

## SolarBee uses sunshine on the water to scrub reservoirs clean

Running water is an energy source, but still water can be an energy drain. As much as 3 percent of the country's energy consumption goes to treating water in reservoirs and wastewater lagoons, according to [Pump Systems, Inc.](#), manufacturers of a floating water circulator that runs on renewable energy.

The photovoltaic-powered [SolarBee](#) aerates closed water bodies, mixing warm, oxygen-rich water from the pond's surface with cooler, oxygen-depleted water at the bottom. Currents do this same job in open watercourses like rivers and springs, balancing the aquatic ecosystem. Without aeration, nuisance plants and [harmful algae](#) build up, killing fish in freshwater ponds, aggravating environmental concerns in wastewater lagoons, and giving off unpleasant odors.

Until recently, municipalities and industries had only two options for aerating ponds and reservoirs: a never-ending cycle of chemical treatments or mechanical circulators powered by electric motors. That didn't strike PSI president and founder [Joel Bleth](#) as enough of a choice. "Both ways are expensive and neither is very efficient," observed Bleth. "You're either introducing more chemicals into the environment or running a big electric motor during peak hours."

PSI developed, manufactured and installed its first solar-powered circulators in 1998. Operating from sunup to sundown 365 days per year, two SolarBees can replace a 100-horsepower circulator running for five hours a day at peak load. A shore power option allows the unit to run around the clock for about \$10 in monthly electric charges.

### SolarBee helps reclaim lake for summer fun

Aeration is a practical—and affordable—answer to odor control for small communities. Residents around Gaynor Lake in Boulder County, Colo., used the 66-acre, freshwater pond for water skiing and swimming. However, when the weather warmed up, algae blooms and fish kill turned the water murky and smelly.

The Gaynor Lake Homeowners' Association consulted an engineer and a limnologist—an expert on freshwater conditions. The limnologist's research indicated that drawing oxygenated water across the oxygen-free (anoxic) water layer on the lake bottom would clear up the water and eventually replace the black, plant-free silt with clean sand. "He suggested a \$30,000 SolarBee circulator as an alternative to draining the lake, which could easily turn into a million-dollar project," said association member Jeff Swanson. "The price was right, so it seemed worth a try."

Although the SB10000 was installed in June 2003, too late in the year to completely aerate the pond, residents noticed that the smell had diminished by September. "When the wind blew over the lake, it actually smelled like water," noted Swanson. "The long, gooey strings of algae on rock walls and piers were gone, too."

Working over an entire season from spring thaw through the summer, the SolarBee is expected to produce a two to three foot cap of clear water and eliminate the odor and algae problem without dredging. The association is now considering the addition of a solar battery pack so the unit can store clean energy to clean water after the sun goes down.

### Reduced need for chemical additives pays back equipment investment

What one SolarBee is doing for Gaynor Lake, several SolarBees are doing for a large reservoir in California. Lake Palmdale supplies the city of [Palmdale, Calif.](#), Water Treatment Plant and supports boating, fishing, hunting and airplane landings. Aqueduct water containing nutrients from farms and residential lawns feed the

312-acre lake, creating favorable conditions for intense blue green algae blooms.

In 2002, the city applied 2,000 pounds of copper sulfate weekly to the raw water reservoir to control taste and odor problems. Even with the treatment, the lake was designated a “no contact” body of water and the city was able to draw only 25 percent of its 30 million-gallon daily needs from the reservoir.

The city installed six of SolarBee’s new SB10000 units on the reservoir in November 2002 and added a seventh in June 2003. The units were equipped with intake hoses that distributed oxygen to average depths of 20 feet. The improved aeration allowed the city to apply copper sulfate only once that year, saving \$65,000 on the chemical compared with 2002. “The SolarBees cost a total of \$210,000 and the maintenance and operation costs are very low, making the payback period a little over three years,” said Bleth.

Another benefit was that Palmdale could draw 60 percent of its water needs from the lake, taking some pressure off the city’s well fields with their conventionally powered pumps. Also, the water treatment plant operated much more efficiently. “Algae can clog treatment systems, and as long as we keep pouring nutrients into the soil, the algae problems are going to keep on growing,” Bleth stated. “Towns can either spend millions of dollars continually upgrading their treatment plants or they can beat the problem in the lake using renewable energy.”