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Highlights

The power quality of the system will be better than utility supplied power from the aging local distribution system within the Caddo Lake National Wildlife Refuge.

The specified off-grid technology package is a highly cost-effective option for the Starr Ranch facility, and may provide more than \$150,000 in savings over its expected 30-year life when compared to the utility power supply option.

The payback period of the off-grid power supply package is immediate if compared to the utility power supply option. Conversely, there is no payback period associated with the utility power supply option.

Powering a 1300 square-foot property for the twenty-first century...totally off the grid

In 2000, 7,500 acres of the Longhorn Munitions Superfund Site in Karnack, Texas, were established as the Caddo Lake National Wildlife Refuge. The purpose was for migratory bird and other fish and wildlife management and conservation, and the protection of the highest quality old-growth bottomland hardwood forests in the Southeastern United States.

The Starrs, one of the early Texas pioneer families, maintained a small house on the shore of the Caddo Lake. This historical building has fallen into severe disrepair; however, several local entities have expressed a strong interest in rehabilitating it. Currently these groups are discussing whether the structure should be demolished and rebuilt, or remodeled to make it habitable again. The facility would be used for short-term public stays, as well as longer term occupancy by visiting scientists and researchers conducting studies and collecting data within the Refuge.

The purpose of the feasibility study was to develop an off-grid profile for the Starr Ranch facility. The design plan had to address the “worst-case” scenario of maximum potential electricity usage. In this scenario, operating in a continuous manner for several or more days in a row was used. Since the facility’s occupancy

patterns are expected to be intermittent, the actual energy consumption should be even less, which allows for some flexibility in the design

load. In addition, energy consumption from the base load could be reduced even more, if energy is used in a conservative manner.

After reviewing many options, the final recommendation for the Starr Ranch renewable energy conceptual design utilizes a Photovoltaic (PV)/Battery/Gen-Set hybrid system with the PV and battery back-up sized to meet the majority, if not all, of the predicted loads at the facility. Supplemental power is supplied, when necessary, by an auto-start propane back-up generator, triggered by parameters designed to maximize battery life and performance, while minimizing generator run time and propane consumption. State-of-the-art inverter technology will provide high-quality power that accommodates the use of delicate electronics such as computers, printers, and satellite communications equipment without the surge characteristics which often are found in conventional utility power supplies, especially at the end of



Don't let the look of this small cabin fool you. It will be state-of-the-art once it is complete...and off the grid!



radial distribution lines. Hybrid PV/Battery/Gen-Set systems, when properly designed and installed, provide reliable and high quality power to off-grid end-users.

In terms of real dollars (2010), the off-grid supply option will save an estimated \$168,000 over its 30-year expected life, compared to the utility supply option. Perhaps even more important is the comparison of the payback periods of the two options. Under the utility supply option, the \$300,000 investment in the line extension is never recovered, and requires the purchase of energy from the local utility in perpetuity. As a result, there is no payback period associated with the utility supply option. Conversely, the payback period for the off-grid energy supply system is immediate since it avoids the estimated \$300,000 line extension payment to the local utility. In fact, the Year One savings attributable to the off-grid energy supply package amounts to over \$230,000, primarily due to avoidance of the line extension payment and off-grid energy package turn-key costs estimated at \$67,000.

Currently, US Fish and Wildlife Service is determining energy needs once the Friends of Caddo Lake work out their renovation plans. We can't wait to see this exciting project come to fruition. Stay tuned.



It isn't any surprise that the Friends of Caddo Lake would love to retain this beautiful view from the newly renovated Starr Ranch cabin.

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