

Outdoor Illumination with Solar Powered LEDs

Eneref Institute examines how solar-powered outdoor LED lighting fixtures eliminates the need for underground trenching wires at Swan Lake Park in Liberty, NY.

Swan Lake Park is one of the first parks in the US to take advantage of a new solar-powered LED lighting technology powerful enough for practical commercial outdoor-area applications.

Swan Lake is one of four hamlets in Liberty Township, in Sullivan County, NY. Years ago, the area was a trendy New York State tourist spot and the center of “Borscht Belt” comedy acts. While those days are now part of its rich history, Liberty still boasts several town parks, golf courses and the award-winning municipally-owned Swan Lake Park. Bordering the park is a three and a half mile long private lake. Today, Swan Lake also attracts potential homeowners for its serene views and recreational activities.

Heinrich Strauch, who manages the Liberty Community Development Corporation (CDC), teamed up with a local volunteer-based organization, Swan Lake Renaissance, to enhance the park’s beauty. CDC is involved in economic and housing development for Liberty, including a program called Public Spaces, dedicated to projects such as the beautification of Swan Lake Park. Sullivan Renaissance, who oversaw the project, is principally funded by the Gerry Foundation. The light-

ing of the park was part of a solar street light demonstration project co-funded by the New York State Energy Research and Development Authority (NYSER-DA).

The 14 ft tall solar-powered LED streetlights installed along the pathway at Swan Lake were supplied by Solar-

small LEDs, providing a uniform light inside a housing that is a throwback to classic street lighting of the early 20th Century. The fixtures are powered by photovoltaic (PV) cells that convert light energy into electrical energy.

What sets the lighting fixtures apart is a computer technology that ensures that the lights are always on, regardless of cloudy sunless days or long winter nights to create the first reliable off-grid streetlight solution.

Along the lake is a boardwalk and gazebo; neither or which was originally lit. Only the road had light posts. “It wasn’t welcoming at night and there was also a safety factor”, says Nancy Levine, an Officer of Swan Lake Renaissance. “But we didn’t want to put up a railing on the boardwalk because



SolarOne Solutions solar powered LED's illuminate the boardwalk at Swan Lake Park in Liberty, NY.

One® Solutions of Framingham, MA. The fixtures employ round strings of

people sit on the edge and fish. It just wasn't something we wanted to do”.

The economic benefits include the elimination labor and material costs from trenching and repaving required for underground lines. Although each fixture can cost over \$5000, after the initial cost, the energy from the sun is free. Light poles can be placed anywhere on the grounds without running long-distance high-voltage underground lines because the lights are powered by the sun's energy instead of being plugged into the electrical grid.

A somewhat less measurable economic benefit is the reduction of loss due to vandalism. "We've got kids that destroyed a few things whether intentionally or unintentionally. With the lights here I think we've had less incidences of vandalism" said Levine.

Six solar-powered street lights, were sufficient for lighting the area at night. The average foot-candles where the lights were positioned on the walkway is 0.64. The lumens per fixture are 2400. The fixtures are also "Dark Sky" compliant. Dark sky policies prohibit lights that wash out the starry night sky.

However, unlike grid-wired LED lighting, the solar-powered lighting required special solar planning, beginning with determining the solar array

needed to produce sufficient energy to serve the electrical load for the different conditions and seasons. The next step was estimating how many "bad", sunless days to expect. For sunnier climates such as Southern California, generally 5 days of battery power storage is recommended, and 10 days for cooler, cloudier regions like Toronto. And when placing solar panels, the best orientation of the panels is south, but also that they can be spoiled by the shadows of trees or buildings.

The feeling that Swan Lake is a safer park at night has substantially have increased the public's use of the park, says Levine, "I would say 10 times more people visit at night than before".

Levine says the lights also add beauty to the park. "The fixtures are a very soft, beautiful light. Not glaring at all. And they light up the board walk, and all the way down to the parking lot. So it lights up the places in the park that need to be lit up but we also designed secluded dark areas of the park"

The illuminated pathways now guide pedestrians to designated walkway, making it easier to patrol at night and reducing accidents. With no underground cabling restraints, the lamps could be repositioned if need be. The

LED light levels are infinitely adjustable and the white light provides greater visibility without over-lighting.

"It's a great showpiece, and people can actually experience it", says Strauch. "You always have naysayers that say, 'yeah in theory it sounds nice, but it doesn't provide the illumination', but this is a showpiece where you can really tell them, go there and look at it. It works perfectly"

"It's a great role model for future development" said Strauch. ●



This article is an excerpt of the future Eneref report which assesses the impediments to building zero-energy urban communities in the US. A companion film documentary, The Eneref Project, will seek to demonstrate to key decision-makers how zero-energy communities can be commercially viable.