

industry insights

Transport

Wind set fair for sail power's return

As operating costs continue to soar and the pressure on the cargo shipping industry to curb carbon dioxide emissions intensifies, an altogether more gentle alternative to fossil fuel looks increasingly attractive, **David Crossland, Foreign Correspondent, writes from Berlin**

With its tall masts and billowing sails, the *Tres Hombres* evokes the romance of the long-gone age of sea travel.

Yet this brigantine, or twin-masted ship, could serve as a beacon for a renaissance of sail in global cargo trade.

The 32 metre-long vessel, with a capacity of 35 tonnes and a crew of up to 15, ploughs the Atlantic between Europe, America and the Caribbean region carrying cargoes such as coffee, cocoa, chocolate and rum, all stamped with a label informing buyers the products travelled thousands of miles without generating a gram of carbon dioxide emissions, the greenhouse gas blamed by many for global warming.

It has been sailing since 2009 after undergoing a major refit by three Dutch sailors who bought the composite steel and wooden hull of a German auxiliary naval ship built in 1943 during the Second World War.

Given the trend towards ever-larger vessels, with ports around the world being dredged to accommodate leviathans capable of carrying 18,000 or even 20,000 standard cargo containers, one might think that the contribution of sailing ships to global freight transport can only ever amount to a drop in the ocean; that it's just a dream of green idealists with a passion for the sea.

After all, there was a commercial reason why sailing cargo ships vanished from the world's oceans more than a century ago. Setting and reefing the sails required too much manpower, and the absence of wind made no difference to engine-powered ships.

Yet the commercial backers of *Tres Hombres*, along with marine architects and engineers around the world, are convinced sail power will re-emerge as an important factor in cargo shipping of the 21st century, thanks to rising fuel prices and mounting pressure to curb carbon emissions from ship engines.

"Wind propulsion will play a great role in the future, if not in two years' time then in 25 years' time," says Guillaume Le Grand, 31, the founder of Trans Oceanic Wind Transport, a French freight company that works with *Tres Hombres* and a small fleet of other sailing ships.

"Man in the 21st century will have to rediscover sail and capitalise on new technologies now available to make it efficient."

Mr Le Grand says he sees using existing sailing ships for transporting cargo as an important first step to raise awareness among the public and potential investors that the concept is economically feasible, even though current vessels are not very fast, do not sail upwind very easily, need a relatively large crew and are slow to load and unload.

His company has developed a green shipping label that allows buyers to track the journey the goods take and is expanding distribution networks for sail-shipped products through eco-friendly stores.

"Just two or three years ago sail shipping was regarded as something for lunatics, just like organic food producers were dismissed as crazy 40 years ago," says Mr Le Grand. But retailers are now showing a growing interest in sail-shipped goods.

"We're building something out of the blue. It's important to have something concrete now to make decision-makers understand it does exist and that we are in need of support and a technology break."

Various designs for modern, automated sailing ships are on drawing boards around the world but they have found little backing from investors so far, possibly because the pressure for change is not high enough yet.

There is currently no international regulation of greenhouse gas emissions from ships, even though the world's fleets belch out some 1,000 million tonnes of CO₂ per year, accounting for about 3 per cent of global CO₂ emissions. More than 90 per cent of the world's trade is carried by sea.

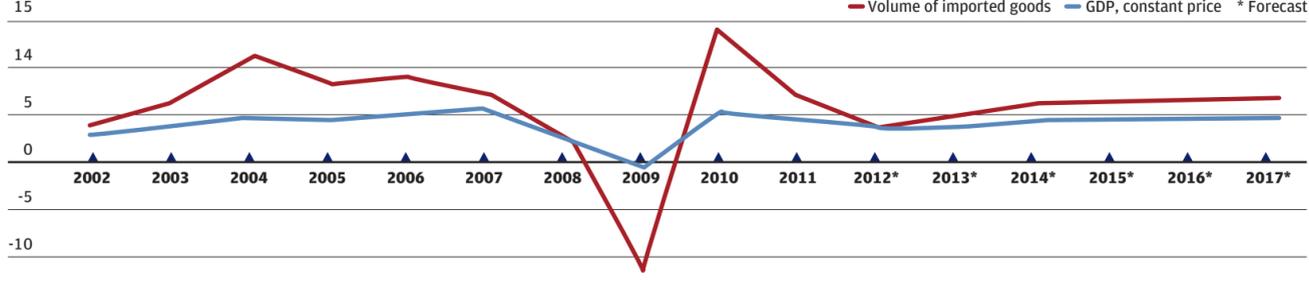
But tougher rules are in the offing. The European Commission has said it is considering several options to cut shipping emissions, such as a fuel or carbon tax, mandatory emissions reductions per ship or inclusion in the emissions trading system (ETS). The aviation sec-



The *Tres Hombres*, a twin-masted sailing ship, transports cargo across the Atlantic between Europe, America and the Caribbean. Courtesy TOWT – Michel Floch

Commerce

World trade volume and GDP – growth rate (% change year on year)



Source: BIMCO

tor was included in the ETS from the start of last year.

The International Maritime Organisation (IMO), a UN agency, has been imposing cuts in the sulphur content of shipping fuel, which causes acid rain and an array of health problems in humans. The next round of those cuts is due to come into force in 2015. The exhaust fumes created by the heavy oil cause an estimated 50,000 deaths every year in Europe alone.

Shipping fuel prices have risen sixfold over the past decade – and the low-sulphur oil ships are increasingly being required to burn is some 60 per cent more expensive than conventional fuel. Many shipping lines have responded by ordering their fleets to save fuel on the high seas by slowing down – but they are going to have to embrace new technologies to wean themselves off fossil fuels.

One sail innovation, the Dyna-rig, was developed back in the 1960s by the German engineer Wilhelm Pröls. The square sails are stored inside the mast and are automatically unfurled along the yards at the push of a button. The masts can be rotated to allow the ship to make optimal use of the wind.

The system is already in use in a luxury yacht, *The Maltese Falcon*, and is one option being considered by Dykstra, a Dutch company designing the planned Ecoliner, an ambitious project to create an 8,200-tonne sailing cargo vessel.

"We do get a sense that this is the future, we don't have a signed contract yet but we do think there's a lot of interest in the project," says Daan Sparreboom, a naval architect at Dykstra.

"The Ecoliner is meant as a multi-purpose ship. It will be able to take containers, which can be placed on the deck or in the cargo hold but conventional container ships use cranes and with the masts that will be less practical, so we're trying to



A rendering of the Ecoliner, a concept for a modern cargo sailing ship being developed by the Dutch firm Dykstra. Courtesy of Dykstra Naval Architects

design it as a multi-purpose cargo ship for things like bulk goods or machine parts," says Mr Sparreboom. It would be able to carry 476 standard containers.

The Ecoliner could be equipped with an engine that would work in conjunction with the sails.

"When there's little wind you can use the engine to increase the speed of the ship and this extra speed gives you more wind in the sails," says Mr Sparreboom.

"The sails benefit from the use of the engine."

The Dyna-rig is only one of the propulsion options being considered for the Ecoliner. Another is the so-called Flettner rotor, designed by the German inventor Anton Flettner in the 1920s.

It is a tall vertical cylinder that rotates in the wind and thereby transmits energy to propel the ship. The technology is already in use on E-Ship 1, a cargo vessel owned by Germany's Enercon, a wind turbine manufacturer, and has been in operation since 2010.

Another idea, developed by the Japanese start-up Eco Marine Pow-

er, consists of a rigid sail design incorporating solar panels so the vessels could generate energy even when in port. The company says its Aquarius Eco Ship concept could lead to fuel savings of 40 per cent or more.

In Britain, B9 Shipping, part of the B9 Energy Group, is designing a 3,000-tonne wind-powered cargo carrier with three 55-metre masts, and a biogas engine fuelled by organic waste.

In Germany, the inventor Stephan Wrage came up with the idea of a giant kite as an auxiliary propulsion system for cargo ships. Steered automatically, it enables a ship to save up to two tonnes of fuel per day in perfect wind conditions, Mr Wrage says. The IMO calculates Mr Wrage's Skysails technology could eliminate up to 100 million tonnes of CO₂ emissions a year – or 11 per cent of Germany's CO₂ emissions.

The system has already been fitted on four vessels and an upgraded version will be installed this year on the *Aghia Marina*, a 28,500-tonne dry bulk cargo vessel chartered by the Cargill group.

Mr Wrage says the shipping industry has underestimated the political will of international authorities to tackle maritime CO₂ emissions and will need to invest heavily in lowering its carbon footprint in the coming years.

"I don't think the industry is sufficiently prepared for what's about to happen," he says.

"People keep saying the emissions curbs will keep on getting delayed but I don't think so. Things could get uncomfortable for some companies in the coming years."

Wind power can not propel the biggest container ships but that fleet makes up only 10 per cent of the world's maritime fleet.

"The backbone of the global economy is made up of freighters and tankers of all sizes, many of which would be suited to wind power propulsion," says Mr Wrage.

"Wind is simply the cheapest source of energy on the high seas and it makes no economic sense not to use it. Everybody's talking about offshore wind in power generation. Well, ships are offshore by nature so there's no reason why wind power shouldn't play a huge role."

But Mr Le Grand believes investors are still too cautious to back a project as big as the Ecoliner.

"I am convinced that an intermediate step will have to happen first, so that the next five years or so will see the development of smaller modern cargo sailing ships that will eventually make the Ecoliner possible."

Noting that the UAE has a strong focus on investing in green technology, he adds: "Investors there need to get in touch with us."

"If you want to invest strategically in the future, give us a call. Shipping things by sail is something that is not only credible – it is also necessary for all of us to survive."

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Future

Maersk drops Panama in favour of the Suez Canal

The wind of change is blowing for the world's biggest container shipping company – although a switch to sail power is unlikely.

Maersk Line will stop using the Panama Canal to transport goods from Asia to the US east coast as ever bigger ships help the company move them profitably through Suez Canal.

Maersk Line will send through the Suez Canal a vessel that can carry as many as 9,000 TEUs (twenty-foot equivalent units) at a time, instead of using two 4,500-container vessels through the Panama Canal, says Soeren Skou, the chief executive. The last sailing through Panama will be on April 7 and the first service through Suez a week later.

"The economics are much, much better via the Suez Canal simply because you have half the number of ships," Mr Skou says. "At the end of the day, it comes down to cost."

Shipping companies, including Maersk Line and Neptune Orient Lines, have cut costs, reduced the speed of their fleet and sold some vessels to contend with freight rates that are below break-even levels. Maersk Line, based in Denmark, which is taking delivery in June of an 18,000-TEU vessel – the world's biggest when it enters service – has said pressure on charges will remain this year.

The company finds it more cost-effective to send larger ships through the United States, even if it means the ships need to sail longer, Mr Skou says.

"The practice of using bigger ships through Suez Canal rather than Panama Canal will likely be followed by other carriers," says Bonnie Chan, an analyst at Macquarie Group who is based in Hong Kong. "This gives shipping companies a bit more flexibility in managing capacity."

The number of container ships crossing the Suez Canal fell 12 per cent to 6,332 last year, according to the waterway's authority. A total of 17,225 ships of all types travelled the link between the Mediterranean Sea and the Gulf of Suez last year. The Panama Canal was used by 3,331 container ships last year, up from 3,253 in 2011, the canal authority says. There were 12,862 total crossings.

Fees for ships to go through the Panama Canal have tripled in the past five years to US\$450,000 (Dh1.6 million) per passage for a vessel carrying 4,500 containers, Mr Skou says. Last month, the Suez Canal Authority announced canal toll increases that would be effective from May, according to the Asian Shipowners' Forum.

A \$5.25 billion expansion of the Panama Canal, the waterway handling 5 per cent of global trade, will open by June 2015, six months later than originally planned. The canal connects the Atlantic and Pacific oceans.

Whether Maersk will use the Panama Canal after the expansion will depend on the economics, says Mr Skou.

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#the number

12%

decline in the number of container ships using the Suez Canal last year