

Solar Sal Makes History



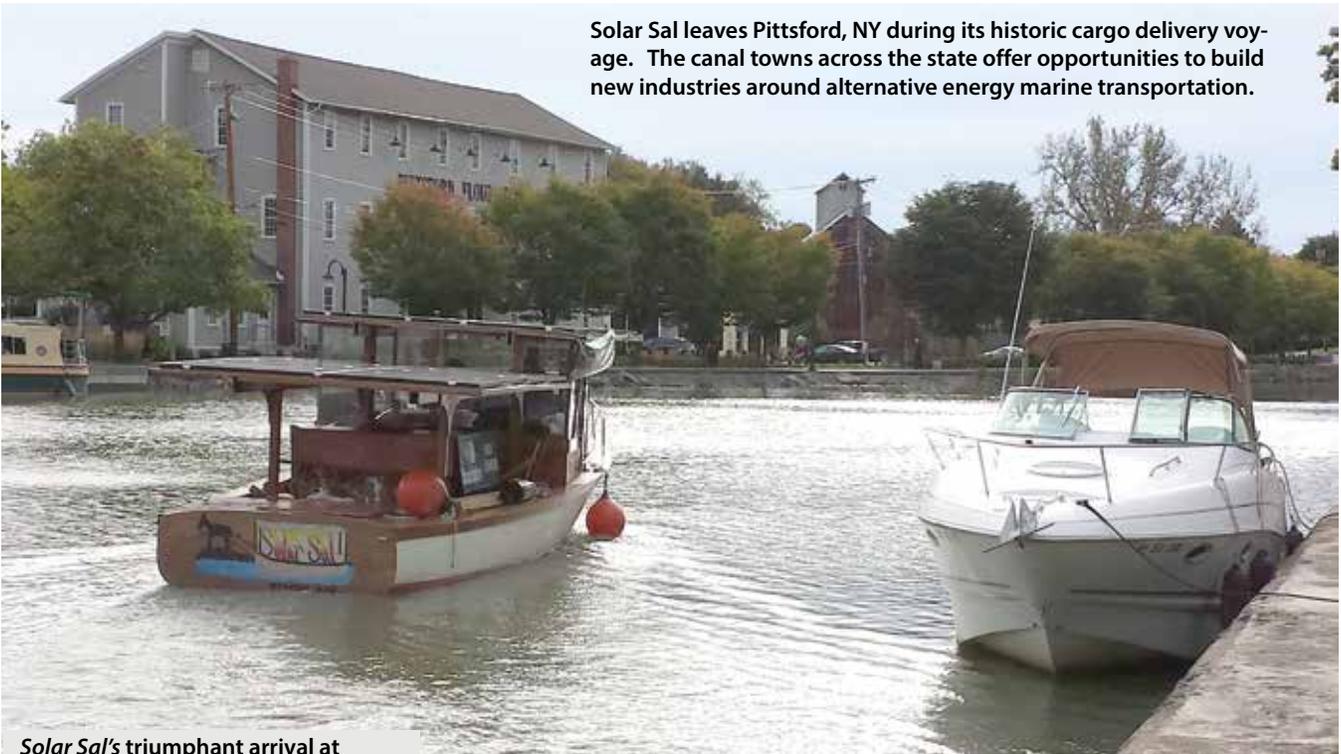
Celebrating the old and the new, as the Schenectady Yacht Club marks 75 years in operation, the Mohawk Towpath Scenic Byway reaches its 10th, and *Solar Sal* nears the completion of its trip in Rexford, NY (Saratoga County). Clifton Park Town Supervisor Phil Barrett, Assemblyman Jim Tedisco, Chamber of Southern Saratoga County President/CEO Pete Bardunias, Retired RPI Professor David Borton (creator of *Solar Sal*), Byway Executive Director Eric Hamilton, Schenectady Yacht Club Commodore Ted Bochenek and others involved greet the *Solar Sal*.

First Cargo Delivery Trip Using ZERO Fossil Fuel!

by Pete Bardunias,
President/CEO, the Chamber of Southern Saratoga County

On October 13, 2015, *Solar Sal* became the first-ever boat to traverse the Erie Canal and deliver a cargo without using a drop of fossil fuels, demonstrating its capabilities to interested onlookers statewide. Numerous possible uses were uncovered, from tour boats and trawler-style private yachts to short haul delivery vessel and even floating farmers markets.

Solar Sal leaves Pittsford, NY during its historic cargo delivery voyage. The canal towns across the state offer opportunities to build new industries around alternative energy marine transportation.



Solar Sal's triumphant arrival at the Mechanicville Docks. Pictured are representatives of the leading sponsors of the trip (L-R): Phillippe Bourassa, Plant Manager, Cascades Tissue Group, Mechanicville; Andrew Sheridan, Marketing Manager, Away From Home Products, Cascades Tissue Group; Ian Germain, Marketing Manager, Greenfield Manufacturing/Hull-speed Performance Marine Coatings, Saratoga Springs.



Professor David Borton headed west on September 19, cruising the entire length of the Erie Canal from Waterford to the Niagara River, returning to Lockport in time for the September 29 loading of 6 bales (8000 lbs) of recycled cardboard from lead sponsor Cascades Paper's Depew, NY facility. I traveled west on Amtrak, joining them on a rainy day just as the Cascades folks were discussing the logistics of loading the boat. Despite the raindrops and various challenges we successfully took on the cargo, aided

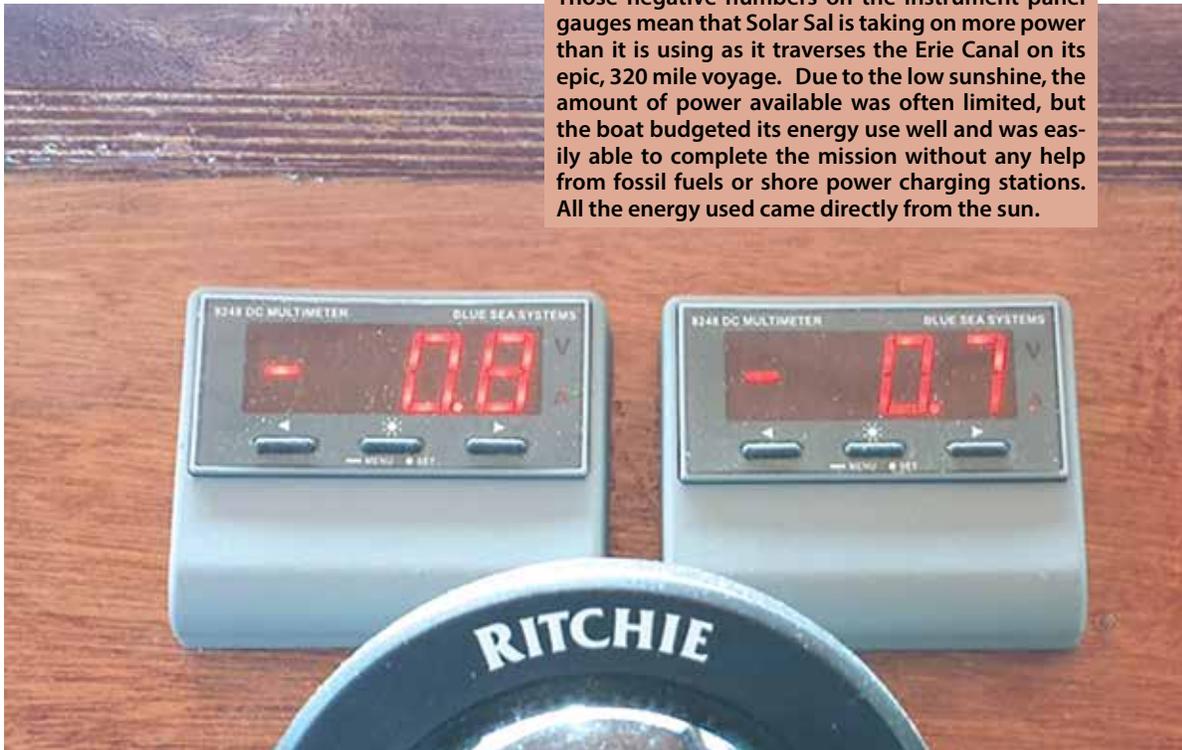
by New York State Canal Corporation employees and Ian Germain from Saratoga-based Hullspeed Coatings, also a sponsor of the trip.

We began cruising eastward into the murky gloom. As Solar Sal moved along, David showed how the vessel could proceed solely on just the incoming power from the dim light. Its solar arrays can gain energy from minimal daylight, and Solar Sal's battery reserve allows for some running even at night (maxi-

From the Publisher:

Individuals like Dr. David Borton, the retired professor from RPI in Albany who used his own money to build and operate Solar Sal, and Mr. Pete Bardunias, who as President/CEO of the Chamber of Southern Saratoga County has the connections to make it happen, are the true leaders in moving forward in projects that others might not yet have thought or conceived. There are many like them in the Hudson River Valley, and most never get the credit they deserve for what their forward thinking creates.

The Solar Sal concept is perfect for the canal system as it offers minimum cost transportation, helping make canal transport a viable method and bringing our inland waterways into the 21st century. Next we need deep thinkers to apply the concept to products and services that meet the goals of low cost transportation costs, and cost effective at the speed through the canals that fit this concept. Are there graduate schools or other minds ready to take on this concept and project?



Those negative numbers on the instrument panel gauges mean that Solar Sal is taking on more power than it is using as it traverses the Erie Canal on its epic, 320 mile voyage. Due to the low sunshine, the amount of power available was often limited, but the boat budgeted its energy use well and was easily able to complete the mission without any help from fossil fuels or shore power charging stations. All the energy used came directly from the sun.

mum range on a full charge – 50 miles). We stopped in a nearby town and stayed overnight in a quaint motel, eagerly awaiting the next day's challenges.

Thus began an odyssey that spanned a week's time and about 320 miles of towns, bed and breakfasts, hotels, waterfront parks, marinas, restaurants and other attractions. We met people who encouraged us, hoping for new industries to revitalize some of these towns and help build the upstate economy. It was quite sad to see so many former canal terminals and barge loading sites rusting away, clearly unused for quite some time. Even sadder were the ones that looked like they had been used fairly recently but were now joining their older counterparts in mothballs.

Solar Sal performed well, despite significant overcast and rain for days. She easily reached her top speed of 7 knots when called for, and in direct sunlight could sustain a 5 knot cruising speed (same as commercial tugs

travel in the canals) using only 4kW of power. Since the solar arrays can deliver 5kW on a really nice day, a reasonable speed can be achieved while more energy flows into the boat's batteries than it is using – in essence the boat is refueling while underway. Try that with your typical powerboat! Given the nature of our endurance run, the inclement weather meant that we needed to slow a bit to achieve the same effect, but it was a trip to watch the gauges as we crossed Oneida Lake knowing we were actually taking on fuel.

The boat is nearly 40 feet long and 11 feet wide, although production designs might benefit from increased beam at the gunwales to provide sidedecks and better protect the solar panels from bumping into the lock walls. It handled amazingly well and had a smooth, comfortable ride in a 2 to 3 foot chop on Oneida Lake. Steering with a heavy load takes some getting used to, being akin to piloting a barge.



With assistance from Bette & Cring Construction Company, Barton & Loguidice and the City of Mechanicville, the bales of recycled cardboard emerge from the cargo hold of Solar Sal. Each bale weighed about 1200 lbs.

Sporting his "Ship By Canal" pin, author Pete Bardunias (right) shares a light moment with skipper David Borton in Solar Sal's wheelhouse. Professor Borton's vision led to the creation of this very capable vessel, planned as the first in a fleet of solar-propelled delivery boats, private yachts or tour boats.



Docking is reminiscent of a large I/O powered boat, because the twin Torqueedo 5kW outboards are mounted in a motor well. However, once familiar with this boat it is amazingly easy to dock. Wind affects it far less than the typical powerboat, and the electric drive offers an infinite number of power combinations, with full propeller torque available at all power settings. For example, the skipper can specify 150-300 watts when entering locks and easily glide the boat to the proper position. I learned when a little opposite throttle could help, as on a twin screw boat, and loved the sure response and quick burst of power available with a good dose of reverse thrust alongside the dock.

Because the design can accommodate a 12 ton payload it is very versatile, with multiple possible uses. For example, if finished as a private trawler-style yacht, there's room for a cozy cabin with sleeping for 4 or 6 including the typical accoutrements cruising boaters expect. Substitute a module with open seating and it could be an equally effective tour boat (we carried the weight of 40 passengers on our trip without any adverse effects). Other possibilities include short haul cargoes of heavy goods, recyclables, trash, or even fuel oil (why use fuel to move fuel?). Finally, Solar Sal could be a useful platform to create floating farmers markets or small scale transportation of food to downstate New York residents. Thus begins a fabulous new journey in the world of alternative energy!