

Architecture

New green ships for eco-oceans

Rigid sails collect solar energy while hulls catch the wind and kites tow container ships: the sea will never be the same

by Tommaso Sacconi

A 'green route' which looks like a very good bet, particularly at a time when shipyards are suffering from the general malaise that in recent years has swept away a sizable share of production. Nowadays cargo ships are the most efficient and effective form of product transport, accounting for 90% of world trade, a market so extensive that it can have a serious impact even on the environment.

According to recent reports, the emissions of carbon dioxide produced by maritime transportation are causing alarm: they are currently estimated at 1200 million tons of CO₂ a year, double the amount of the previous years and even then the figures weren't at all reassuring. If one also considers that in recent years the price of fuel hasn't stopped climbing, never has it been so essential to find a way out by seeking more sustainable solutions.

The paths followed differ and include instant remedies, such as reducing cruising speeds (which also reduces costs and emissions), right up to more audacious, albeit less immediate plans that could however revolutionize the entire shipping world. In Northern Europe in particular there are a whole range of initiatives set on turning things around.

A recent very interesting proposal is *Vinkskyp*, by the Norwegian firm Lade AS in Aselund. The basic idea is very simple: make the wind work to our advantage. The key role is played by the hull, which has been designed with an eye on aerospace developments, and is modelled like a wing so that it can generate a positive force along the length of the ship. In other words, the entire vessel, with its

☒ The solar powered catamaran *Turanor* in the port of Hong Kong. This catamaran was the first photovoltaic powered yacht to circumnavigate the world.



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particular shape, becomes a sail that can support the performance of the engine. Depending on weather conditions, a sophisticated program calculates the most effective route so that any wind energy along the way can be exploited to the maximum.

The result is a vessel that can save 60% of its fuel consumption and reduce its production of greenhouse gases by 80%, or at least this is the claim made by the designers of *Vindskyp* – which so far is nothing but a computer model. Nevertheless, a whole series of tests have given positive indications regarding the future of the experiment and there's already talk of a revolution in naval engineering.

Another example of hybrid propulsion, which also uses wind as its additional

source of power, is the cargo ship *MS Beluga* owned by the German firm *Sky-sails*, which in 2011 received the Sustainable Shipping Award.

In this case the solution that has been introduced and already guarantees a 15-20% reduction in consumption is a vast 'kite' fastened to a telescopic pole on the prow. With its 160 sq. m. of surface and a cable that can extend out as much as 500 m. in height, this additional sail is capable of towing a ship of imposing size.

If we take a step back in time, the pioneering *Solar Shuttle Hamburg* of the German *Solar Lab*, reminds us that wind is not the only clean resource we should be bearing in mind. Forty-two metres long and almost entirely covered in photo-

voltaic panels, the *Solar Shuttle* already provides an efficient passenger service without having to use any fuel at all.

The *Hamburg* thus avoids the dissipation of 5 tons of CO₂, the amount it would produce if it were powered with a diesel engine. The great media attention and the far reaching success of the project, which also has an intriguing design, has led the company to increase production.

But the ideas don't stop here and are continually being applied to different kinds of vessels. The catamaran *Turanor*, a Swiss project built in the shipyards in Kiel, in Germany, has been sailing since 2010 thanks to an extensive battery of photovoltaic panels stretching over as much as 512 sq. m and is the first solar powered yacht to manage to circumnavigate the world.

Japan on the other hand is coming up with prototypes based on solid wing sails lined with solar panels that are arranged along the entire length of the ship, thus exploiting both wind and solar energy, while from South Korea comes the news of a large fin with excellent hydrodynamics, which by reducing friction between the ship and the water, reduces fuel consumption.

Need, as the saying goes, sharpens one's wits. The happy meeting between the commercial imperative of cutting maritime transportation costs and the ecological one of reducing greenhouse gas emissions seem to have popped the cork off a particularly rich vein of human ingeniousness, thus renewing and improving man's relationship with the sea. **E**

Tommaso Sacconi, is Swiss-Italian and specializes in emergency architecture. He has worked in Egypt, Japan and Africa.

