was supportive of the projects. The solar panels located on the cart barn roof are really out of view – it was a perfect location with the correct pitch etc. In addition, the systems were tested during a hurricane and we had no issues occur, an important aspect for performance and communications. Other outreach efforts involve tours to the golf course to see the systems in place. The Island was a stop on the American Solar Energy Society’s National Solar Tour in 2008.

These projects are a significant improvement at The Island. We will explore options for the maintenance building, but energy use is low for that facility and it will depend upon the ROI for that project. In addition, there are four other wells that we can review. Golf facilities should explore their options for alternative energy, energy conservation etc., because some environmental stewardship efforts can improve the bottom line as well.