Striking the right balance

Simon Johnson asks three high-speed ferry operators how they plan to reduce emissions and adapt to new fuels while continuing to provide safe, cost-effective and reliable services to passengers

Fast ferries have long been part of the everyday ferry scene, allowing operators to offer their customers more frequent and faster crossings. With pressure on fuel costs and demands for greener travel rising, our three executives share their thoughts on why they must consider new technologies, fuels, supply chain and shoreside infrastructure to ensure fast ferries continue to be cost-effective and an attractive option for passengers in future. What is clear is that they are all ready to embrace the challenges ahead and agree there is definitely a place for fast ferries in their ferry fleets.

What are the biggest power, speed and fuel challenges facing high-speed ferry operators in 2022?

FC: For pre-existing vessels, the biggest challenges are the rising cost of fuel and our moral imperatives as operators to reduce emissions and decarbonise our fleet as soon as possible. In 2022 and beyond, customers will continue to expect a fast and cost-efficient service which runs to timetable and is increasingly sustainable. Our small, modern high-speed vessels help us to operate efficiently. However, we must continue to adopt new technologies and explore ways to reduce our carbon footprint, whilst ensuring we meet our customers' timetable requirements.

SC: Small inland fast ferry operators like Uber Boat by Thames Clippers have very specific requirements. Our ferries must be capable of delivering a high-speed service, without requiring long charging times. Additionally, our boats must be as sustainable as possible because we operate in busy residential hubs. Hence, we must strike the correct balance between green alternative technology and standard diesel options.

Currently, a ferry powered completely by batteries remains unrealistic. The volume of batteries required to deliver sufficient power would make the vessel too heavy, and the downtime period needed to charge the batteries would be so long as to be commercially unviable. It's possible to imagine that a non-diesel power source, such as a hydrogen fuel cell, could work with batteries in future. For now, however, our brand is focusing on powering vessels with a hybrid mix of batteries and onboard power generation via low-emission engines. This supports the high-speed requirements of the vessels and also allows them to operate at low speed with zero emissions.

MM: The biggest challenge is meeting the maritime industry's zero-emissions goal. The new Tier Four technologies have increased the size and weight of engine packages, which requires vessels to have

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MORGAN MOONEY
CEO of San Juan Clipper, and Captain and Media Director of Fire Island Ferries

Uber Boat by Thames Clippers will launch the UK's first hybrid high-speed passenger ferry in London in autumn 2022 as part of its strategy to achieve net-zero emissions with all newbuilds by 2025

larger engines and engine rooms to obtain the power necessary to achieve the high speeds of previous models. For example, the Tier Three engines Fire Island Ferries installed on Isle of Fire need to operate at higher revolutions per minute to achieve the same speed as previous engines. Though the emissions are lower, the vessel is burning approximately 15-20 gph more for every roundtrip. So, it becomes a difficult balancing act of finding the optimal cruising speed versus fuel burn versus the vessel's scheduled trip times, all while remaining conscious of emissions.

The drive for zero emissions and implementing alternative fuels will prompt operational changes that could negatively impact the bottom line. High-speed ferries must provide fast and convenient services, so operators have to decide between saving money by reducing speed and thereby extending travel time, or accepting these budgetary increases and passing the additional cost to customers. Both options could negatively affect the public's view of the company.

"We must strike the correct balance between green alternative technology and standard diesel options"

Sean Collins, Uber Boat by Thames Clipper

The two new hybrid vessels for Uber Boat By Thames Clippers will operate solely on battery power in central London and recharge using biofuelled power while sailing outside that zone

Can high-speed ferries still be an attractive proposition in the era of new fuels?

FC: There is absolutely a place for high-speed ferries, particularly on domestic routes. Red Funnel provides a lifeline service for passengers travelling to school, work and medical appointments between the Isle of Wight and England, so we prioritise service reliability when considering new technologies and fuel options. We'll continue to take a risk-based and considered approach to new technology, adapting our overall operations to reduce our carbon footprint. Our passenger-only catamaran service is ideally placed to adopt new technologies due to the small vessel size and short crossing time, and we intend to continue offering a high-speed service. However, it's essential that the systems are fully reliable and that the infrastructure and supply chain is in place to support new fuel sources.

SC: Our service is used as a vital transport link for many commuters travelling in London, UK, and therefore it's essential that our ferries continue to deliver a high-speed service. This remains attractive during the era of new fuels.

> "We all have a responsibility to decarbonise our vessels as soon as possible"
>
> **Fran Collins, Red Funnel**

MM: The 'slow it down' principle to burn less fuel will only work for so long, regardless of the ferry's design or classification. New fuels will be an attractive proposition if they can meet the current speed versus cost expectations, while also allowing for minimal weight increase or dockside disruption, they will be very attractive. If hybrid or new fuel designs can create similar or more efficient services than those offered by today's fleets, many operators will build or retrofit their vessels.

What are your plans for fuelling your fleet in the future?

FC: Our high-speed fleet is young, with the Red Jet 6 and 7 being launched in 2016 and 2018 respectively. They have modern engines and although they currently operate on marine gas oil, we're not planning to retrofit them until the technology and infrastructure becomes more established. However, we closely monitor developments in the industry so that we are ready to consider retrofitting to support zero-carbon operations, or to add new decarbonised high-speed ferries to the fleet. There is a lot of discussion around using existing LNG networks and hybrid vessels, but these are transitionary solutions and the route to full decarbonisation is our priority. Therefore, we're closely monitoring the development and trials of fuels such as

Red Funnel's Red Jet Hi-Speed service is the fastest way for foot passengers to cross the Solent from Southampton, UK, to the Isle of Wight

ammonia and hydrogen, as well as the more established battery systems.

SC: We have two hybrid vessels currently under construction. They will operate solely on battery power while transporting commuters and sightseers through the capital, and recharge using biofuelled power while outside of central London. We have already embarked on next steps to evaluate what alternative fuel sources are going to be and we're confident our ferries can achieve zero tailpipe emissions in future.

MM: We'll continue to explore new fuel opportunities as they become available for possible future vessels. The San Juan Clipper vessel is over 30 years old, and we'll continue to operate her as cleanly and efficiently as possible to limit her emissions. The cost of retrofitting her to Tier 4 engines or a new fuel is prohibitive. Any future investments in new fuel will have to wait until if/when we build a new vessel.

What factors will you have to consider when choosing how to fuel your ships?

FC: Factors such as availability of fuels and shoreside infrastructure are key in our decisions in future fuels for our vessels. We're very excited by the developments in this area, but as a lifeline provider, we need the assurance of reliability, both in operation and in the supply chain, before we are able to adopt new fuels with confidence.

SC: The inter-port infrastructure to support the refuelling process is extremely important to us when considering such matters. We're currently working with various partners to establish how we can most efficiently and safely deliver a bunkering system that is equal to – or better than – the processes we are familiar with, and which would allow our services to be commercially and economically viable.

MM: Factors we need to consider seriously when contemplating new fuel are routes, the location of our piers, and any environmental fallouts the new fuel may have to the waterways and marine wildlife in the event of a leak. San Juan Clipper's routes and whale-watching excursions need the vessel's engines running for six to 10 hours between fuelling. Hence, we need to be sure that the storage, or available capacity, of the new fuel will allow the vessel to operate at speed for long periods of time. The nature of our ferry service to Friday Harbor means there's no opportunity to take on additional fuel while docked at San Juan Island. The infrastructure of the island is not prepared to accommodate new fuelling facilities.

> "The high-speed ferry industry will embrace new fuels and hybrids in the next five years"
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> **Morgan Mooney, Fire Island Ferries and San Juan Clipper**

Caption

Prior to switching to a new fuel, we also need to ensure it is locally available. We're in the heart of Seattle, Washington, and must work with the local municipalities to build new fuelling facilities. The long-term return on investment affects the appeal of such a project. We're fortunate that Washington State Ferries also operates throughout the region which may afford us a future opportunity to access new fuels more easily than private operators in more remote areas.

When would you estimate that the high-speed ferry sector is likely to embrace new fuel? When will you adapt your fleet?

FC: Many high-speed operators provide lifeline services, so reliability is a key need. That said, we all have a responsibility to decarbonise our vessels as soon as possible, and the opportunities are certainly there for those prepared to be first adopters. Red Funnel has a young and relatively efficient high-speed fleet, so we're able to adopt new technologies in a considered and risk-assessed manner that enables us to protect both the Isle of Wight's service requirements and the environment in which we operate.

SC: Through previous research and development we have determined that the cost and technical challenges of retrofitting the type of vessel required for our style of operation is unavailable. Therefore, a structured fleet replacement programme is likely to be our preferred route. We believe that 100 per cent alternative fuel services could be achieved within the next five years, subject to port fuelling infrastructure being available.

MM: I predict the high-speed ferry industry will embrace new fuels and hybrids in the next five years. As more operators successfully transition to new fuels, the wider industry will become more willing to take the plunge. We'll see an increase in hybrids as the industry continues to develop the technologies and provide possible investors with real-world results. High-speed ferries with short routes and the ability to refuel at multiple locations will be the first to be transitioned to new fuels. It will be interesting to see the new industries that develop as a result of new fuels in the maritime industry. Of course, we still need to answer the big questions about how new fuels will change current regulations, classifications, safety measures, terminal infrastructure and more – and at what cost. **CFR**

A helping hand

Shipbuilders Incat Crowther and Incat Tasmania share how they can assist operators to build the fast ferry fleets of the future

A high-speed future

The future in high-speed ferry transport lies in larger, more efficient ships that operate in the 20 to 30 knot displacement speed range. Weight-saving technology and lightweight construction methods developed at Incat Tasmania over three decades can be used to produce ships with transport efficiency well above what is on the water today. The resulting higher efficiency means less energy demand and a simpler transition to alternative fuels and zero-emission ships. While electric ships are the future, a lightweight ship will always be more efficient to operate, regardless of the power and propulsion source used.

Photo: Incat Crowther

Helping ferry lines achieve sustainability goals

Incat Crowther aims to deliver meaningful solutions to help customers achieve sustainability goals, using stepping-stone technology that is commercially viable and future ready. Incat Crowther undertakes modelling of the complete ferry network to ensure it can make informed design decisions around the most applicable technology for a given operation. This operation-driven design includes timetabling to suit the technology and clientele. To protect capital investment, Incat Crowther is increasingly looking at multiple operating speed modes to accommodate numerous routes. Typically, this entails developing ferries that are designed to use plug-in electric power on shorter routes, and switch to higher energy density fuels on longer routes.