

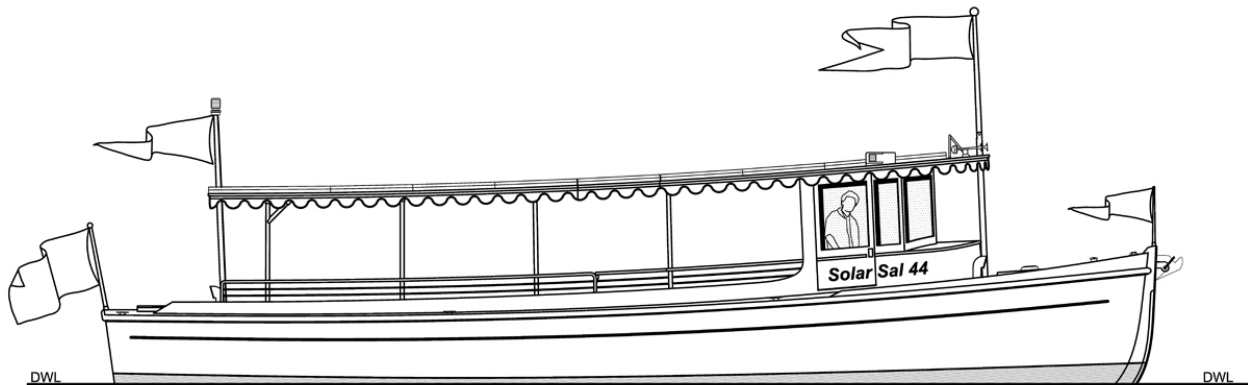
Sustainable Energy Systems, Inc., Gerr Marine, and Riverport Wooden Boat School at Hudson River Maritime Museum Present the Design and initiation of construction of:

Solar Sal 44

A Zero-Fuel, One-Hundred-Percent Solar-Electric Passenger Tour Boat The First of its Kind!

LOA:	44 ft. – 11 in. (13.7 m)	Draft Max:	1 ft. – 11 in. (0.6 m)
DWL:	42 ft. – 0 in. (12.8 m)	Beam Overall:	10 ft. – 10 in. (3.3 m)
Disp:	13,500 lb. (6198 kg)	Fuel Needed:	Zero
Power:	10 kW Torqeedo Outboard	Batteries:	(32) 8D
Solar Panels :	(16) SunPower E-Series	Bridge Clearance	11 ft. – 11 in. (3.6 m)

Note there maybe some technical changes...

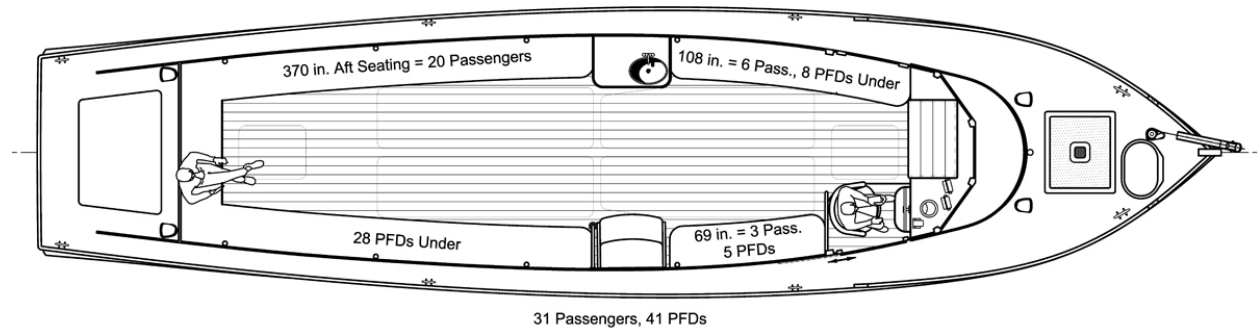


Since the first powerboat, all vessels have needed fuel . . . *until now!* David Borton conceived of a practical 100% solar-powered boat—a boat that carries no fuel and doesn't even plug in to shore power. The *Solar Sal 44* is the result. A commercial passenger vessel, she is the first of her kind.

The Concept

Borton has tested and proven his concept on two full-size 100% solar electric vessels which he built and tested: The 25 foot *Sol* and the 40-foot (12 m) *Solar Sal*. Both boats are powered solely by their solar panels (with no shore-power charger), and both can run all day and well into the night, at 5 or 6 knots. The entire concept is U.S. patent pending (PCT/US201/59967) by David Borton.

In mid 2016, Borton retained Gerr Marine to design the *Solar Sal 44* based on his concept. The initial *Solar Sal 44* design is for an inspected passenger vessel, under U.S. Coast Guard regulations. This new longer boat maximizes the potential of Borton's concept, with the large battery capacity and optimization of the solar-panel configuration. In addition, a live-aboard cabin-cruiser version of the *Solar Sal 44*—the *Solar Sal Cruiser*—will follow shortly. This will be the first cruising powerboat ever that won't require any fuel.



A Zero-Fuel, Ultra-Green Boat

The *Solar Sal 44* not only uses no fuel, but she is designed to have the lowest carbon footprint possible—to be as green as possible. Of course, using no fuel at all is already super green and super low carbon, but the hull is also built of wood—of wood-epoxy/strip-plank sheathed with glass. (Wood-epoxy/strip-plank construction sheathed in glass has maintenance and longevity characteristics equal to that of conventional fiberglass.) This means that 95 percent of the hull structure is from the renewable and low-carbon material wood. Other boatbuilding materials—fiberglass, aluminum, steel and even ferrocement—have much, much higher carbon footprints.

Traditional Styling to Fit Local History

While the *Solar Sal 44* incorporates the latest in twenty-first century technology, her styling is that of a late nineteenth-century launch. At that time internal combustion engines were heavy and low powered and their hulls had to be very efficient. The home waters of the *Solar Sal 44* are around Albany, New York where she will cruise the Hudson River and the Mohawk, Champlain and Erie Canal system. Launches of this type were often found in these waters. The name “Sal” in *Solar Sal 44*, refers back to the old *Erie-Canal Song*, written by Thomas S. Allen in 1905, with lyrics that begin:

I've got an old mule and her name is Sal
 Fifteen miles on the Erie Canal
 She's a good old worker and a good old pal
 Fifteen miles on the Erie Canal
 We've hauled some barges in our day
 Filled with lumber, coal, and hay
 And every inch of the way we know
 From Albany to Buffalo

For the twenty-first-century *Solar Sal 44*, the power isn't from a hard-working mule, but from our sun Sol, and so “Solar Sal.”

Arrangement

The *Solar Sal 44*'s arrangement consists of a main deck, with seats for 31 passengers, plus room for a captain and one or two crew. Boarding is from a ladder to starboard, with an optional wet bar to port. Forward, to starboard, is the helm station, and forward below is a fully private head compartment.

The thirty-two 8D batteries are all easily accessible directly below four large battery hatches. A 10 kW electric Torqeedo outboard is set in an enclosed outboard well aft, with a hatch over it to make it even quieter. In fact—like most electric boats—the *Solar Sal 44* whispers across the water, making almost no sound and leaving almost no wake.

On top of the awning roof are sixteen SunPower solar panels. This provides a nearly horizontal and unobstructed surface to maximize exposure to the sun on the panels. Headroom under the awning roof is a minimum of 6-foot, 9-inches (206 cm).

The *Solar Sal 44* is fitted with a 55-gallon (208 l) black-water tank to starboard and a 55-gallon (208 l) grey-water tank to port. Aft are a pair of fresh-water tanks, with a total capacity of 60-gallons. Multiple hatches ensure good access to the bilge and to wiring and plumbing.

In bad weather, the fully open cockpit sides are closed with roll-down eisenglass curtains. Combined with the forward cabin/windscreen, the entire cockpit is protected from the elements. In fair weather, not only do the eisenglass curtains roll up, and most of the forward windscreen windows open for optimum airflow.

Fabrication at the Riverport Wooden Boat School of the Hudson River Maritime Museum

Bids for building *Solar Sal 44* were received in late 2016. Happily for the Bortons the winning bid came from Kingston, New York, fairly close to their home in Troy. The Maritime Museum has a wonderful collection of artifacts and history of the Hudson River. The Boat School provides both education and professional wooden boat building and repair and currently holds Clearwater, Onrust, and Woody Guthrie overwinter.

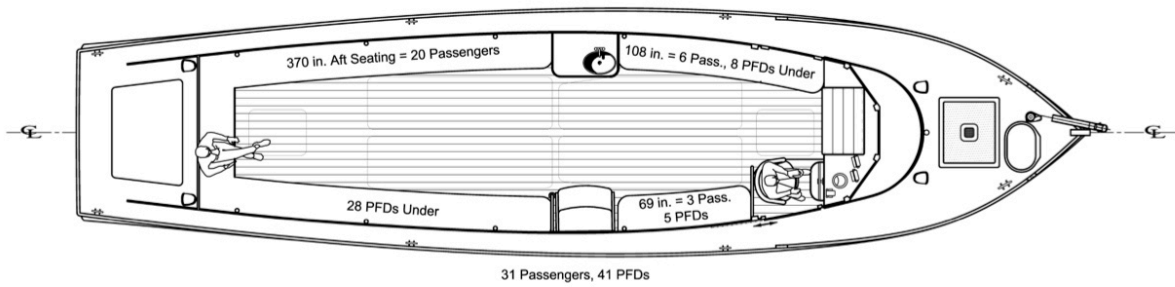
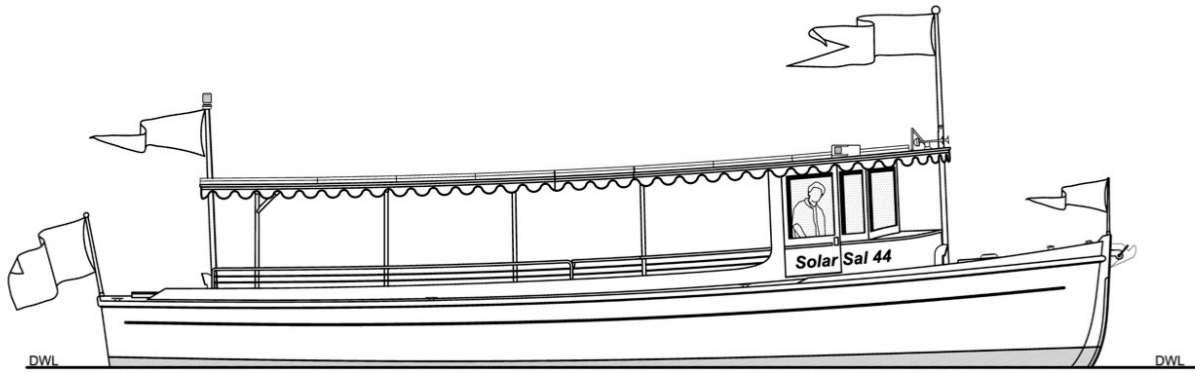
Kingston is one end of the Delaware and Hudson Canal and has been a center of boatbuilding and transportation for centuries. Besides coal and general cargo Kingston produced and shipped cement for construction up and down the east coast.

The Erie Canal, starting at the Hudson's headwaters of navigation in Troy, connected Buffalo, the Great lakes and the mid-west to a small port on Manhattan turning it into the shipping and financial center of the whole state. By uniting the mid-west to the east coast the Erie Canal united the United States. The story of the canal systems in New York, powered by mules and horses, is best learned traveling along the canals in solar powered boats.

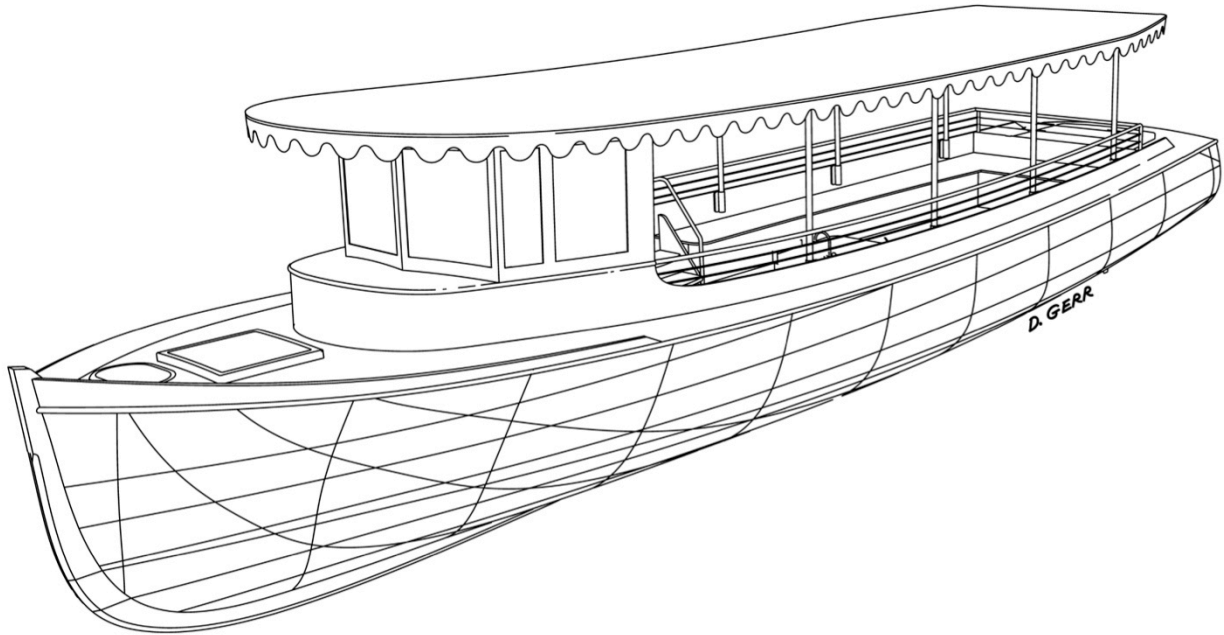
Conclusion

The *Solar Sal 44* is the first zero-fuel commercial powerboat. Not only does she use no fuel but she employs low-carbon, green construction. She provides her passengers a clean, quiet, super-efficient way to enjoy the water.

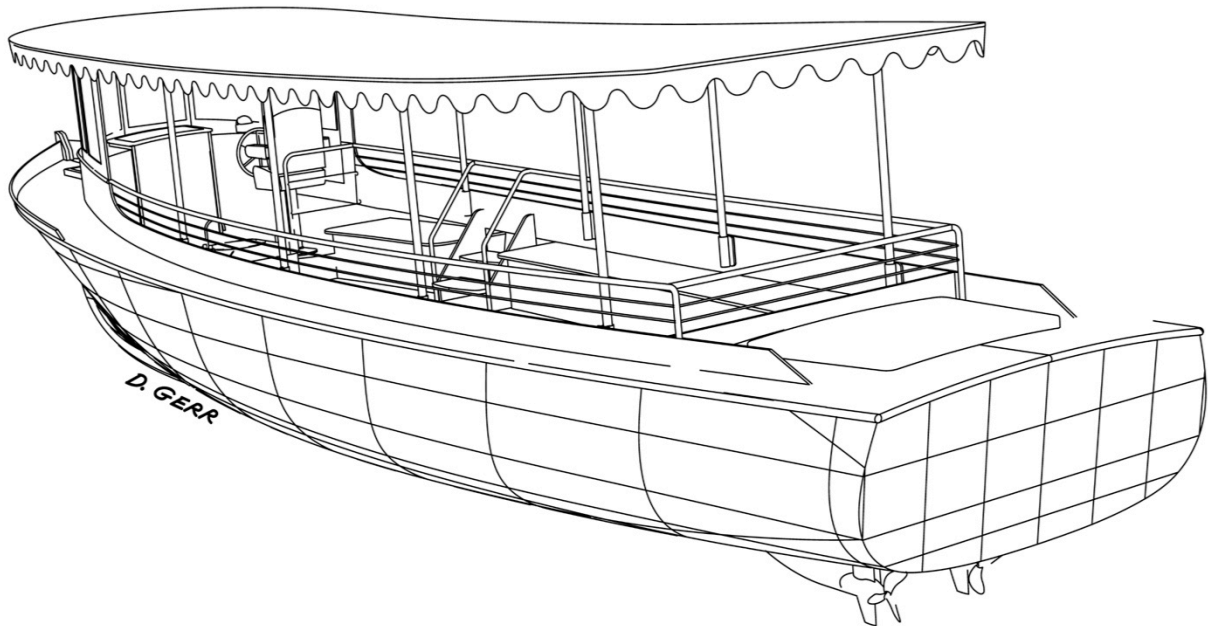
Solar Sal 44 Images



Solar Sal 44 - Zero-Fuel Tour Boat - Gerr Marine, Inc. - Dave Gerr, CEng FRINA Naval Architect - 838 West End Ave, Suite BB, New York, NY 10025 USA, Tel: +1 (212) 864-7030, Email: dave@gerrmarine.com, Web: www.gerrmarine.com



Solar Sal 44 - Zero-Fuel Tour Boat - Gerr Marine, Inc. - Dave Gerr, CEng FRINA Naval Architect - 838 West End Ave, Suite BB, New York, NY 10025 USA, Tel: +1 (212) 864-7030, Email: dave@gerrmarine.com, Web: www.gerrmarine.com



Solar Sal 44 - Zero-Fuel Tour Boat - Gerr Marine, Inc. - Dave Gerr, CEng FRINA Naval Architect - 838 West End Ave, Suite BB, New York, NY 10025 USA, Tel: +1 (212) 864-7030, Email: dave@gerrmarine.com, Web: www.gerrmarine.com

About David Borton

A Coast Guard certified Inland Master, an ABYC certified Marine Electrical System Technician and a physics Ph.D, David Borton has been President of Sustainable Energy Systems, Inc., since 1992. He was president of two other solar energy companies and taught solar energy engineering at Rensselaer Polytechnic Institute for 33 years. Solar energy concentrators were his major research focus. He grew up using and repairing wood-canvass canoes and has built graphite/epoxy canoes and Adirondack guideboats.

David's toying with a solar electric canoe in 2004 led to fabrication another aluminum solar boat as an experiment. Those successes led to the "real" wooden solar electric boats: Six year old *Sol* is a 25 foot launch used on an Adirondack lake where there is no road and no electricity to carry people supplies and equipment; and *Solar Sal*, a 39 foot multipurpose prototype of tourist, cargo and yacht versions of 100% solar electric boats. She mostly carries interested people, but she also carried 4 tons of cardboard the length of the Erie Canal for recycling into paper along the Hudson River.

Solar Sal 44, Patent Pending, is the first commercial "T" boat product for Sustainable Energy Systems. She is planned to launch in early summer 2017 and be on the Erie Canal for its 200th anniversary celebration. See also www.solarsal.solar

About Dave Gerr

A Chartered Engineer and Fellow of the Royal Institution of Naval Architects, Dave Gerr is a naval architect based in New York City. His design firm—Gerr Marine, Inc., founded in 1983—designs both yachts and commercial vessels, and probably works on a wider assortment of boat types than any other design office—sail and power; yacht and commercial; monohull and multihull.

Projects have ranged from 10-foot nesting canoes to luxury motoryachts, to consulting on the Virginia Class (SSN 774) nuclear attack submarines. Gerr's designs range from the aluminum Kanter 57; to the fleet of unique ultra-shoal, beachable, tunnel-drive cruisers built by Covey Island Boatworks, and ranging from 42 to 50 feet; to the magnificent 76-foot tunnel drive aluminum motoryacht *Walrus*, built at St. Augustine Marine.

From May of 2003 through December 2014, Gerr served as the director of the Westlawn Institute of Marine Technology. In August 2015, Gerr became an adjunct professor at SUNY Maritime College, where he lectures on boat design.

Gerr is the author of *Propeller Handbook*, *The Elements of Boat Strength*, *The Nature of Boats*, and *Boat Mechanical Systems Handbook*, all published by International Marine/McGraw-Hill. He has published over 400 articles on boats and boat design, which have appeared in almost every major boating magazine.