

ASK THE EXPERTS

Solar Boats

FEATURING **ALEX BORTON** OF SUSTAINABLE ENERGY SYSTEMS



Alex Borton

Alex Borton is a Bellingham, Washington-based U.S. Coast Guard certified boat captain who works with Sustainable Energy Systems. The company was founded by his Troy, New York-based father, Dr. David Borton, who is also a licensed captain. The two have worked on several solar boats across the country and have ambitions to launch production lines of their completely solar cruising boats.

The promise of green technology is all around us—on land with hyped-up electric cars, solar panels on roofs, and increased acreage of wind farms. But what about the sea? Specifically, our boats? Surely, if we can send rovers to Mars and find spouses via dating apps on our cell phones, we can make a 100 percent green-powered boat. (Cue the sniggers from sailors who've been doing this since the Neolithic period.)

Sailing aside, shouldn't it be possible to fire up the engines without that toxic soup of long-dead lifeforms we call fossil fuels? You don't have to be a tree hugger who wants to reduce the carbon footprint or reduce noise emissions that bother whales. We all want to save money at the pump or hold a non-shouting conversation while underway. Spare a moment to contemplate this utopia: never paying for gas or electricity for your boat. Ever. Again. Paradise!

Thus, we segue into a new generation of solar boats and the *Solar Sal*, an all-wood, 27-foot, custom boat designed by Sam Devlin. A pretty, traditional-looking vessel in her own right, the groundbreaking aspect of the *Solar Sal* is her guts. This boat is 100 percent solar powered, built to cruise nearly si-

lently and indefinitely without almost ever hooking up to shore power. This capability differs from other solar-powered peers like the Duffy Boats used for sunset tours on Lake Union, or the high-performing, all-electric outboards of Seattle marine technology startup Pure Watercraft.

Solar Sal is the product of Sustainable Energy Systems, a company founded by Dr. David Borton about ten years ago that has worked on mostly land-based solar energy projects. Borton was joined by his son and fellow boater Alex Borton, and the two spearheaded the dream of not only building solar boats, but also launching successful lines of 38- and 45-foot purely solar cruisers.

Their collaboration is a cross-country endeavor, with Alex living in Bellingham, Washington, and his father based in Troy, New York. They've produced other notable solar boats as well, including a 44-foot tour boat for the Hudson River Maritime History Museum in downtown Kingston, New York.

How are they going to take solar boats into production? I had to find out, so I met Alex aboard the *Solar Sal* at the docks of Waterline Boat Works on South Lake Union to ask the expert on solar boats.

NWY: One aspect of your solar boats is the ability to cruise indefinitely without needing to ever plug in. How does a boat achieve this all-green energy, off-the-grid capability?

So, people always ask us 'how far can it go?' because they think all electric boats need to charge up at shore. We plug in to the sun. With our boats, it's not about how far but rather how fast.

If the summer sun is shining, you cruise at five knots almost all day long without even drawing power from the batteries. If it is dark, then there are 40 miles in the batteries at five knots. If you want to go six and a half knots, you probably got about two hours of juice to do so. Even on a cloudy day, you can maintain two knots if you threw your batteries overboard (but we don't recommend that).

As long as it is daylight, there is energy coming in from the sun to move the boat.

NWY: When standing on Solar Sal, I've got all the comfort and push-button convenience of a power boat, yet performance is related to the amount of sun available like a sailor with the wind. Is there some merit to that summary?

Yes, I'd say so. In the summer, you'll be able to do just about everything your fossil fuel motorboat peers will be able to do at that five to six-knot range. In

the shoulder season, like sailors when the wind is low, you may be more limited to daytime cruising. You may need to take a day at anchor here or there to replenish the batteries, or plug into shore power overnight.

Like I said earlier, we're eager to get our 38- and 45-foot production cruisers built. It's a new kind of boating. If you want to go fast, this isn't the boat for you. If you don't mind five or six knots—and for a lot of folks that's their speed anyway—and unlimited range, then our boats are worth considering. As you mentioned our boats are quiet and there are no diesel odors. Being on the water on a solar boat is really quite pleasant.

NWY: Currently these boats are in the custom realm?

Yes, right now they are custom one-offs built by Sam Devlin. *Solar Sal* is priced at \$269,000. Most of that is because it is a custom wooden boat. It'd be priced around there with conventional engines too. The solar system aboard ran about \$30,000; including panels, battery, charging systems, etc. The beauty of a custom boat is it can be configured exactly how you want it.

NWY: Solar technology seems to be steadily improving every year. Do you see a plateau with regards to panel efficiency on the horizon, or no?

I think the trend will continue. Right now, these are the most efficient photovoltaic cells we could find, with 23 percent efficiency. For boats, you have to go really efficient because you have limited space aboard.

We're not as dependent on battery technology as some might think. We don't utilize a giant battery bank, instead emphasizing the efficient solar system so the owner will need to draw from the batteries less. With *Solar Sal*, we went with the high-end lithium iron phosphate batteries that are fantastic, but we've successfully used normal lead acid batteries,

Sustainable Energy Systems and Solar Sal

Sustainable Energy Systems was founded by David Borton, who now works with his son Alex Borton on their solar boat passion. The duo teamed up with famed boat designer Sam Devlin to make an all-wood, 27-foot example of what they can do, the *Solar Sal*. Built to that famous Sam Devlin standard, the *Solar Sal* can clip along at seven knots indefinitely without even drawing from the batteries, as long as the sun is shining (three knots on a cloudy day). Operation is near silent with zero carbon emissions. *Solar Sal* is listed with West Yachts at the time of this writing.

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notably with another project of ours on the Hudson River. Our *Solar Sal* 44T just passed full U.S. Coast Guard inspection and is now the first all solar-electric boat with no diesel backup to accomplish that.

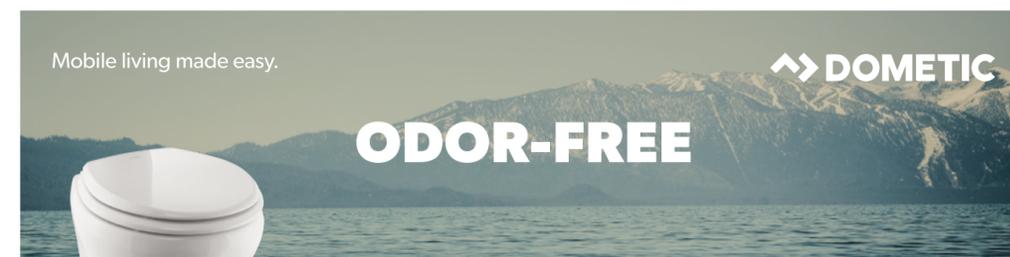
NWY: Are there ideas to not only apply this tech to a production line, but also implement these systems on existing motor or sail boats?

It is hard to retrofit an existing boat to 100 percent solar because we need an efficient displacement

hull with a large roof area with panels. For what we're doing, the hull form is very important to success for 100 percent solar. The hull needs to be a long, thin, hyper-efficient full displacement one to work. It is easy to add solar panels to any boat to increase efficiency and reduce the need for a generator. BRJ Solutions in Seattle and Revision Marine in Port Townsend do excellent work designing systems like this for existing boats. **NWY**



Top: Even on a cloudy day, *Solar Sal* has enough energy to maintain 3 knots. More speed, of course, draws from the batteries and means less range. **Below:** Inside the Devlin-built *Solar Sal* at the 2019 Seattle Boat show.



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