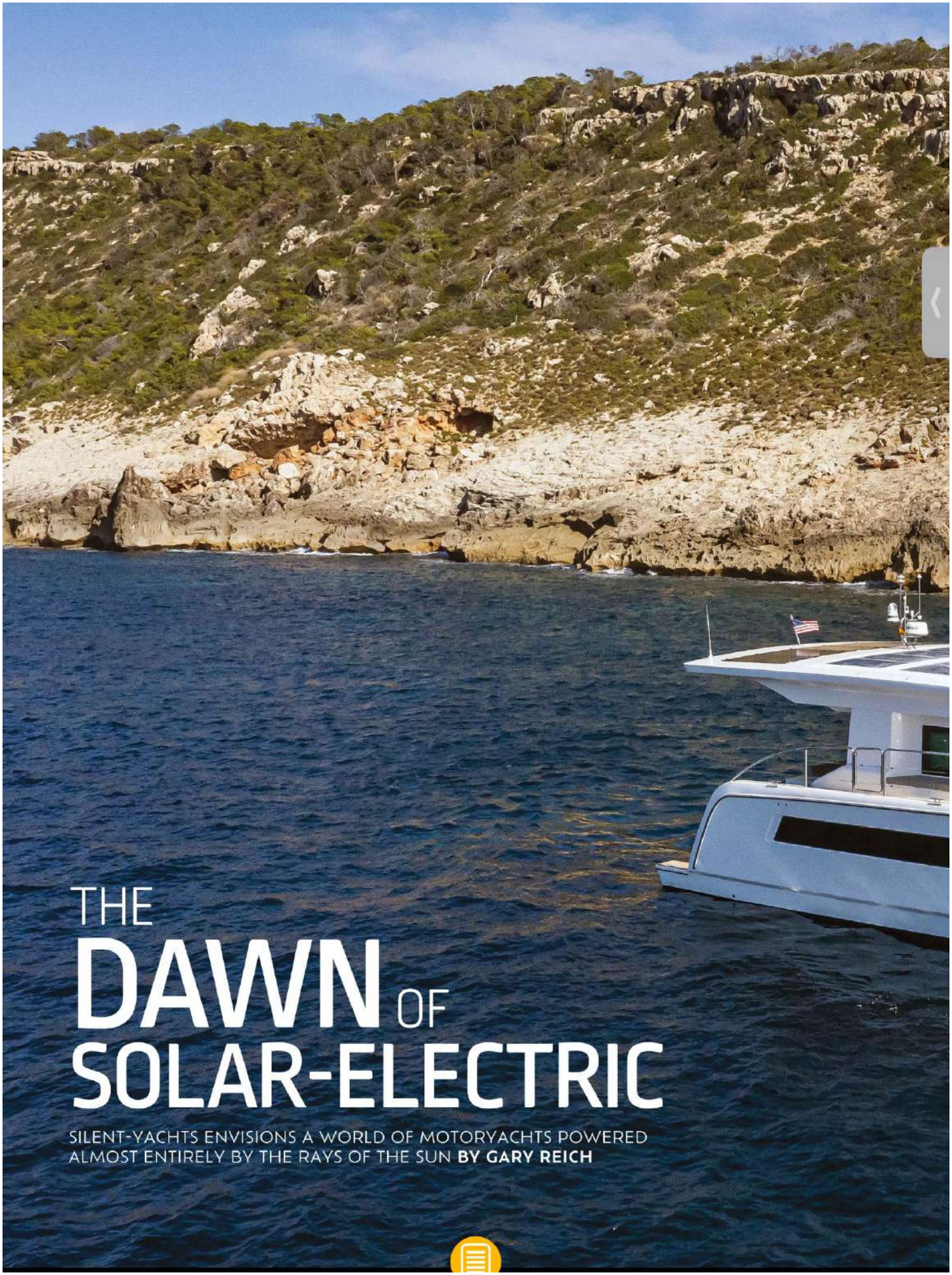


THE DAWN OF SOLAR-ELECTRIC

SILENT-YACHTS ENVISIONS A WORLD OF MOTORYACHTS POWERED ALMOST ENTIRELY BY THE RAYS OF THE SUN **BY GARY REICH**

The sailing background of Silent-Yachts founders Michael and Heike Köhler is evident in the Silent 60.

Despite the way they are often marketed, electric boats are not new technology. They were in use as far back as 1839, when Russian electric-motor wizard Moritz von Jacobi, with financial backing from Czar Nicholas, built a 28-foot paddleboat powered by batteries. It could carry 14 passengers and had a top speed of 3 mph with an electric motor of Jacobi's design, according to the University of Tartu Museum in Estonia.

Since then, boatbuilders have been trying to figure out use-cases for boats that best suit electrification. A panel of marine industry experts from Brunswick Corp., Yamaha Marine, Torqeedo and Ingenity recently sat down at the American Boating Congress in Washington, D.C., to discuss the state of the electrification push in recreational boats, charging infrastructure and the challenges presented by electric boat propulsion systems.

The main takeaway: Most panelists agree that energy densities in lithium-ion-style batteries are not yet ready to support what the marine industry typically calls all-day, wide-open-throttle use. In other words, don't expect to see large center consoles shedding their 4-stroke outboards for electric propulsion anytime soon.

That said, there are some electric boats with serious speed joining the market, such as those made by Candela and Eelex. Unfortunately, running those boats at speed significantly reduces range.

Most participants on the panel agreed that the 5- to 7-knot cruise use-case is currently the most suitable for electrification. But owners still have to plug in. Not to mention that marine charging infrastructure is not yet fully developed.

So it seemed serendipitous when I received an email from Silent-Yachts to sea trial its new Silent 60 in Ft. Lauderdale. The boat is a transoceanic-capable power cat with dual electric motors and a battery bank that gets most of its juice from the sun. The boat has a virtually unlimited range cruising at 6 to 7 knots in ideal charging conditions.

Silent-Yachts is the brainchild of bluewater cruisers Michael and Heike Köhler, who have sailed and cruised more than 6,000 days and 75,000 nautical miles around the world. The company began with an idea to take advantage of the most reliable source of energy available in the majority of cruising areas: the sun.

PHOTOS COURTESY OF SILENT YACHTS

Elegant, functional, and durable are hallmarks of the Silent 60's interior.

"We are actually sailors at heart," Michael Köhler says in a promotional video. "I bought my first sailing boat at 18 years old, and we've been sailing the globe for the past 40 years."

The couple didn't like being dependent only on the wind in a sailboat or only on fuel in a powerboat—the latter, especially, because it's not eco-friendly.

"In 2009, we started on the construction of our Solar Wave 46," Heike Köhler says. "It was the first prototype of an oceangoing yacht which used solar energy.

"Not only for propulsion," Michael adds, "but also to provide energy to all household appliances and devices on board, such as the stove, freezer, air conditioning, washing machine, and the watermaker."

A year later, in 2010, the couple began a four-year sea trial on the prototype Solar Wave 46. They traversed Europe by river and cruised across the Black, Aegean, and Mediterranean seas. Michael says that during those four years, the solar-electric drivetrain worked flawlessly, and not just in sunny conditions. The couple encountered snow, rain, ice, cloudy skies, and Force 9 storms.

"The diesel generator on board was not used at all in the first three years," Michael says. "During the last year, we only used the generator for 30 minutes per week so the engine wouldn't become rusty and break down."

That was all the proof they needed that solar power was the way forward. In 2016, the company launched its first solar-powered production yacht, the Silent 64.

"Our client actually made a big statement with his personal Silent 64. He crossed the Atlantic Ocean in 2018

An optional kite can add 3 knots of propulsion to the Silent 60

The Silent 60 is built—and priced—to be top-quality.

as the first solar-powered production yacht to ever do so."

Today, Silent-Yachts has boatbuilding operations in Italy, Thailand, and Turkey, with a total book of 55 finished and unfinished models from 60 to 120 feet, according to Philip Bell, Silent-Yachts' director of North American sales.

The Silent 60 that I boarded in Ft. Lauderdale was the third hull of that model to be launched. Its owners were scheduled to take delivery soon, then run her up the Intracoastal Waterway, according to the captain, Kyle Miller. They also have plans to cruise America's Great Loop.

There's no mistaking that the Silent 60 is a high-end product. She has sleek, contemporary lines; a precisely executed fit and finish; and a light interior with seating, fixtures, and fittings made from top-quality materials. There's a price to match the luxury: The Silent 60 starts at $3 million in its base configuration.

Inside is a four-stateroom, four-head layout. The design elements feel minimalist, yet elegant. A couple of folks on the cruise likened the look to an Apple retail store.

The platform is spacious, measuring 59 feet overall with nearly 30 feet of beam. It felt as if Miller would have one heck of a time getting her out into the relatively narrow canal where she was berthed side-to on a bulkhead, but he made easy work of it, using the bow thrusters and twin electric motors to move the Silent 60 in a slick, sideways maneuver.

The most notable thing to our ears as the boat began to move was noise coming through vents on both sides of the cockpit. "There is some mechanical space and engine room ventilation running, and the below-decks air-conditioning units are churning at the moment," Bell said. "Once we get some air moving through the cabin, we'll shut those down."

Hull No. 3 was the first "front entry" Silent 60 built. There's a door forward in the main salon that leads to bow seating—both conventionally upholstered seats and two mesh-bottom pods. The forward entry may not seem like a big deal, but once the air conditioner units were shut off and the forward door was opened, the cabin remained comfortable in the 95-degree heat. Our forward motion of about 7 knots generated a brisk breeze inside. The only noises present were the gentle gurgling of the propellers and the sound of water rushing past the hull, which was silent enough for most guests on board.

Three power packages are available. They revolve around battery bank capacity, and electric motor and generator output. The midrange model has twin 250-kW electric motors and a lithium-ion battery pack with a capacity of 225 kWh. Silent-Yachts installs a backup generator on every yacht; our sea trial boat had a 150-kW Volvo Penta diesel genset.

The low-range Cruiser model has two 50-kWh motors, a 143-KWh battery bank and a 100-kW generator. The top-end configuration includes two 340-kW motors, a 286-kWh bat-

tery bank and a 145-kW generator.

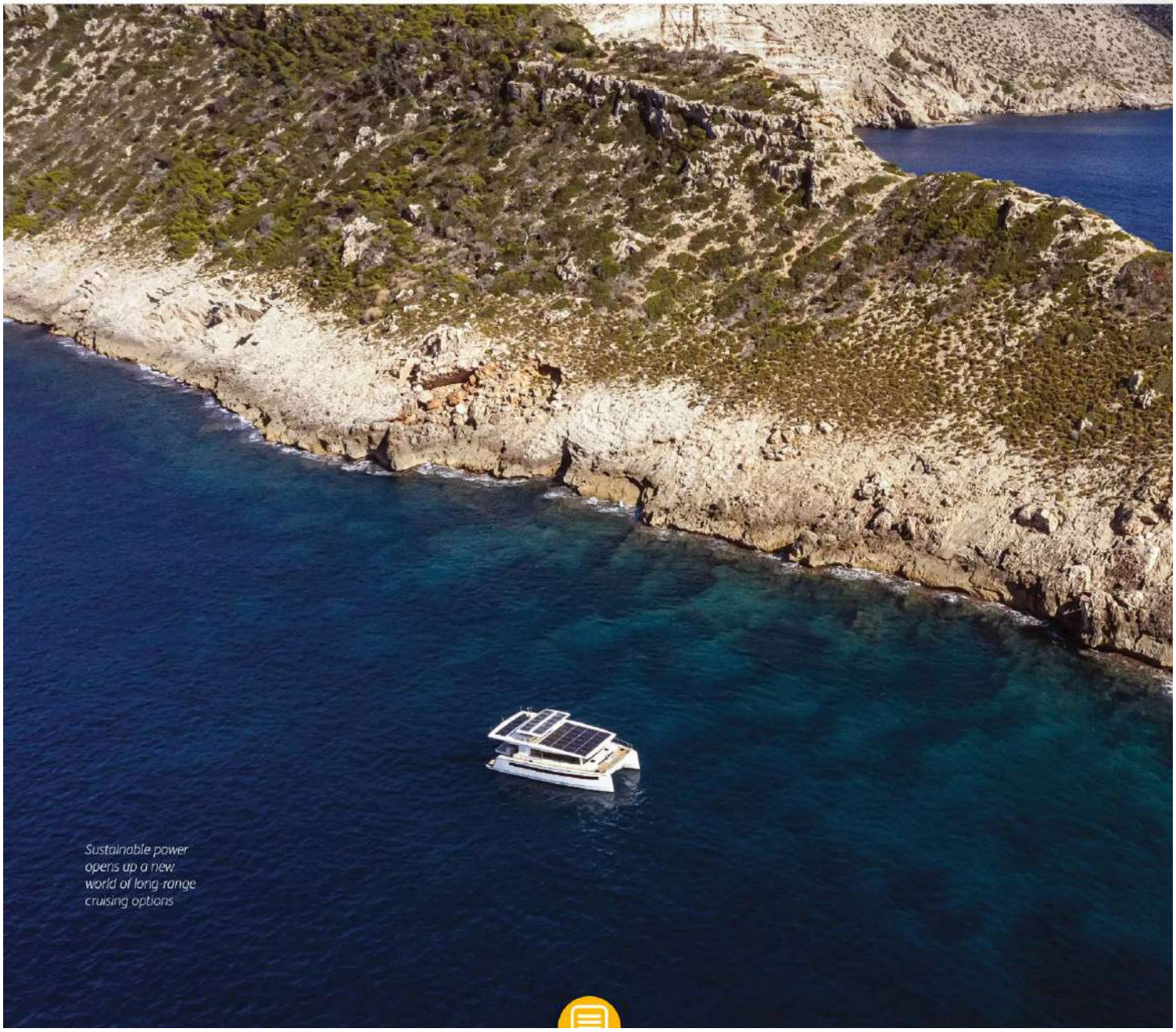
When I asked about the sustainability of having as much as 500 gallons of diesel fuel on board for a backup generator, and why one is even necessary, Michael said, "All of our boats have a backup generator, mainly for safety reasons. I never want the client to be in the situation where there are three days of bad weather and [they] want or need to move the boat, and [there is] no power in the batteries."

The Silent 60's array of solar panels lines the forward and aft cabin tops, and the flybridge hardtop. It produces up to 17 kWp in bright sunshine. That equates to 17 kW of charging per hour, in ideal conditions.

At the helm, Miller was piloting the Silent 60 along the ICW at 5.4 knots, drawing a combined 8 kW from the battery bank. A small but easy-to-read display showed power draw and charging in one convenient grouping. Miller bumped the boat up to just under 7 knots, which increased energy draw from the bank to 14 kW. That meant 3 kW was still going into the battery bank from the solar array.

"If you start out with a completely dead battery bank, which isn't generally a situation owners will encounter, it takes four bright days to charge it back up again," Miller says. "Most folks are going to run the generator occasionally, especially when running air-conditioning in hot weather. But we've found people rarely have to use the air conditioning since the boat is ventilated so well. You can also charge the batteries via shore power if you tie up."

The Silent-Yachts 60 with midrange power has a top-end



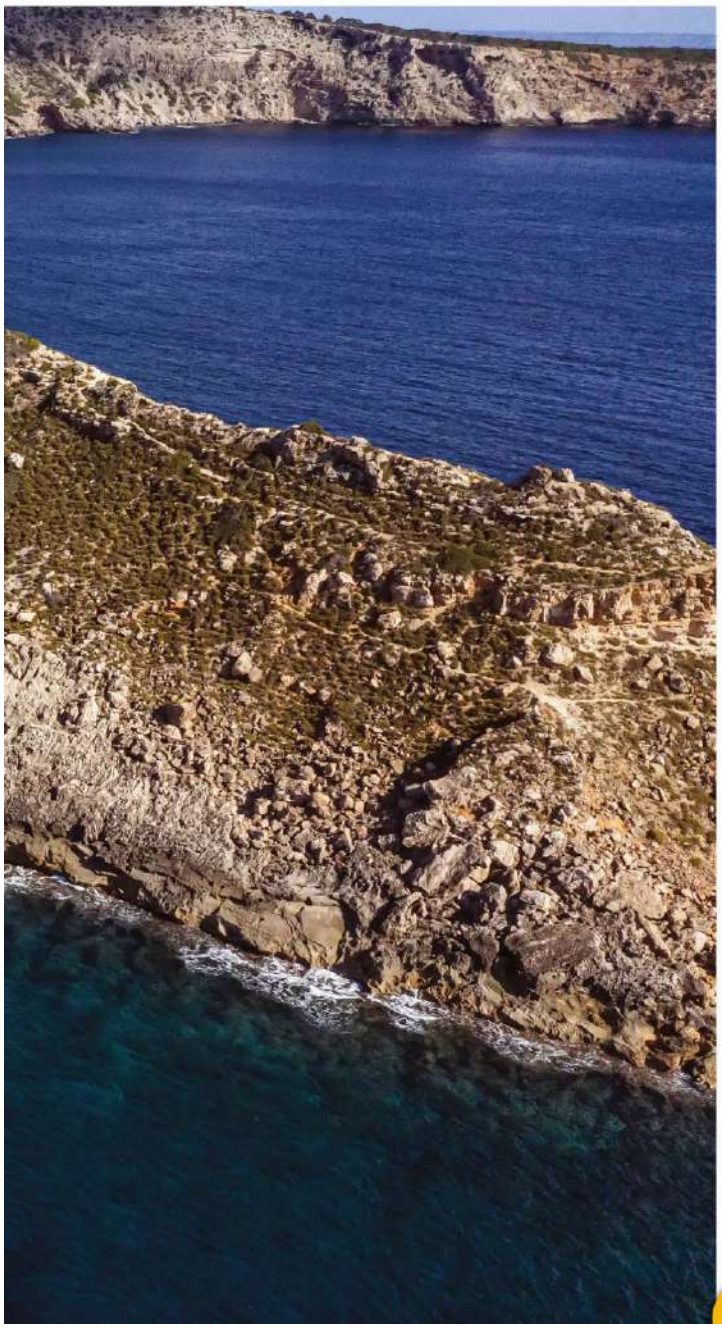
Sustainable power opens up a new world of long-range cruising options

speed of 13 to 14 knots, though Miller says running the boat constantly at that speed "fights against the theme of the vessel."

"You certainly need that speed to sometimes escape weather, or make it to the anchorage before dark, but the way we're using this boat today—at 6 to 7 knots—is the way it's most sustainable," he said. "Running the generator all the time to run at 10 to 13 knots just doesn't make sense. That's not what this boat is about."

The batteries are under two hatches in the salon. Access to each motor is behind the transom steps at the aft end of each hull. Wiring and installation of all the supporting tech is neat, clean, and well-secured.

When asked which technology will eventually increase speed and range, Michael said energy density in batteries was



likely to kick off the next big increase. "Motor development is not to be expected anymore because they are about 97 percent efficient, which is not enough room left for improvement," he says. "Solar panels are [showing] very slow improvement, very slow. We expect more to come, maybe in five, maybe 10 years, nobody knows.

"Regarding the batteries, [that's where] we can expect the biggest improvement in another two to five years," he added. "Hopefully, we will have a big step where they could reduce the weight and almost double the energy density. That's what I look forward to."

The Silent 60 also has a kite-sail option that can pull the big cat along at speeds as high as 3 knots, or to reduce energy draw underway. "It takes a bit of time to set up," Miller says, "but once it's deployed, its operation is totally automatic, flying in a figure-eight pattern."

Near the end of the hourlong cruise, the Silent 60 had consumed around 9 percent of its battery capacity traveling an average of 6 knots with a full load of fuel and water, and approximately a dozen people on board. Many complimented the quiet, soothing feel of the ride, and almost everyone appreciated the luxury touches from stem to stern.

One guest said the only thing that really needs maintaining on board is the diesel generator, along with the normal systems and exteriors that would need maintenance on any other boat. The savings from needing no diesel-engine maintenance could be significant. "The only downside I see is for people who want to fast cruise," he said. "This is not their boat."

Michael says the company vets suppliers' sustainability cultures, and aims to use the most sustainable materials. "We try to do everything as sustainable as possible, and try to exchange less-sustainable materials for more-sustainable ones throughout the boat," he says. "If it's in the galley for the walls, for the ceilings, the floors, the construction materials, we try to get more and more sustainable. We do the same with our suppliers, if possible."

At the end of the day, a multimillion dollar yacht isn't something most people would consider sustainable, given the carbon footprint of assembling a vessel this size. "It's a starting point," says Silent-Yachts designer Juliana Miguel. "It opens the discussion for using solar-electric on a broader scale. That's the sort of sustainability we're talking about."