**[HEADLINE] Breaking waves, breaking records**

**[STANDFIRST]** Sailing the ocean waves offers a freedom and excitement few other activities can match. But for world record holder Phil Sharp, it is about more than just thrills: he hopes the cutting-edge technology he uses could help decarbonise yachting.

**[INTRO]** Phil Sharp, one of Britain’s most successful offshore sailors, has already secured a world record for the fastest solo monohull crossing of the Channel. Now, he is spearheading a project with Imerys that could have an impact that extends well beyond the record books.

The Energy Challenge is a bold effort centred on innovation and energy efficiency that will see Phil sail 100% CO2-free, with not even a diesel generator for emergency back-up.

The Energy Challenge team are currently testing a stand-alone hydrogen-electric energy system that could one day replace fossil fuel motors in yachting.

Imerys Graphite & Carbon is playing a central role providing the graphite powder and the carbon used in light but highly efficient lithium-ion batteries to store energy. With the help of Imerys Roofing, Imerys Fused Minerals has also been working with the Energy Challenge team to develop an innovative non-slip coating for the boat’s solar panels, allowing the sailors to move around safely on deck. And, the good news is that, while the team was just trying to find a non-slip solution, they actually increased the absorption capacity of the panels by an estimated 10%.

A key aim of the Energy Challenge is to speed up decarbonisation in the yachting space, which Phil believes lags behind some other fields. “In terms of the objectives of this technology, we want to use it as a means of increasing our energy supply on the water, but also as a demonstrator for a transition to sustainable technology in the marine sector,” he explains.

**[INTERTITLE] RACE SUCCESS**

Ahead of the Transat Jacques Vabre race in November, Phil is leading this season’s Class 40 Championship - which involves offshore, Channel and ocean races - proving the potential for zero-emissions technology.

He and his yacht Imerys secured a win in this year’s first event, the three-day Grand Prix Guyader off Brittany, France, and then followed up with victory in the Normandy Channel Race setting a new race record alongside his teammate, Spanish sailor Pablo Santurde.

Plenty more action followed. In July, Phil finished with a close second in Les Sables-Horta-Les Sables, a demanding 2,540-nautical mile return race through the Bay of Biscay and the Azores archipelago. With another second place in the Rolex Fastnet Race, Phil won the 2017 Class’40 European Trophy… racing on ZERO CO2 emissions and drawing on renewable energy only.

The highlight of the year, however, will come in November with the year’s final Championship race, the Transat Jacques Vabre. This 4,350 mile challenge, likely to take Class40 competitors more than three weeks to complete, takes a notoriously difficult course from Le Havre in France to Salvador in Brazil, following in reverse the route clippers used to take when transporting coffee from Brazil to France at the start of the 19th Century.

**[INTERTITLE] SOLAR IN PLACE OF DIESEL**

Phil’s interest in renewable technology dates back to when his boat’s diesel generator developed problems before his very first ocean race from France to Brazil. Rather than buy a new generator, he installed solar panels. “It’s an incredibly invigorating feeling, to know you’re using clean energy. You have endless power; you just have to manage your energy consumption very well,” he said.

His Imerys tie-up began in 2016 through a technology partnership with the Graphite & Carbon Division and the Roofing Division, before an Imerys-wide three-year sponsorship agreement was launched in 2017.

While Phil’s future is focused on clean energy, his past was inherently tied to water. Hailing from Jersey in the Channel Islands, he was in the perfect location to take to the ocean waves and, on top of that, his parents and grandparents enjoyed sailing. Yet, to start with, he faced choppy waters.

“Even as a young child, I endured various offshore passages. I used to be very sea sick,” he said. “When I got to university, it sparked my passion for competition. I really got attracted to the racing side of sailing.”

**[INTERTITLE] LIFE ON THE WAVES**

Phil studied Mechanical Engineering at Imperial College London, which ultimately led him to become Commodore of the Sailing Club. It was on the Welsh Harp Reservoir, a 170-hectare area of open water in north-west

London, where he learnt to sail competitively. “I used to go to events around the country to race against different universities. It was such good fun,” he remembers. It was winning the only offshore Student Nationals race of the year that gave Phil the boost to pursue a career in professional offshore sailing.

To date Phil’s offshore career has delivered some jaw dropping results. In 2006 Phil won France's infamous transatlantic race from France to the Caribbean, the Route du Rhum nearly a whole day ahead of 2nd place, and more recently in early 2016 after suffering damage from the impact of a serious storm and two gales in the gruelling solo Transat race from England to New York, he held on to podium position finishing with half a mainsail.

It doesn't stop there. Recently likened to France's infamous offshore sailor Francis Joyon able to deliver super human efforts, Phil broke the world record for a solo crossing of the Channel in nine hours, three minutes and six seconds.

Phil’s ultimate aim is to compete in the Vendée Globe 2020, a non-stop solo-sailing event that lasts more than 10 weeks. It is often considered the pinnacle of ocean racing. More than 5,000 people have summited Mount Everest, over 500 people have travelled into outer space, but fewer than 100 people have sailed single-handed non-stop around the world.

For the moment, however, he is focused on perfecting his boat’s zero-carbon technology, something that could change the future of sailing as we know it.

**[PULL QUOTE 1]**

“It’s an incredibly invigorating feeling, to know you’re using clean energy.”

**[PULL NUMBER 1]**

4,350 miles to complete November’s Transat Jacques Vabre, which runs from France to Brazil

**[Q&A title] Tea-fuelled feats**

[QUESTION] How do you deal with the solitude during long races?

When I started ocean racing I found it very difficult. You could talk to someone on the VHF if there was a boat near you, but most of the time you didn’t have a boat near you after the first few days. You felt completely detached from civilisation and humanity.

[QUESTION] Have modern satellite communications made a difference?

If there’s a problem on the boat, or to speak to your family, it’s a huge help. You can get back in touch with humanity and the world. It’s wonderful to speak to people with the satellite phone. Once a day is always good.

[QUESTION] What do you enjoy most?

Sometimes, when things are nasty, the meals are the only things to look forward to. It’s good to have treats. A friend’s mum makes amazing flapjacks. I take them on every ocean race. I cook porridge. Having some hot food inside you is really good. To get through the long night, I have to drink copious amounts of tea. It’s a great morale booster.

[QUESTION] Do you have any special meal preparations?

I aim to consume 3,500 to 4,500 calories per day. To keep the boat’s weight down, I use a desalinator to make fresh water to add to my freeze-dried meals. I snack on biltong, cereal bars and fresh fruit, as well as cheese sandwiches for fat and protein.

[QUESTION] What do you do in your free time during a race?

It would be nice to have some free time, but frankly you don’t. There’s so much to manage on a boat from navigation to changing the sails if the wind changes to even just turning the sails.

[QUESTION] Do you find time to sleep?

There’s very little time to sleep – if you’re getting seven to eight hours, you’re not going to be competitive. You have jobs through the night and day. You can’t sleep for more than 20-25 minutes at a time or you risk the boat slowing down or even changing course. You sleep in very short bursts and try to accumulate, if you can, four hours out of 24. If you get any lower than that, you can’t think straight to make tactical decisions.

[QUESTION] What are the physical challenges?

Physically you can deteriorate very heavily. I lost half my strength in The Transat bakerly– a solo transatlantic race from Plymouth to New York. It’s a very extreme event, sailing upwind across the North Atlantic. It takes weeks to recover. It’s the physical workout you have to do on the boat. You could be sitting at the helm for hours and then you have to jump up and exert a huge amount of strength to pull a sail up. It’s a very difficult thing to prepare for. It's important to keep doing some physical training on the boat if you can and eat the right foods to recover your muscles.

**[BREAKOUT BOX]** The tech below deck

The Energy Challenge team are developing a self-sufficient hydrogen-electric and CO2-free energy system that is not only lighter than a diesel generator, but also more reliable as it relies on multiple energy sources.

Energy storage comes from a lithium-ion battery and a system in which an electrolyser is used to create hydrogen, which in turn powers a fuel cell. The system is light, there are zero greenhouse gas emissions, running costs are low, and the operation is almost silent.

Imerys’ Graphite & Carbon Division is supplying graphite powder and carbon that, will be used to develop efficient and lightweight lithium batteries to store power. The Energy Futures Lab of Imperial College London is playing a key role in developing the technology.

The Energy Challenge project is also cutting-edge due to the advanced materials being used in the solar cell integration. Fused Minerals have worked with Phil to provide a durable and safe non-slip solution, which has already proved successful this year.

“I can move round with confidence even when there are waves crashing on the deck,” said Phil. “It means we can install more solar panels because we can put them on the deck.”

During races, measurements will be taken of carbon dioxide levels, wind speed and sea-surface temperatures to assess climate models, while plastic pollutants will also be recorded.

Ultimately, Phil plans to use this technology on an IMOCA 60 yacht, which is larger than the Class 40 vessel he is currently racing. It will include photovoltaic panels – a type not currently available on the market – plus a wind turbine and a hydro-generator to supply energy.

**[PULL NUMBER 2]**

7

square metres of solar panels on Phil’s Class 40 yacht

ends