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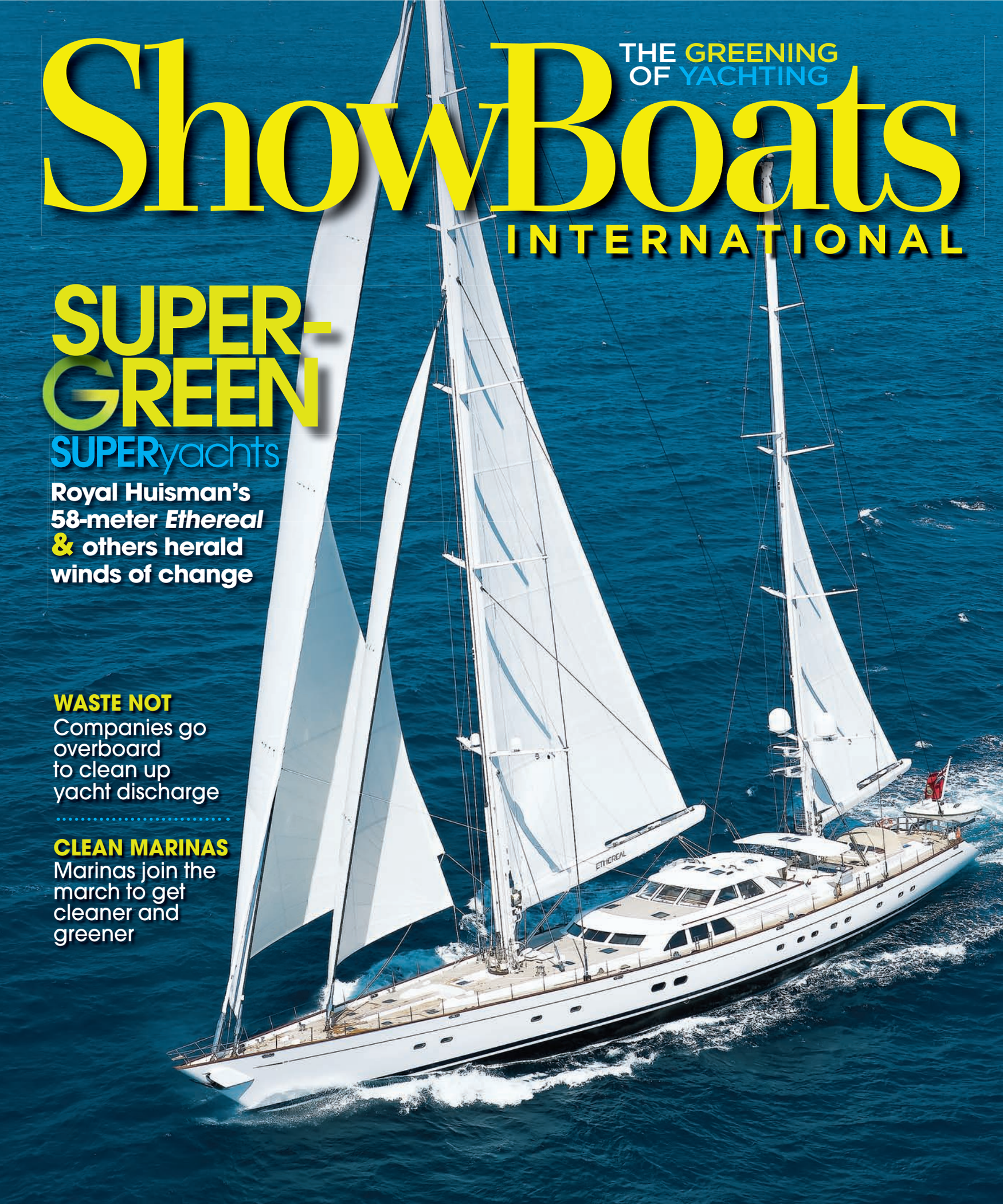
SUPER-GREEN SUPERyachts

Royal Huisman's 58-meter *Ethereal* & others herald winds of change

WASTE NOT
Companies go overboard to clean up yacht discharge

CLEAN MARINAS
Marinas join the march to get cleaner and greener



Yachtbuilders, designers and owners are making headway on improving efficiency and reducing the industry's environmental impact ▶ STORY BY **JUSTIN RATCLIFFE**

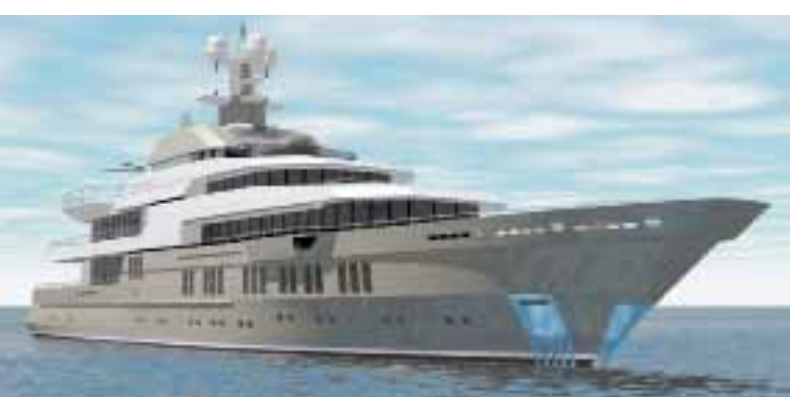
GREEN as can be

Let's be frank: There is no such thing today as a "green" superyacht, and it is unlikely there ever will be. As editor Andrew Rogers points out in the February 2009 edition of *Yacht Valley,* published by the HISWA Holland Yachting Group, "A truly environmentally friendly superyacht would require a galley of oarsmen led by Ben Hur, leaving little room for cooking or for guests."

Joking aside, in an era where Al Gore wins the Nobel Peace Prize for putting global warming on the political agenda, where the Dow Jones has a sustainability index and Wall Street traders talk of "ethical investment," the superyacht industry is under increasing pressure to be seen to be doing the right thing. Indeed, Rogers continues his editorial with the observation that "it is clear that a genuine awareness of the need to be greener is prevailing across the spectrum of the yachting community."

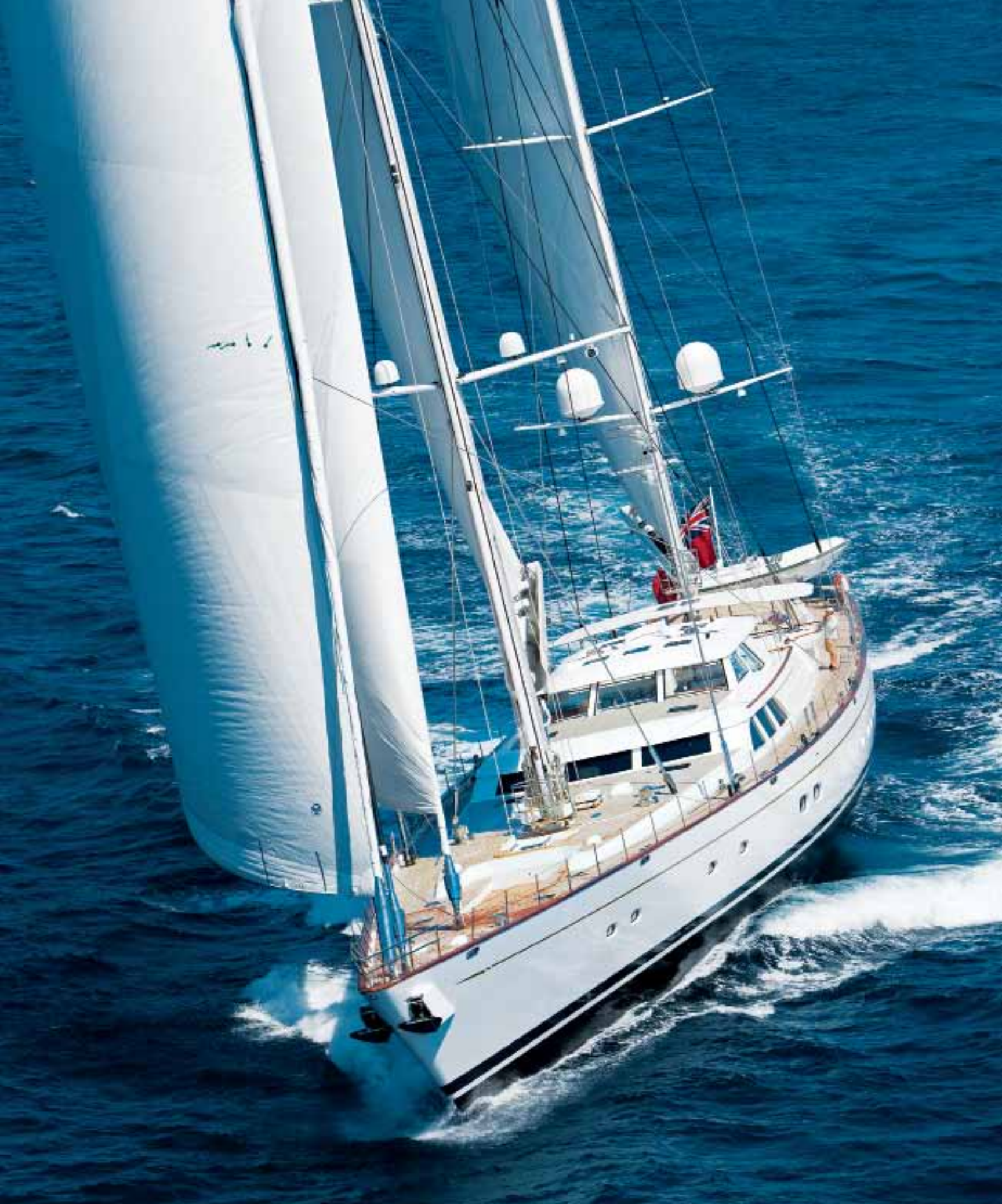
Holland is one of the world's most densely populated nations and, consequently, a leading campaigner on environmental issues. So it comes as no surprise that a Dutch superyacht builder, Royal Huisman, is at the vanguard of research into environmentally friendly technology. Last October, the shipyard launched Bill Joy's 58-meter sailing yacht *Ethereal,* which since its inception has been touted as one of the most technologically advanced and complex sailing superyachts ever built.

Created by Ron Holland Design, Pieter Beeldsnijder Yacht Design and Royal Huisman, *Ethereal* is a graceful, 190-foot world-cruising ketch with classic sheer, easy-on-the-eye superstructure and beautifully appointed accommodations. But beneath the surface lies some cutting-edge design and engineering features that collectively represent a "quantum shift in energy efficiency," enabling *Ethereal* to operate for extended periods under her own resources.

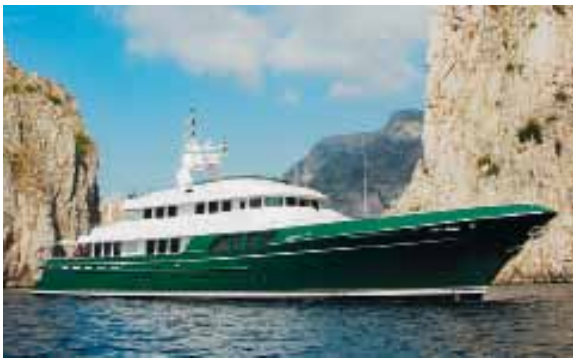


Above: VSY's 72-meter project illustrates how building a "green" boat begins at the very start of the design process. Opposite: Royal Huisman's 190-foot, cutting-edge *Ethereal.*

The yacht's hybrid electro-mechanical propulsion system can recharge her lithium-polymer battery bank through the drivetrain under sail rather than relying on generators. She is able to raise anchor, motor, hoist sails and run ship systems from quiet, stored electrical power. Energy demands rigorously were addressed through innovations in insulation, lighting, appliances, watermaking and air-conditioning. Gains in speed and propulsion efficiency were achieved from model and tank testing. Large propellers and the ability to generate power from the main engines increase fuel efficiency and reduce maintenance. The winged keel increases ≫



EFFICIENCY IS A KEY ISSUE FOR RON HOLLAND AND ONE THAT DOES NOT HAVE TO RELY ON NEW TECHNOLOGIES.



Above: Ron Holland, the designer of *Ethereal* and *Marco Polo* (above right); although one is a motor yacht and the other a sailing yacht, both were designed with efficiency as a primary design criterion.

windward sailing performance, while underwater appendages were faired for the lowest possible drag.

Back in March 2008 when the yacht still was under construction, designer Ron Holland discussed the project at the Yacht Vision symposium in Auckland, New Zealand. He quickly put to rest the concept that *Ethereal* is a truly "green" yacht because it still draws on vast quantities of materials such as teak (although Royal Huisman is looking into synthetic alternatives such as those produced by the Dutch firm Esthec). Instead, he focused on how the owner's objective was to take a new look at resources in order to increase efficiency and minimize the yacht's impact on the environment.

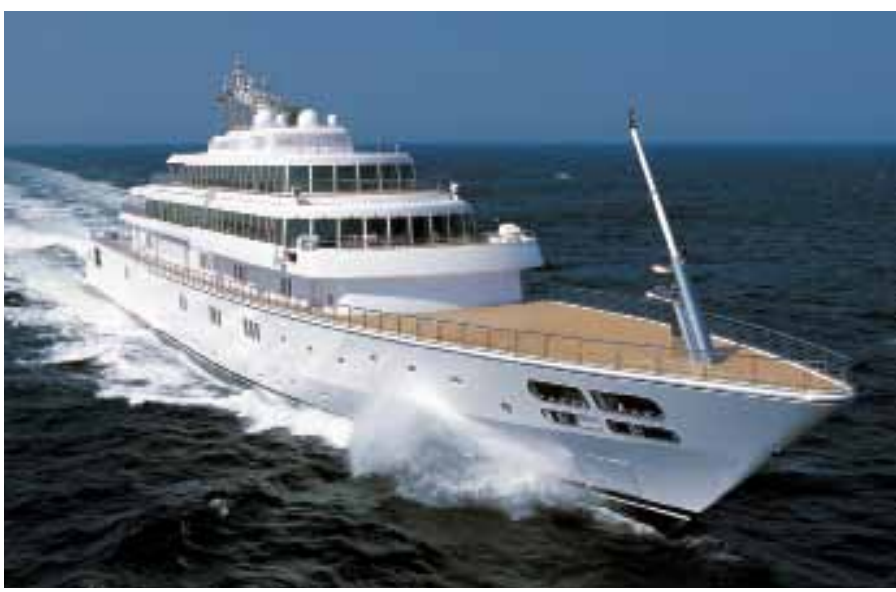
"How we got there was an extremely refreshing and innovative process," says Holland. "Bill Joy said he wanted to look at every aspect of sailing design and technology and introduced us to the 'charette' method of brainstorming ideas—a non-judgmental approach of putting every possible new idea on the table and inviting world experts to comment….It set a psychological platform for a fresh and open-minded look at subjects that we thought we knew all about and wouldn't normally critique."

Above: Michael Peters pictured at Yacht Vision '08 where he spoke about environmental issues and the yachtbuilding industry; one topic mentioned was the amount of teak used aboard *Rising Sun* (right).

Efficiency is a key issue for Ron Holland and one that does not have to rely on new technologies. A case in point is *Marco Polo,* the 45-meter long-range explorer yacht launched by MCC/Cheoy Lee in China in 2007. Conventional wisdom has it that large motor yachts typically have a twin-screw configuration. Conventional wisdom also has it that the world's large commercial vessels—where fuel-efficiency is vital—typically have a single-screw configuration. The Ron Holland Design team took a closer look at this paradox and concluded that they could create a single-screw motor yacht with all the performance and handling characteristics of "conventional" designs, yet offering a fuel savings of some 34 liters per hour. Sometimes less is more.

Naval architect Michael Peters, another speaker at the green-tinged Yacht Vision '08, raised further environmental issues that today are at the forefront of the yachtbuilding industry. Peters has based his career since the early eighties on designing high-performance race boats and is an unlikely convert to the green-is-good school of thought. Nevertheless, while researching his presentation he came up with some discomforting statistics. He found that a typical 150-foot, full-displacement motor yacht running at 1,000 hours per year at 12 knots produces 50 times more greenhouse gases than an average family of four over the course of a year. He went on to tell an increasingly sheepish audience that a yacht like *The World Is Not Enough* running at high speed burns in just 1.7 hours the same energy resources that keep an average family of four going for a year.

"Then there is the steel and aluminum production, the teak, the oil and the resin…not to mention the animal skins and the destruction of reefs through careless anchoring,"



says Peters. "The industry has a history of seeking out exotic, often endangered materials."

As an early example, he chose the Royal Yacht *Britannia,* which during her construction in 1953 used so much teak that her builders envisaged a time when the timber would be an endangered resource. *Britannia* was built at least three decades before the rise of the superyacht industry, which brought super-consumption with it. Fifty years later, some 10,000 square meters of teak went into the building of 138-meter *Rising Sun.*

It is not all bad news. Standards introduced by RINA Green Star, MARPOL and Lloyd's Register Green Passport

Justin Ratcliffe (far left, top and bottom); John Anderson (top left)

Left: *Tribù,* superyacht of Luciano Benetton (pictured far left), was the first to have RINA Green Star certification. Owners are coming under increasing pressure to be seen to be green.

are designed to combat pollution issues, for example. But Peters sees recycling as the most sustainable way to protect the environment. As a relatively young industry, the superyacht sector has not yet had to face up to the environmental hazards posed by commercial shipbreaking.

"Many boats being designed today will not see a second life," Peters points out. "It is simply not designed into the formula. As designers and builders, we have to come up with a longer-lasting shelf life, and we have to encourage owners to build these kinds of boats.

"We have to look at the standards that already exist, and then we can look for some direction," Peters concludes. "There are certainly technologies out there that are beginning to push in different directions, and we can clearly be more fuel efficient."

Peters himself is working on a 48-meter, hyper-efficient project that uses diesel-electric propulsion and Voith Schneider drives for fuel savings of 20 percent or more over conventional systems.

"What I like is problem solving," says Peters, "and I want to see if we can go slow as well as fast and be creative about it. Racing is about being a little bit better than the guy behind you, and going slow is like that too. So it's not as far removed from the high-speed arena as you think. It's all about efficiency."

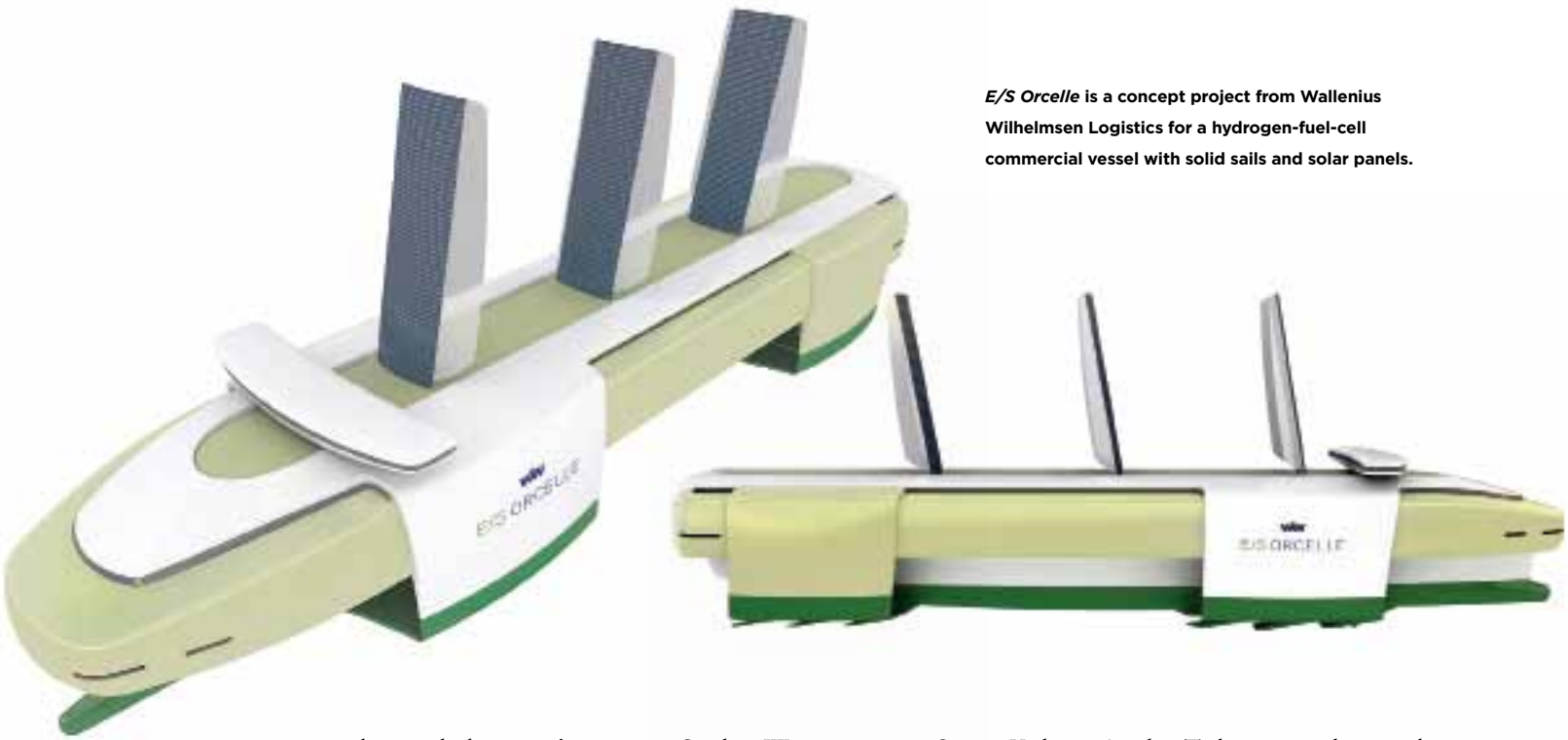
Joy is not the only yacht owner concerned about protecting the environment. Others, over and above their personal ethics, are increasingly conscious of how public opinion is inclined to frown on the super-sized carbon footprints of their superyachts.

Luciano Benetton is one such example. His 50-meter explorer motor yacht *Tribù,* launched in 2007, was the first superyacht to carry RINA's Green Star notation. A voluntary initiative, the notation allows an owner to document his or her respect for the environment via a series of precise technical criteria. These include systems for treating bilge and ballast water, possibly contaminated with fuel and oil, in special holding tanks; alarm sensors and anti-pollution equipment in case of accidental spillage of hydrocarbons; anti-fouling paint for the hull that does not contain toxic pesticides such as TBT; differentiated trash collection with refrigerated storage of organic waste for treatment and recycling; and strict controls on nitrous and sulphurous gas emissions that are damaging to the ozone layer. The advantage for a long-range yacht like *Tribù* is that its owner can voyage to remote and possibly delicate ecosystems around the globe secure in the knowledge that they will not be affected adversely. RINA recently strengthened its commitment to more environmentally friendly shipping by launching Green Plus, based on a performance index that covers all aspects of the vessel's impact on the environment, including carbon emissions.

Green Star, originally conceived for cruise ships, is an example of how commercial shipping rather than the superyacht industry is leading the way in blue-sky, green concept vessels. Another case in point is Bremen, Germany's Beluga Shipping GmbH. Last year in Hamburg it launched a 132-meter cargo ship with the first commercial application of the SkySails concept. A significant step forward in finding a sustainable way out of dependence on diesel oil and reducing damaging emissions, Beluga Shipping believes that "potential [fuel] savings of 20 to 30 percent are definitely feasible and realistic." British designer Rob Humphreys ≫

Below: cargo vessel *Beluga SkySails* about to embark on her maiden voyage equipped with an auxiliary towing kite. British naval architect Rob Humphreys is working on yacht concepts that incorporate the same technology.

Justin Ratcliffe (top left); Courtesy of Mondomarine (top right); ©SkySails (bottom)



E/S Orcelle **is a concept project from Wallenius Wilhelmsen Logistics for a hydrogen-fuel-cell commercial vessel with solid sails and solar panels.**

is working with the system's innovator, Stephan Wrage, to develop a superyacht that utilizes SkySails technology. The first of a possible series is a 40-meter trimaran motor yacht that has three propulsion modes: power, hybrid and towing kite only. The slender hullforms are derived from wave-piercing outriggers to make the most of the kite's tractive force and maximize interior volume. VPP calculations show a potential top speed of more than 20 knots using a 320-square-meter kite.

"Although the project is still a case of work in progress," says Humphreys, "what we envisage is a motor yacht with the transoceanic freedom of a large sailing yacht, able to fly the SkySail for sustained periods for relatively fast, comfortable and quiet sailing." While no orders have been confirmed to date, Humphreys also has developed an 80-foot monohull designed to carry a towing kite as a low-speed, auxiliary energy source.

Wallenius Wilhelmsen Logistics in Sweden has developed a concept ship that, although ironically a car carrier, features a pentamaran hullform propelled in part by pods powered by hydrogen fuel cells, batteries and fold-down solid sails with additional electricity supplied by solar panels in the sails. Named *E/S Orcelle* (E/S stands for "Environmentally sound Ship"), the concept is unlikely ever to be built in its entirety, but hydrogen fuel-cell technology is one of the great future hopes for powering hotel services aboard superyachts.

Below: Guillaume Roché of Sunrise Yachts firmly believes in the future of fuel-cell technology.

Sunrise Yachts in Antalya, Turkey, is actively researching green technologies. Cofounder Guillaume Roché believes that "in five years' time, Sunrise Yachts will be able to build a carbon-neutral boat using fuel-cell technology." Fuel cells produce electricity, but also a lot of heat and steam that can be used to heat water or condensed to make drinking water.

"So all of a sudden you're generating efficient, clean power, and you eliminate the most important sources of noise and vibration on board: generators, watermakers and A/C compressors," explains Roché. "We can't get away from diesel engines for now, but what you then do is go away and buy yourself some carbon credits and you have a carbon-neutral boat."

Fuel cells and other emerging technologies are still years away from becoming mainstream solutions. Until that happens, diesel engines will remain the principal power source aboard superyachts, and research will focus on increasing efficiency.

One shipyard putting environmental protection at the core of its production process is Viareggio Superyachts (VSY), in Italy. The yard recently launched two 62-meter sisterships designed by Espen Øino. For the sea trials of *Candyscape II,* the first hull to splash (and, incidentally, the first yacht to be designed from the outset with Green Star certification in mind), the company bought from Yacht Carbon Offset 963 euros of carbon credits, equivalent to 24,000 liters of fuel. According to the Det Norske Veritas (DNV) classification society, VSY is the only yard at present with an integrated manual covering quality, environment and safety certifications. But the company's green policy goes further, and an upcoming 72-meter project illustrates how building a "green" boat begins at the very start of the design process.

Justin Ratcliffe (bottom, 2)

"WHETHER IT'S MORE EFFICIENT HULL SHAPES, NEW MATERIALS OR ALTERNATIVE FUEL SOURCES, THIS IS JUST THE BEGINNING." —MICHAEL PETERS

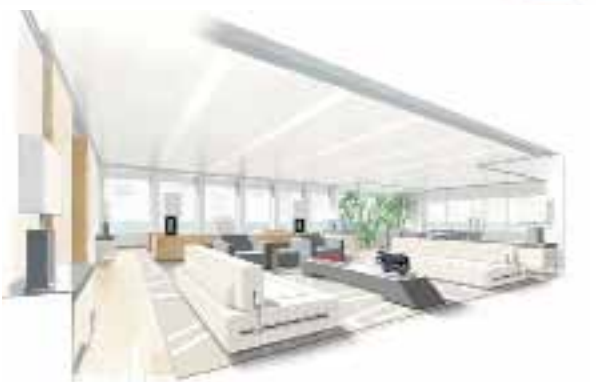
"Our technical office went to great lengths to design a system of seacocks on deck for recycling rainwater for washing the decks," explains Alex Jacopozzi, marketing and communications manager for VSY. "The dirty water is then recollected and scrubbed clean for reuse. This not only means detergents are not washed overboard, but less energy is consumed for making freshwater."

Other energy-efficient features include double A/C ducting in the cabins; one for pumping cooled air in and another for rerouting the air to where it is most needed. Although the yacht will have traditional diesel propulsion, both propellers and shaft lines are variable pitch. This means that during long crossings, just one variable shaft can be used to optimize engine torque while a feathering prop on the other shaft reduces drag. The result is less noise and maintenance combined with an increase in range of over 500 nautical miles. Another seemingly minor, yet innovative design feature is the decision to install drinking fountains in the crew areas to drastically reduce the consumption and recycling of plastic bottles. The owner will still have his San Pellegrino mineral water, but perhaps the same concept should be introduced in the guest areas?

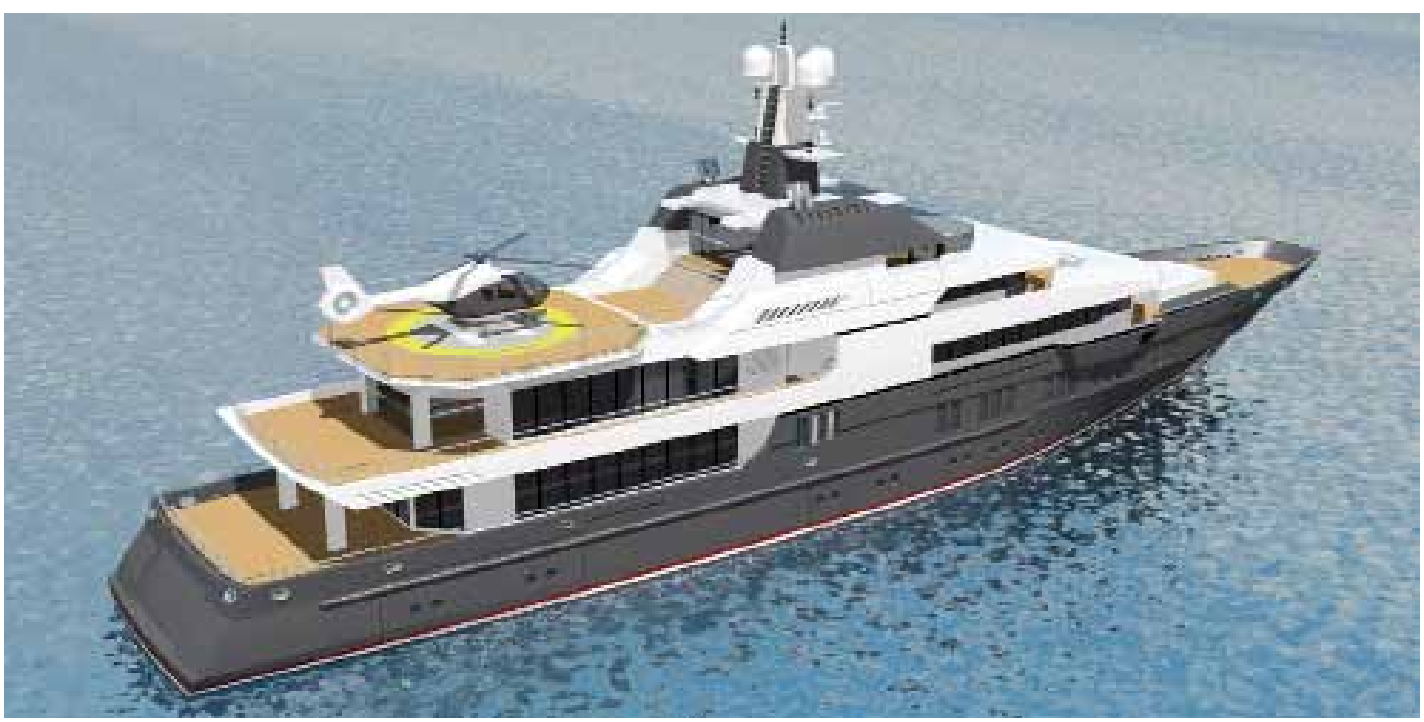
What all these examples illustrate is that a new mode of thinking and a commitment to changing how the superyacht industry is perceived and managed is already under way.

"We are living through the consequences of 150 years of using the cheapest and easiest form of energy on Earth. And also the dirtiest," says naval architect Peters. "I don't think we can even imagine where it goes from here. This is not the end of anything. Whether it's more efficient hull shapes, new materials or alternative fuel sources, this is just the beginning." Amen.

To charter or find out more: Camper & Nicholsons International (Ethereal), *954-524-4250, ag@fil.cnyachts.com; Burgess Monaco* (Marco Polo), *+377 97 97 8121, charter@burgessyachts.com; Fraser Yachts Monaco* (Tribù), *+377 93 100 480, monaco@fraseryachts.com; Candy & Candy* (Candyscape II), *+44 20 7592 2000, nsanders@candyandcandy.com.*



This page: VSY's new 72-meter project was designed from the outset to include several energy-efficient features to reduce its impact on the environment.



Michela Reverberi (top right); Laurent Giles/Courtesy of VSY Technical Department (middle); ©2009 Espen Øino International S.A.R.L. (bottom)