Summer 2023

ELECTRIC BOATS INTERACTIVE

FEATURE BOAT

Hybrid Sailaway

CRUISE GUIDE

Weaver Navigation

Electric Boat Association

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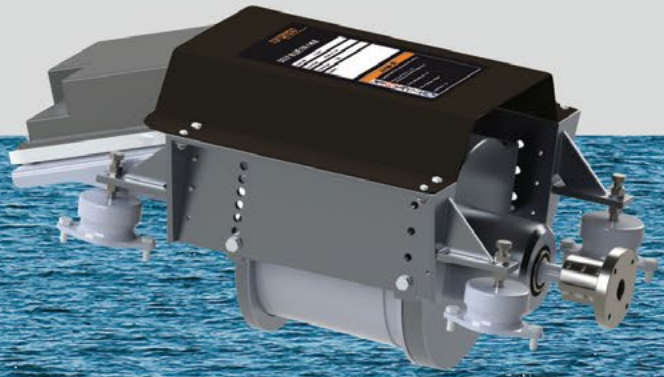
STARNBERG.GERMANY

DEEP BLUE i



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ELECTRIC BOATS INTERACTIVE

Contact

Editor Don Wright

email: editorelectricboat@gmail.com

Submit

Contributions from readers are welcome although we cannot be held responsible for any damage or loss which may occur to material provided. Items of interest include letters, reports of rallies, events, cruises, articles and advice on building and running electric boats and on items of equipment. We also welcome manufacturers' reports on new equipment and boats.

Copy Deadlines

Material to be considered for inclusion in Electric Boats interactive should be sent to the editor (preferably by email) by the following dates:

Spring	31 January
Summer	30 June

ELECTRIC BOATS INTERACTIVE

Volume 5
Number 2
Summer 2023

Going Faster

Speed is a feature in this edition of the magazine. A new water speed world record for Electric Boats has been set this year by Vision Marine Technologies breaking the 100 mph speed barrier. The UK Electric Boat Association was formed in 1982 to promote electric boats and boating and has played an impressive role in past world water speed records for electric boats (p31)

The cruise guide (p17) takes in the Anderton Boat Lift which connects the River Weaver to the Trent and Mersey Canal. The Lift is a designated scheduled monument and is today a significant visitor attraction. However the capital investment in such a major piece of industrial infrastucture in the late nineteenth century was an indication of the value of the trade the river and canal once carried.

Tourism is a modern day multi million pound industry but the proposed reduction in government funding for Britain's waterways (p12) seems a poor investment decision.

Electric boats are the ideal tourist vessel for exploring senstive marine envrironments and protected inland waterways ecology and heritage. Kevin Desmond's concept of an electric propulsion Polyboat (p27) is designed with this in mind. Although his interest is in his local river the Garonne, near Bordeaux, the versatility of the Polyboat makes it suitable for a wide range of inland waterway activities. French boatbulder Naviwatt has already supplied two similarly designed houseboats to a local tourist operator in the protected Marais Poitevin Regional Park.

Speed isn't everything. One of the narrow boats moored up on the Trent and Mersey Canal waiting for the Boat Lift to open had Hybrid Marine's system on board (p10). The owner had been cruising for around three seasons and apart from being very happy with the minimum amount of diesel needed over this time, was particularly impressed with how the boat operated at low speed manoevering, which was much slower than with the diesel engine at tick over (but the electric propulsion mode was not so good in weedy waters).

One of the features of the Lymm Marina Hybrid Sailaway was Hybrid Marine's remote control system which enables the boat to be helmed from the lockside. The Robot WasteShark (p13) can also be radio controlled as it patrols the Thames in search of plastic prey.

Don Wright

Cover: Lymm Marina Hybrid Sailaway

Electric Boat Association

Published by Futuremode Limited

CONTENTS

Summer 2023

Hybrid Electric Sailaway

Lymm Marina specialises in selling new narrow and wide beams shells as lined or part fitted sailaways. All work is carried out at the boatyard by experienced craftsmen and the shells can be customised to customers' specifications.

The boatyard and sales office is located on the banks of the Bridgewater Canal in the North West of England, and the marina is usually open to visitors on Thursdays, Fridays and occasional Saturdays.

The boatyard is ten minutes from Manchester airport, 30 minutes from Liverpool and one hour from Birmingham. There are always boats available to view and some ex-stock for sale.

The steel hulled boats are sourced from different shell builders, to suit different requirements and budgets and the range includes shells from:

Cheshire narrowboats
Mike Christian boats
Tim Tyler boats
Jonathan Wilson narrowboats
Liverpool narrowboats
Collingwood boats
Reeves boats
Piper boat

as well as other builders.

Lymm Marina's sailaway boats are on the water ready to go. They are sprayfoam insulated and battened and suitable for fitting out to all layouts.

The boats have an engine, stainless steel water tank, 4x12v domestic battery bank and twin coil hot water calorifier

In addition to the basic sailaway and to help owners' fit-out lead times and give them a head start on fitting out a boat Lymm Marina now also offer a number of Sailaway 1st Fix packages which provide the essential narrowboat live aboard utility services infrastructure:

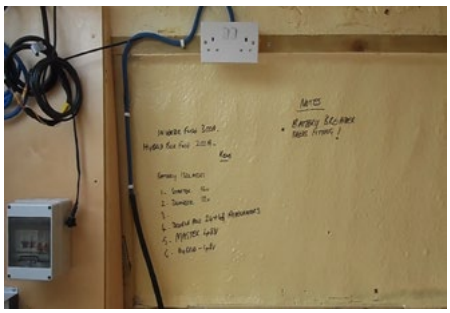
1st fix plumbing
1st fix electric
upgraded inverter
1st fix diesel heating
1st fix gas run
& other extras to order

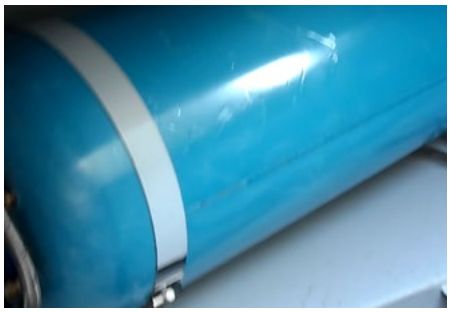
First Fix Sailaway

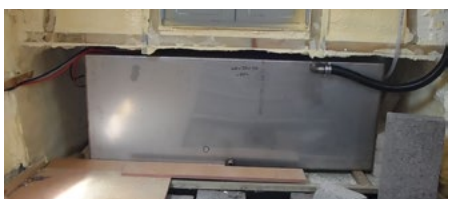
This Lymm Marina Sailway has Hybrid Marine's engine and motor installation in a Tim Tyler 57 foot semi trad stern steel narrowboat together with a full first fix fit out.
The plumbing system includes connecting and testing the Eberspacher diesel heating by installing a sacrificial hot water radiator which can easily be repositioned or replaced when the interior layout is planned. This is the principle behind all the first fix installations. All the domestic plumbing and electrical systems are tested and are easily connected when the interior layout build of bathroom kitchen and bedroom is undertaken.
The engine and motor are also fully tested before the boat sails away and in particular the interface of the calorifier to the boats's hot water system. The hot water system can be heated by the diesel engine when it is in operation and by a coil heater powered by the battery bank if needed at other times.

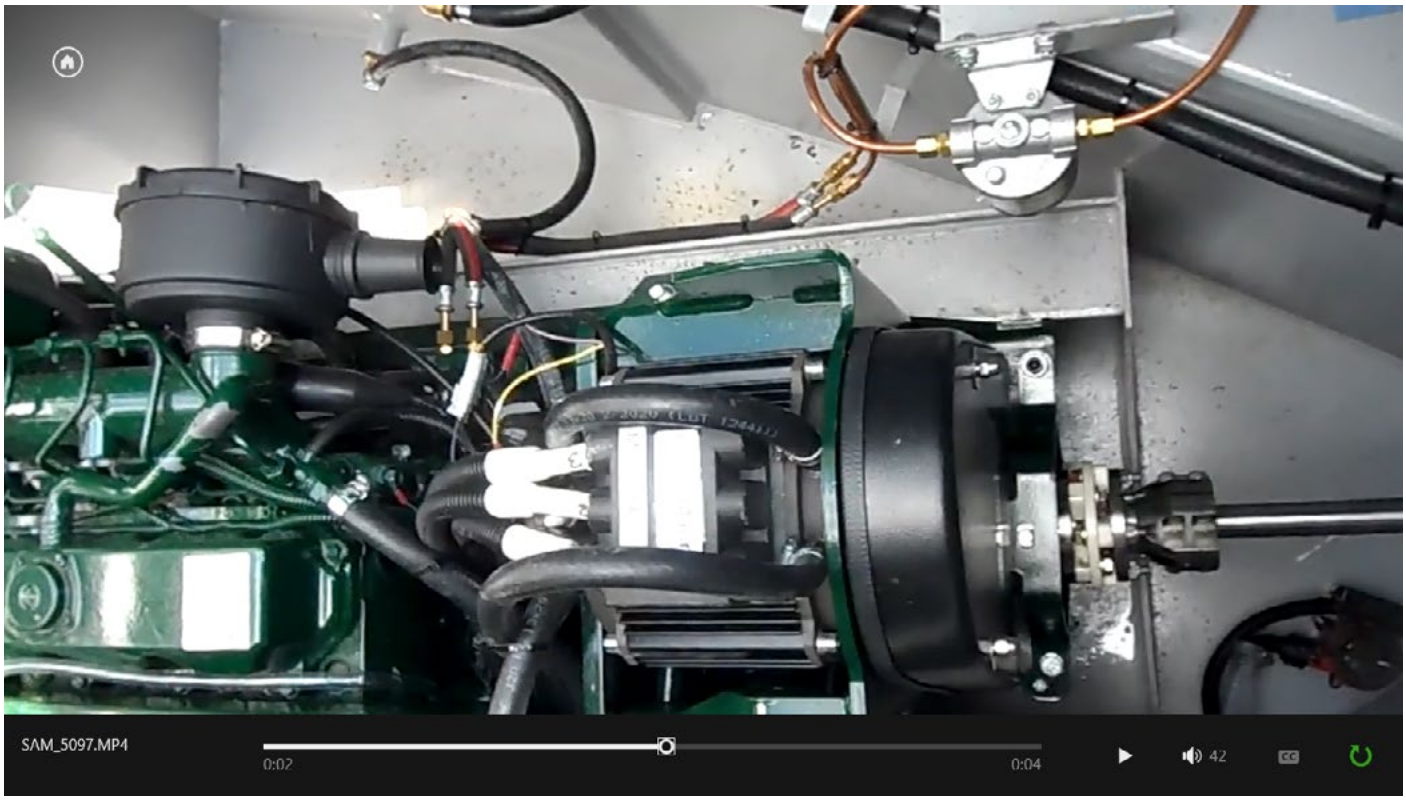
Specifications

57' Tim Tyler narrowboat shell
Semi trad style stern
Foam insulated sailaway
10kW Motor
38hp diesel engine
Eberspacher diesel heater
48V battery bank
Victron inverter
4 x 12v domestic battery bank
Twin coil hot water calorifier
Stainless steel water tank



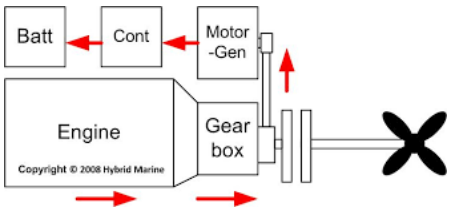






Propulsion: Hybrid Marine parallel system

The Lymm Marina sailaway is fitted with Hybrid Marine's parallel hybrid system designed to provide a complete power and propulsion solution.
The hybrid system does not disturb the normal shaft / propeller connection to the diesel engine, instead, as the name implies, it connects to the shaft in parallel with the engine. Hybrid systems offer efficiency improvements during low to mid power cruising and the Hybrid Marine system makes good use of this basic principle. The standard diesel engine is sized to provide the maximum power requirement for the boat, while the electric drive is designed to match the boat's mid range power needs. This allows the electric drive components to be smaller and provides a very cost effective hybrid solution.
It takes approximately 3 to 5kW to move an average 20T narrow beam boat at moderate canal speeds (2 to 4 MPH). The 10kW liquid cooled, brushless, motor/generator, electric drive provides this with plenty to spare for normal manoeuvring. Operating in adverse conditions, say on a fast flowing stretch of a river, then the full power of the main engine will be needed.
In Hybrid Marine's parallel hybrid system the motor/generator is kept out of the conventional drive chain and connects to the drive shaft after the gearbox. If stand-alone generation is needed, which is not always the case, a clutch is required to disconnect the propeller shaft. As the motor is not in direct contact with the engine cooling is a little easier and the motor has its own cooling circuit. It is easy to remove, service and replace the motor without the diesel engine being disabled. The shaft clutch is accessible and can easily be locked together should it fail. The pulley/ belt drive gives great flexibility and the drive ratio of the motor can be set independently from the engine gearbox which allows matching of the motor to a wide range of engines. An in service adjustment is simply a change of external pulley size. As motor technology improves and becomes more cost effective the motor can easily be upgraded.
The toothed drive belt and pulley system has a very low loss(typically 1%-2%) and is used in such diverse applications from stone crushing machines to replacing chains in performance motorbikes. Hitting a solid object in the water can cause the belt to break. However such a collision could also damage an engine mount or break a gearbox damper plate if on engine drive and having a beltbreak first can save more expensive components and will not disable the engine. A broken belt takes a short time to replace at a low cost..



Energy supply and storage

The Hybrid Marine sailaway is fitted with an 48V 800Ah wet cell battery bank as as well as a 12V battery bank for the boat's on board 12V systems. The 48V Battery bank (400Ah complete system or 800Ah enhanced system), supplies both propulsion and house loads. When properly maintained wet cell batteries offer excellent performance and are ideally suited to Hybrid Marine's propulsion system. The parallel hybrid system can charge any battery system, has a four stage charging algorithim when operating in generate mode, and includes the inputs necessary to connect an external battery management system to control both charging and discharging of the battery by the hybrid system. The 5kVA Victron charger/inverter supplied also has these capabilities ensuring that the whole system can work with any battery technology, both now and in the future. Usually when cruising within canal speed limits the enginge is running at just over tick over speeds (1,200 to 1,400RPM) and the system is designed specifically to provide 7-8 kW of power generation at this low engine speed. In typical canal conditions the electric motor can be used for long periods. A 48V/400Ah battery bank would last around 3-5 hours, and the 48V/800Ah would last 6-10 hours. When the engine is engaged the motor automatically becomes a generator to recharge the batteries. At normal cruising speeds the batteries are quickly recharged via the powerful generator and a boost alternator bank provides an extra 3kW giving a charge rate up to 8kW. Every hour of engine drive can store enough energy in the batteries to travel between 1 and 2 hours in electric drive. There is also a cross charger for the 12V battery system.

The large inverter and fully charged high capacity battery bank will power standard 230V electrical circuits and domestic appliances and the 800Ah enhanced system allows all electric cooking without any need to have gas onboard or run the diesel generator.

Radio link

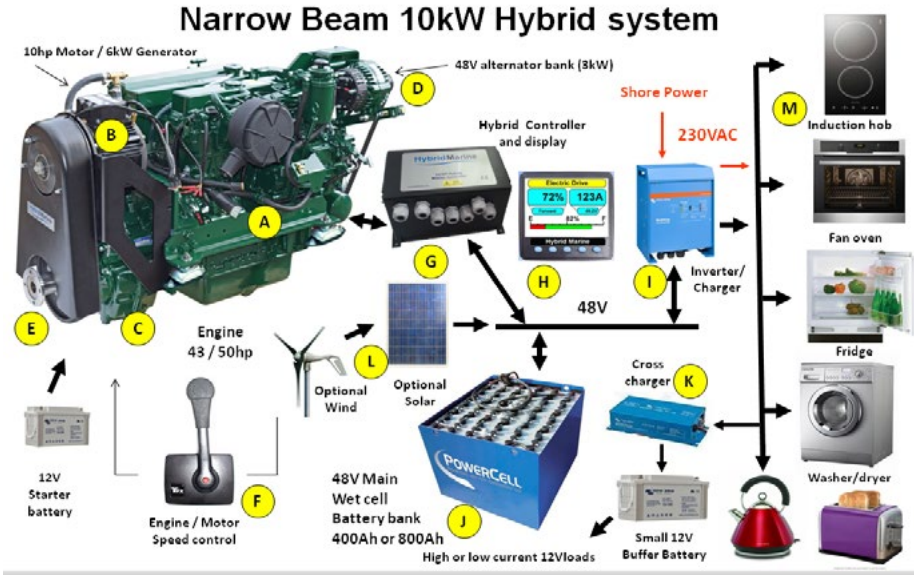
The radio transmitter/receiver link has been fitted as an optional extra. This is not designed for prolonged operation but intended to assist close quarters maneuvering when confined in a lock. The radio receiver is powered whenever the Hybrid control box is turned on.

Control and monitoring

When the hybrid operation is engaged the hybrid control box and colour display monitors, motor speed/direction control, and multi phase battery charging when the engine is running. There is also a batttery monitor diplay for the battery management system.

Hybrid Marine has been supplying narrowboat systems since 2007 and specialises in providing custom packages to boat builders who want to offer hybrid technology to the leisure and commercial markets. The award winning patented parallel hybrid systems are the result of extensive research and provide an integrated power and propulsion systems for inland canal boats, commercial barges and sailing boats including fast offshore sailing catamarans. Hybrid Marine has been working with Beta Marine UK since 2008 to provide complete parallel hybrid systems for both inland and offshore craft based on Beta's range of marine diesels. Hybrid Marine has also been working closely with E.P.Barrus UK, sole importer of Yanmar engines, since 2010 to offer hybrid systems based on the popular range of Yanmar marine diesel engines. Hybrid Marine cusomers have been using the sytems and batteries for many years now and the parallel hybrid powered narrowboat *Watt Knot* built by Ortomarine, was a previous Crick Boat Show 'Favourite Boat' awards winner

HybridMarine



A Marine diesel engine
B Liquid cooled, brushless, motor generator, 10kW electric drive and 5-6kW generation
C Standard marine gear box, PRM150
D Boost alternator bank
E Standard 4" coupling to propeller shaft
F Smart Morse control. .
G Hybrid control box
H Hybrid colour display
I Charger/Inverter. 3kVA for complete hybrid system, 5kVA for enhanced system
J 48V Battery bank 400Ah(complete system) or 800Ah (enhanced hybrid)
K Cross charger for buffer battery supplying on board 12V appliance
Not supplied with package
L Renewable charging sources
M Standard 230V domestic appliances

CRICK BOAT SHOW

In 2019 Hybrid Marine joined the European project "Implementation of Ship HYbridisation" (ISHY) together with fifteen project partners consisting of Universities and companies active in Hybridisation.
European Regional Development Funding is provided under the Interreg 2 Seas program.
ISHY aims to foster the development, testing and validation of technical tools and business models for the implementation of hybrid and hydrogen fuel cell technologies in vessels and ports, in order to increase the adoption of low carbon technology in the shipping and port sectors. The program looks to retrofit existing vessels, encouraging the building of new vessels, as well as constructing the necessary logistical facilities.

In Brief

Waterways Campaign

The Inland Waterways Association IWA was founded in 1946 when the inland waterways were under threat and since then another 500 miles have been added to the network. However despite the waterways being widely acknowledged for the many benefits they provide, the canals and rivers are under threat once again. IWA is deeply concerned about the proposed funding cuts, with for example Canal & River Trust and Scottish Canals financial situations being especially critical. Despite being recognised in the government's Environmental Improvement Plan, the condition of the waterways continues to deteriorate while government funding is decreasing. Canals and rivers are valuable assets which can contribute to the country's economic recovery, help to mitigate the impacts of climate change and enrich the lives of local communities The IWA has now launched the Fund Britain's Waterways campaign and is calling on national and local government to fund all waterways at a level that keeps them as major assets that can continue contributing to the economy, peoples' health and wellbeing, and coping with climate changes. Millions of hours of volunteer time and effort along with lottery funding have been invested in revitalising the waterway network and the IWA is determined to prevent the network fall into disrepair again.

Campaign Cruise

After attending a Fund Britain's Waterways campaign demonstration in Birmingham city centre in August the Birmingham Canal Navigations Society's working boats *Atlas* and *Malus* continued to promote the campaign by moving on first to the Brownhills Canal Festival, then to the IWA Festival of Water at Pelshall and finally to the Black Country Boating Festival at Bumble Hole on the Dudley No2 Canal in early September.

Electric Flyer

The UK-based engineering firm, Equipmake, has supplied an advanced e-drivetrain system for a long-range electric flying boat currently in development. The SpiritBARTech35EF project, in collaboration with Spirit Yachts and BAR Technologies, is a 35ft electric vessel that uses active retractable foils to lift the hull above the water and reduce drag, enabling a fast cruising range of approximately 100 nautical miles at 22 knots. The project is set to become the first fully electric yacht capable of delivering a range of 100 nautical miles between charges. Equipmake designed, developed, and manufactured the fully electric drivetrain for the boat which features a specially adapted version of its motor and gearbox, an Equipmake inverter and custom battery pack. The project is the first time Equipmake's electrification products and expertise have been applied to the electric marine market

New Fischer Panda electric drive

Fischer Panda UK introduced the new, efficient ePanda Series 8.0, comprising a new 5kW electric shaft drive at this year's South Coast and Green Tech Boat Show. The new drive has been developed to meet the demand for complete and efficient power solutions for low-powered recreational craft. The ePanda Series 8.0 includes the newly developed air cooled 5kW shaft drive which forms a fixed unit with the inverter, is brushless, sensorless and features permanent magnet technology. This makes it a low-maintenance, extremely efficient drive, weighing only 22kg.

Innovation Award

At this year's Crick Boat Show Lynch Motors had on display their Marine Business Technology Centre Award for innovation alongside the LEM 240v motor with their patented Lynch axial flux design and their Red Snapper motor, a complete diesel/electric hybrid inboard system,

click on the red dots

Thames Hydrogen

The Port of London Authority is a consortium partner in developing a hydrogen refilling station on the River Thames and operating an uncrewed hydrogen fuelled surface ship. Sea-Kit International has been awarded funding from the Zero Emissions Vessels and Infrastructure competition to design and manufacture the hydrogen-fuelled uncrewed surface ship in the UK. As part of the project and in partnership with maritime Marine2o Sea-Kit will also build land-based infrastructure capable of producing green hydrogen through renewable energy and the electrolysis of water. Marine Zero will support Marine2o with the regulatory compliance and the design and integration of the dispensing facility. The five-year project will also support environmental monitoring, academic and industry research programmes as well as feeding into the Maritime Hydrogen Highway programme

Robot WasteShark

RanMarine Technology's WasteShark is a mini electric catamaran robot that collects plastic waste, and other rubbish in the water while collecting data on water quality. According to the World Wildlife Fund, which helped deploy the first WasteShark in the UK, 8 million tons of plastics are dumped in the oceans each year creating significant environmental damage. The plastic-eating shark is on the River Thames and daily removing the equivalent of over 22,700 plastic bottles. Powered by two electric thrusters and controlled via 4G the WasteShark can navigate waters autonomously for 3 miles collecting more than 500 kg of plastic and other waste or pollution with its open mouth design, operating for six hours in autonomous mode and eight hours with remote control.

click on the red dots

In Brief

Green Flags

The Canal & River Trust has reported that 50 of the Canal & River Trust's canal and river navigations have been awarded prestigious Green Flag status by Keep Britain Tidy with two further waterways which currently hold Green Flags, the eight-mile-long MontgomeryCanal, and a 20-mile stretch of the Weaver Navigation, including Anderton Boat Lift, awaiting confirmation. If the awards are renewed, 620 miles of Trust waterways will hold Green Flag status. The entire 46-mile-long Staffordshire & Worcestershire Canal has been awarded a Green Flag for the first time, along with the Stourbridge Canal and Town Arm, also in the West Midlands.

Annual Report

The Canal & River Trust has published its Annual Report & Accounts for 2022/23. The Report highlights the importance of the 250-year-old canal network in helping to address key societal challenges, but also the significant risks the ageing canals are facing due to a shortfall in funding and more frequent extreme weather events brought about by climate change. Whilst the Report celebrates record usage of the network with 888 million visits, and more boats than ever before, it also highlights the impacts of rapid inflation and external, global factors affecting supply chains. These have added to the increasing cost of maintaining the Trust's 2,000-mile network with its many thousands of structures including reservoirs, aqueducts, bridges, locks and heritage buildings. The Trust delivered one of its largest programmes of repairs and maintenance to date with 83 large-scale works including statutory works to reservoirs, and a further 325 in-house construction projects.

Electric Boat Association

Virtual Club House

Introducing the Virtual Club House. A members only place where members can chat about all things electric boating.


Tim Knox

Looking for love

If I was young and wanting to impress a young lady and when I say 'young lady' I mean 'The One'. I wonder how I might do it these days.

When I met my wife of 36 years, half a lager & lime and a bag of cheese & onion crisps was enough. However, these days we need to be somebody a YouTube influencer, Billionaire, Base Jumper or perhaps even e-boater.

But are e-boaters attractive to women? Probably not. Evidence of this is the EBA rallies which have unfortunately been rather male orientated.

Suggestions please

So what can be done? I'm open to ideas, but as a starter and with the knowledge that an introduction to boating at an early age helps cement a lifetime love of the activity I would encourage members to bring their children and grandchildren to the rallies. I'm sure it would bring more vitality and fun to our little forays.

Teddington Rally

The summer that was

Did you feel that slight bump as the sun passed over the equator last Thursday the 21st September? I really don't like this day as it marks the end of Summer and for many of us the end of a boating season. But lets look forward to next year.


Lechlade Rally

Like in January this year I'll send out a list of forthcoming rallies. These rallies were a great success, inspite of the weather. However prior to that I'll will send out a questionnaire to garner your opinions of timings. Please look out for it.

The EBA Virtual Club House is truely the best place to share ideas and really easy to use. If you have any difficulty logging on, as always please don't hesitate to call us on the number below. We are here to help.


Wroxton Rally

Once on the site you'll find all manner of fellow members willing to chat about boats, places to visit and the best place to buy fuses, batteries. In the future youngsters might even find 'The One'.

Here's to swiping right!

Tim Knox, EBA Secretary
Tel 01823 270458

Logging on to the EBA Virtual Club House

> electricboatassociation.org
> go to 'clubhouse' in top menu
> type your username/password

Not in yet?

Forgotten password? Please click forgot password

Forgot Username? Please email admin@electricboatassociation.org

The Virtual Club House is a private members only area.

click on the red dots

Clubs and Associations

As Edward Hawthorne's book Electric Boats on the Thames 1889-1914 reveals that boats powered by electric motors were on canals and rivers long before the internal combustion engine took over propulsion and the resurgent interest in electric boats is reflected in the clubs and associations that can be found all over the world.

The Electric Boat Association of America was formed in 1992 with the objective of being inter alia: an educational arm and information source for electric powered boating issues, and a representative of electric boaters in matters of environmental protections and regulations; a planning and organizing agency for meetings, exhibitions and competitions. This years Wye Island Challenge, established in 2001 to demonstrate the viability of electric powered boats and to advance their development, takes place in early October.

The Electric Boat Association of Greece is a non profit organisation founded in 2016 to promote the development of Electric Boating and to serve the needs of all who have an interest in electric boating. The Association has a regular news blog and a latest report features the Artemis Technologies launch of the world's first commercially viable fully electric, high-speed foiling workboat range. Developed and built in Belfast, the zero-emission vessels are the greenest workboats on the planet and represent a £12 million investment in research and developmen

The Electric Boat Association of Canada is a not for profit Canadian corporation and was formed by a group of boating enthusiasts concerned about the use of fossil fuels for transportation and excited about the possibilities of boats and ships powered by electricity. Their website has a news feed from Plugboats.com and a latest post features Mercury one of the world's largest fossil fuel outboard manufacturers going electric. The concept Mercury Avator electric outboard is designed to showcase the the new line

The Frisian Electric & Hybrid Boating Association (SEFF) was founded to promote electric and hybrid boating in the Netherlands Frisian province. In August SEFFF made five electric sloops available to tow a number of small boats from different youth classes in the fleet review, a colourful procession of boats which passed by the King's Commissioner on the Frisian state yacht, and then hundreds of spectators along the Sneker city canals marking the opening of the annual Sneek Week

The French Electric Boat Association was created in 1994 in Bordeaux by partners from different professional backgrounds - academics, researchers, engineers and industrialists - to develop the image and market of the electric boat in France as well as abroad. Their news section reports that Taiga Motors has launched its latest electric jetski the OrcaPerformance. Powered by a 120 kW electric motor, it offers up to two hours of autonomy and can be recharged in less than 40 minutes via a fast direct current terminal.

Founded in 2018 the Norwegian Association for Electric Boats is a not for profit organisation for all stake holders in the electric boat value chain. The Association focus is on building network and communicating the needs and business requirements of their members to regulatory bodies and the government, promoting technology change in leisure boats, participating in fairs being a hearing body for the authorities regarding boating laws and statutes and working for the development of charging facilities..

ELECTRIC BOATS INTERACTIVE

Cruise Guide

Weaver Navigation

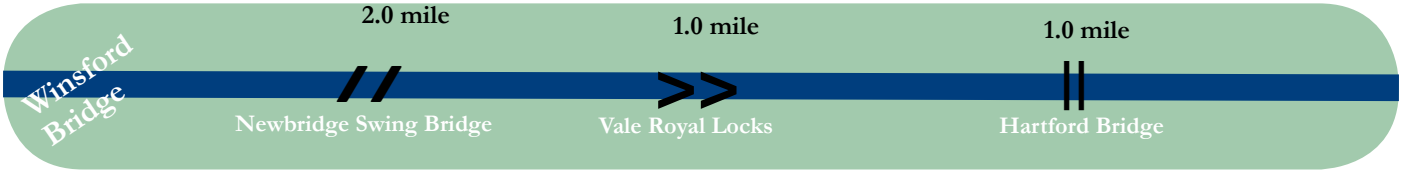
Cruise Guide

Weaver Navigation

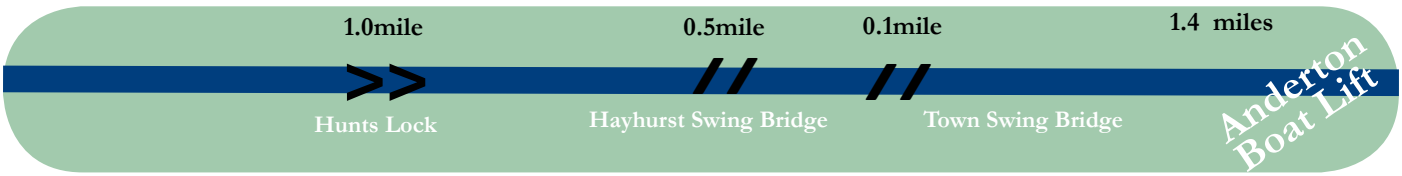
Our Summer cruise takes in part of the River Weaver Navigation, an early industrial transport highway. The river is just over 50 miles long, rising in the Peckforton Hills and making its way past Nantwich, Winsford and Northwich to meet the Mersey estuary at Runcorn. Originally it was a shallow tidal stream enabling the shipment of salt from the Cheshire wyches. Sailing barges could be loaded at highwater and embark on the ebb tide. By 1732 the expansion of the salt industry around Northwich, Middlewich and Winsford led to the river being made fully navigable for 40 ton barges up to Winsford. In 1765 the construction of another early industrial highway the Trent and Mersey Canal passed close to the Weaver at Anderton and provided new traffic for the river. Chutes were built to drop shipments from canal boats to Weaver Flats 50 feet below. In 1871 the chutes were replaced by an iron boat lift to make a better link between the two early industrial highways

Our cruise along this section of the Weaver Navigation starts at Winsford Bridge which is the upper limit of navigation for shipping and the limit of the Canal River and Trust (CRT) jurisdiction. The CRT operates a number of maintenance craft and the large and often double locks are all manned. There are not many bridges crossing the river and they are either very high or are swing bridges operated by CRT staff. Most inland boats will be able to pass all the bridges without any being swung. The river current is not strong unless there has been heavy rain. Travelling downstream from Winsford Bridge the river winds past the oldest and deepest rock salt mine in the country and both sides of the river bank evidence the industrial industry and processes that used the river to move its goods. Once through this industrial landscape we go under the Newbridge Swing Bridge the lowest on the river, the height limit varies with the river level and there is a stone guage on the river bank indicating the headroom available. We now head into the Vale Royal cut where the river flows through a valley with undisturbed woodland on the steep valley sides. The first lock on our cruise is Vale Royal Locks with the large and small locks side by side. As with all the other double locks on the river only the smaller lock chamber is in use. We now reach Hartford Bridge, known as the Blue Bridge, a fixed steel girder road bridge carrying the Northwich bypass and marking the outskirts of the town. Between here and the next lock the river has been straightened and the old cut off loops provide moorings for a variety of river craft. The last lock before Hayhurst Bridge, the first

Cruise Location



of the Northwich's swing bridges, is Hunts Locks, another double lock with only one chamber in operation. Just after exiting Hunts Locks we go under a high railway viaduct before reaching Hayhurst swing bridge and the left bank which is now a housing development was once the site of W Y Yarwwod and Sons ship building yard. As well as building river and canal craft Yarwoods also specialised in coastal ships. Northwich's past boat building and repairs industry is further evidenced by the disused crane and repurposed riverside buildings in British Waterways' yard a little closer down river to Hayhurst Bridge. The Hayhust swing bridge and its more famous sister the Town swing bridge were the first swing bridges built on floating pontoons and the first electrically operated large swing bridges in the UK. The journey between the two swing bridges goes past the first of recent riverside devlopments. The second waterside development is Barons Quay a little way downstream from the Town Bridge and on our way to the Anderton Boat lift which is the cruise destination. The river passes through what was once a large industrial area but is now an extensive woodland area before arriving at the boat lift pound. The two caissons which take the boats are counterbalanced with water filled tanks and move up,and down a vertical slide. Boats are lifted to the Trent and Mersey Canal pound above the river where there is a visitor centre, exhibition, shop and cafe.
Across the river from the boat lift the large chemical works on the north bank are a present day reminder of the past role that the Weaver has played in both Cheshire and Northwich's industrial history and heritage



Info

Launching

There are slipway facilities at:
Northwich Quay Marina
Northwich Quay
London Road
Northwich
CW9 5HD
Tel: 07967 978654
www.northwichquay.com

Licences

Short term licences can be obtained from the Canal and River Trust Boat Licensing Team. There is a 25% discount for electric propulsion.
T: 0303 040 4040
Mon to Fri, 8am to 6pm.
Email: customer.services@canalrivertrust.org.uk
www.canalrivertrust.org.uk/licensing

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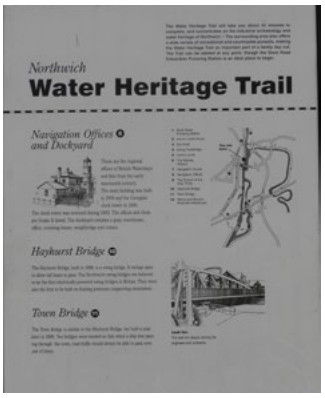
wifi

Tourist Information

www.visitnorthwich.co.uk/information

Northwich

Salt dominates history of Northwich and the town motto is *Sal est Vita* (salt is life). The salt trade was very important to the Romans and at one time soldiers were given a salarium (salt allowance) which is thought to the basis for the modern word salary. At the confluence of the rivers Weaver and Dane, Northwich, with its local salt brines, was a strategic location and there is archaeological evidence of a Roman auxiliary fort at the top of Castle Street. Salt production remained a prominent industry for Northwich in the following centuries and for two hundred years the building and reparing of barges narrowboats and small seagoing ships on the River Weaver was also a significant part of the town's history, but the last shipyard on the river closed in 1971.
Northwich is now a modern day market town and although much of the town centre has been rebuilt there are still some well preserved traditional Cheshire black and white half timbered houses, and with the river navigation, reclaimed parkland and 2,000 years of history a very interesting visitor location. .
The Barons Quay Development, a £80 million waterside retail and leisure complex, opened in 2016 with the creation of more than 28,000 sqm of shopping space, together with a large supermarket, petrol station, cinema, restaurants, cafés and car parking.



Salty Dog

The Salty Dog occupies one of Northwich's listed half-timbered buildings. It has good selection of craft beers and quality cask-conditioned ales and has been featured in the CAMRA Good Beer Guide every year since opening in 2017. It's also a music venue with well-known bands, a diverse clientele with fans of all ages and an eclectic atmosphere.

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EBi International

Kaebon ultra light

Germany

The Kaebon EB Eins electric boat is designed to be the lowest weight possible and is light enough to be carried on a car top like a canoe, eliminating the need for a trailer.
The Kaebon comapany was set up in 2021 in Munich by Kai Krause to build the lightest motorboats in the world by using the advanced composite technologies of industries like aerospace and high-performance automotive. The EB Eins is manufactured from vacuum-tempered foam-core prepeg carbon fiber, chosen for its combination of low weight, strength and durability. Its light and efficient hull design means a smaller powertrain can handle propulsion without undercutting performance.
Kaebon's first boat looked to save weight wherever it could. For example metal cleats are replaced with textile loops that serve the same function but with less weight.
All that innovative weight optimization results in a 5.3m e-boat with a base weight of just 89kg, which Kaebon states is light enough to carry on the roof of a vehicle.
The EB Eins will have enough battery power for 45 minutes at full speed and up to 10 hours when cruising slowly. The standard charger takes the battery from 0 to 100 percent in 10 hours, while the available quick charger does the same in under two hours.
Kaebon says the boat can glide efficiently under power from a small motor, and it offers two Torqeedo e-drive options. The Cruise 6.0 premium drive offers propulsive power comparable to a 9.9-hp fossil fuel engine, while theCruise 12.0 performance drive upgrades that to a 25-hp equivalent.

Salone Nautico eRegatta

Venice

EBA President Kevin Desmond reports on the 4th Venice E-Regatta

In this year's E-Regatta some forty five electric boats, of all shapes and sizes took part in the parade around Venice, passing under the wold-famous Rialto and Accademia Bridges. Official Venetian companies such as ACTV, Alilaguna and Veritas could be seen in this silent but impressive fleet of boats. ACTV's first pair of retro-fitted vaporetti will enter into daily operation at the end of 2023. The final event of the E-Regatta, the second part of GT Electra, took place at the seaplane base. This circuit racing was for yellow one-design monohulls with young drivers between 14 and 17. One new feature at this year's Venice eRegatta was the fast charger designed for Venice by AquaSuperpower. Conferences, such as port electrification and energy transition also took place this year as part of what Venice is calling the Biennale of Sustainability

click on the red dots

EBi International

Wave Flyer

Australia

The WaveFlyer Volaré is a small electric boat seating two side by side with a 7 inch digital dashboard and a control joystick situated in the middle. At 2.9m long by 1.25m wide it is smaller than some jet skis, and its original proof of concept prototype was hydrofoil system fitted to a jet ski, with the idea of eliminating drag and improving range.

As with all hydrofoils, the process of flying the Volaré is too complex to be done manually. It rides less than 70 cm over the surface, and uses a fly-by-wire control system that is capable of balancing the craft at all times. Both foils have control surfaces on the trailing edge, and that's how the boat is steered when the foils are in the water. When on the foils the control system has two different driving modes cruise and performance. The fly-by-wire system also allows the boat to be operated by remote control.

The Volare has a passenger weight limit of 200kg when riding on the foils and 250kg if the boat is used without the foils as a normal boat going very slowly and only getting about a quarter of the range. The boat's range and endurance are related to battery size, which in turn is related to price.

Forza F-22 monohull

USA

After three years developing its own hull, motor, propulsion and battery systems the Forza F-22 has been designed and built from the ground up to create an affordable family cruising and fishing boat that is easy to operate and maintain, with no fuel costs or fumes. The electric motors have gone through various modifications to the existing IM 225 developed with Cascadia Motion and offer a more compact outboard architecture. This configuration also includes a compact inverter to convert AC and DC power between the batteries and motor, and enables the company to stack the motors, creating a single stack 180 HP version that runs on two batteries, as well as a double stack 300 HP model that uses four batteries. Forza's own marine battery program, devised with American Battery Solutions, provides a battery management system on a phone app. The boat is constructed using strong, top-quality composites, resins and carbon fiber on a stringer system to support the batteries and to create the proper center of gravity.

Pirogue repower

Senegal

Earlier this year Eclasss Outboards travelled to Senegal to train marine mechanics in retrofitting local casings to electric propulsion for fishing and tourism boats. The ElecTey Marine Electric Project is sponsored by an international development company DT Global in conjunction with a local Senegal company JokoSun, and UK innovation company Brink.

Eclass have developed a range of kW repower kits and think that this is more affordable solution for customers in developing countries to switch to marine electric. Not only is the heaviest element of the product, the casing, already in country but it's reuse stops it going to landfill or being dumped at sea. And the casings can use readily available parts such as propellers, prop guards, jacking plates and gearing. Senegalese marine mechanics were trained to retrofit casings using T15 2 stroke Yamaha casing and a T18 Tohatsu casing for the pilot conversions. Once fitted and tank tested, sea trials of the motors in typical tourism tours were undertaken by professional Senegalese boatmen. The traditional wooden pirogues used are usually around 7 m and take up to 10 passengers.

Solar Boats and Boating

Energy Observer celebrates

This year Energy Observer celebrated its 40th anniversary and 80th stopover in July after sailing 2,300 nautical miles to dock at Cape Town's V&A waterfront.
The boat was built for ocean racing in 1983 and, after modifications, won the Jules Verne round the world trophy with a record breaking speed. The boat was taken over in 2015 and redesigned as a trimaran with the focus no longer on speed but energy autonomy. While commercial ships last between 25 and 40 years, the larger the shorter life expectancy, racing boats have much longer life cycles. Their cutting-edge construction, often optimized and modified during their careers, and their high-performance design turn them into boats with multiple lives. Since launching in St Malo in 2017 Energy Observer has been sailing around the world stopping in famous port cities to promote the development of sustainable energy.
The thousand onboard sensors, the electrical and control network, the 24v and 400v batteries, the motors, the water makers, and even the electrolyser have almost all clocked up 50,000 hours of operation since their installation. No hydrogen chain has remained under high pressure for more than 50,000 hours and 50,000 nautical miles in such harsh conditions.

Eco-Showboating

Mayfly the Eco Showboat has been navigating Ireland's inland waterways again for a second year meeting local artists, scientists and communities to promote climate and environmental action. In 2022 artists Anne Cleary and Denis Connolly travelled south to north from Limerick to Enniskillen using only solar power. In 2023 their zero carbon voyage has taken them east, along the Shannon, Grand Canal and Barrow from Askeaton on the Shannon's Atlantic estuary to Howth Harbour on the Irish Sea.

Solar superyacht catamaran

Alva Yachts is building the Ocean Eco 90 H2, a 90ft superyacht catamaran with sail wings. The boat will be fully electric with two motors, connected to a 500+ kWh battery bank charged by 200 sqm of solar panels plus a fuel cell range extender supplied by EODev and integrated by Seco Marine.
The vessel will be fitted with Ayro's Oceanwings wind propulsion system with wind sensors on the wing sails. This data is then analysed by a computer, and motors adjust the pitch of the wing sail.

click on the red dots

Solar Boats and Boating

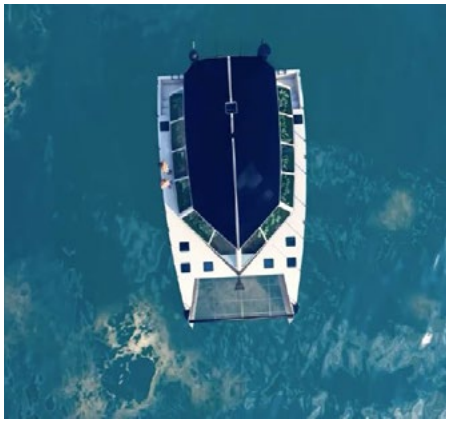
‘off grid’ Powerdock

Faro Electric Boats has launched the Faro PowerDock. It is towable and independent from any power grid. It fits into any wide berth on any Marina but can also be moored anywhere in the world. The PowerDock also includes a boat lift designed to raise a boat out of the water for maintenance as well as reducing the damaging effects of marine growth. The standalone dock has a solar panel canopy to charge the dock’s internal battery bank of between 10.2 to 30.6 kWh More solar panels as well as optional wind turbines help shorten the charging time. The canopy also provides shade for the boat from harmful UV rays.

10th Solar Racing challenge

In July Prince Albert II, the president of the Yacht Club de Monaco, set in motion three days of racing in the 10th Monaco Energy Boat Challenge There were 46 teams from 21 nations and 31 Universities. The Energy Boat Challenge event has gone from strength to strength since its launch in 2014 and now involves leading players in the yachting industry.

‘off-shore’ Sovereign living



Florida-based yachting startup Sovereign Ships is looking to make full time living off-shore a reality. Its Sphinx 40 electric catamaran has been conceived as an on-water homestead capable of producing its own power, its own fresh water, growing food, and providing all of life’s essentials. The 12.1m boat is designed to accommodate between eight and 10 people with a roof that will include 68sq m of solar panels.

Solar Tech

Bifacial perovskite

The dual nature of a bifacial solar cell enables the capture of direct sunlight on the front and the capture of reflected sunlight on the back, and a bifacial perovskite solar cell, holds the potential to produce higher energy yields at lower overall costs, according to scientists at the U.S. Department of Energy’s National Renewable Energy Laboratory (NREL). Previous bifacial perovskite solar cell research has produced devices considered inadequate in comparison to monofacial cells, which have a current record of 26% efficiency. Ideally a bifacial cell should have a front-side efficiency close to the best-performing monofacial cell and a similar back-side efficiency. The NREL researchers were able to make a solar cell where the efficiency is very similar for illumination on both sides. The researchers measured the efficiency of the front at above 23% and that of the back was about 91%-93% of the front. A bifacial perovskite solar module would potentially generate 10%-20% more power.

Heat Resistance

More than 70% of the energy made available by the sun is wasted by conventional photovoltaic cells and the operational temperature is a critical factor in a solar cell’s ability to convert sunlight to energy. Although much research has been directed toward understanding the temperature effects in the efficiency of solar cells, surprisingly little is known about what would be the optimum temperature. A new approach from researchers from the Ben-Gurion University of the Negev Solar Energy Research Center examines a fluctuation in temperature in response to the heat produced from light absorbance and the connection to a fixed temperature environment, compared with present analyses based on the premise that the cell temperature would remain fixed regardless of operational conditions.

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RUBAN BLEU ELECTRIC BOATS

Ruban Bleu is the leader on the market of the electric boats without a riverboat license in Europe. They have sold over 3,000 boats in France and around the world. This French company was founded in 1992.

They are constantly improving their models. Today, it offers 6 boat models, from 5 to 11 seats, to meet the different needs of professionals and private customers alike. Through its boats, Ruban Bleu offers you a moment of sharing and conviviality between friends or family.

Ruban Bleu is differentiated by:
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- through its services: technical assistance, training days, and a wide choice of spare parts on its online store.

The innovation for 2023 from Ruban Bleu? A more powerful engine so that sailing in a maritime environment is possible! Ruban Bleu continues its expansion into a new market, always in a process of sustainable development and respect for the environment.

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Polyboat Project

Kevin Desmond President of the UK Electric Boat Association, Founder of the President GaronneAgenda2029 and Co-founder of the French Electric Boat Association has presented the outline of his Polyboat Project - a zero emission boat designed for passengers passionate about discovering the many riches of his local river the Garonne

A PolyBoat is a river catamaran with electric propulsion which, thanks to its wide deck and its 100% silent operation, allows a serene discovery of the Garonne river, between Bordeaux and Langon, both city-stages on the way to Santiago de Compostela. Bordeaux is a metropolis port at the heart of one of the most prestigious French wine regions.
The PolyBoat project offers:
a range of mini-cruises intended for a varied public, all geared towards the discovery of the river, its history, its flora and its fauna;
an introduction to environmental protection through the collection and recycling of plastic waste polluting the river;
inviting regional researchers from INRAE, France's National Research Institute for Agriculture, Food and the Environment for observation;
participation in the tourist attractiveness of the Metropolis by accompanying locals and summer visitors to the pilgrimage of Notre Dame de Verdelais or to the discovery of prestigious wine estates.
The exemplary nature of its mode of propulsion will contribute to strengthening the ecological commitment of the territories and the essential fight against global warming.
This multicultural and educational project aims to find a favorable echo with territorial entities such as the Bordeaux Metropolis, the Department of Gironde, the New Aquitaine Region and the EU.

The Polyboats will be 11 meters long and with a capacity of between 22 and 50 passengers per vessel and the organization of a flotilla of Polyboats, as well as the reception of groups and individual customers to be managed by the Association of Les Bateliers d'Arcins. On board, a captain and a sailor form the crew The captain ensures the navigation of the boat between the pontoons, the safety of travelers and has authority on board.

Naviwatt electric housboats promote ecotourism

French electric boatbuilder Naviwatt has supplied two electric houseboats to local tourist operator Au bout du Marais which has been granted the rights to operate a non-invasive boat rental service for visitors guests to cruise through one of France's most environmentally sensitive areas, the Marais Poitevin Regional Park which covers half a million acres with 8,200 km of waterways and canals. The Naviwatt houseboats are based on classic French river barge design with a 4.1m beam and 13.1m length allowing room for 12 passengers and six berths. The boats are powered by a 10kW inboard motors and 43 kWh lithium-ion battery banks. With a draft of 0.8m the boats are designed navigate the waterways with minimum noise or propeller wash. Top speed is 10 km/h with up to 10 hours cruising time. The electric houseboats are part of an initative of France's Voies navigable du France department to promote ecotourism and exploration by connecting river navigation with onshore tourist activities.

Hydrogen Coach Boat

The Dutch sailing organisation Watersportverbond introduced its first hydrogen powered coach boat, the H2C Boat, at the 2023 World Sailing Championships in Netherlands.The H2C Boat, developed by the Dutch startup H2 Marine Solutions, is equipped with a Torqeedo Deep Blue 50R outboard motor, and is a collaboration between companies, including Torqeedo, De Stille Boot and the Delft University of Technology. Powered by a 40 kWh Deep Blue battery and an additional 51 kWh hydrogen capacity, the H2C Boat uses a hydrogen fuel cell as a range extender, to give a minimum of five hours of operation on the water. Coach boats are small vessels used to carry staff and safety equipment to support the crew of a racing yacht.

Hydrogen Zero Catamaran

Luxury boat builders Sunreef are creating a catmaran that will run on hydrogen produced on board the boat. *Zero Cat* is presently in development stage and will have a number of different forms of innovative green technologies onboard. The catamaran will be just over 90 feet and will use a special type of generator to produce the hydrogen from methanol. The hydrogen will be used both for generating the electric propulsion of the vessel and for the on board electrical systems. The electrical power for the hydrogen fuel production will be provided by Sunreef's patented 'solar skin' which incorporates solar panels into the boat's superstructure.

Fuel Cell future proofing

Future Proof Shipping (FPS) is to convert a second diesel-powered inland container ship to a hydrogen fuel cell system. The *FPS Waal* has arrived at the Holland Shipyards Group (HSG) shipyard in the Netherlands for the hydrogen retrofit. The main diesel engine and generators will be removed and the conversion will include installing the PEM fuel cells, hydrogen storage, battery packs and an electric drive train. FPS plans to retrofit one more container vessel with a zero-emissions hydrogen propulsion system, *FPS Rijn*. Like *FPS Waal*, the ship was bought in 2021.

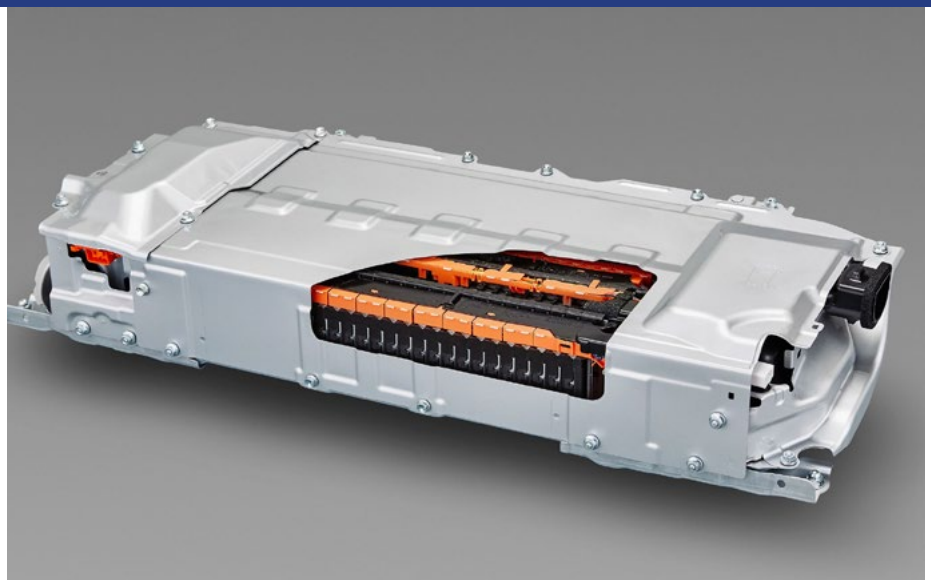
Hydrogen Tech

Plastic Hydrogen

Rice University researchers have found a way to harvest hydrogen from plastic waste using a low-emissions method that could more than pay for itself. The researchers exposed plastic waste samples to rapid flash Joule heating for about four seconds, bringing their temperature up to 3,100 degrees Kelvin. The process vaporises the hydrogen present in plastics, leaving behind graphene, an extremely light, durable material made up of a single layer of carbon atoms. Waste plastics, including mixed waste plastics that don't have to be sorted by type or washed, were converted into high-yield hydrogen gas and high-value graphene. Green hydrogen, produced using renewable energy sources to split water into its two component elements, presently costs around $5 for just over two pounds. Though cheaper, most of the nearly 100M tonnes of hydrogen used globally in 2022 was derived from fossil fuels, with its production generating roughly 12 tonnes of carbon dioxide per tonne of hydrogen.

Electrocatalyst

An international team led by City University of Hong Kong (CityU) has developed a highly efficient electrocatalyst that can enhance hydrogen generation through electrocatalytic water splitting.
The critical development in the CityU-led research is the establishing of new catalysts by using the transition-metal dichalcogenide (TMD) nanosheets as supports, enabling superior efficiency and high stability during the electrocatalytic hydrogen evolution reaction (HER), a vital step in hydrogen production by electrocatalytic water-splitting.
The team has been exploring how to enhance the performance of the HER process by engineering the crystal phase of nanomaterials for several years. Fabricating TMD sheets pure enough for HER is far from straightforward.



Black Gold Dust

Norway has one of the the largest recycling plants in Europe turning used or defective electric car batteries into a black powder made up of nickel, manganese, cobalt, lithium and graphite.The half tonne electric vehicle battery packs are taken apart to recover up to 95 percent of the materials. The aluminium is recycled by Norsk Hydro, while the 'black mass' powder is sold to battery makers to be transformed into new batteries. The Hydrovolt plant opened last year in the port city of Fredrikstad and the site is expected to process 12,000 tonnes of lithium-ion battery packs per year, the equivalent of 25,000 electric car batteries.

4680 Update

Tesla has released detailed update on its 4680 battery cell program. When Tesla announced the new design it looked to reduce battery cost by over fifty percent and has been trying to bring it to volume production since then, but it has run into some hold-ups. Tesla is producing 4680 cells at its pilot plant in Fremont, but it is expected to reach higher volume production at its Gigafactory in Texas. Recent reports have suggested that Tesla was having some issues

with the dry electrode in the 4680 and has recently hired a new expert to help. This update on the 4680 battery program may indicate that the company is starting to resolve the problems

Next generation lithium

Amprius Technologies has released details of its new lithium-ion cell which delivers an energy density of 500 Wh/kg and an increased run-time of around 200 per cent compared to other lithium cells. The Amprius cells are also around half the weight and volume of top end commercially available lithium-ion cells

Battery Tech

3D Printing

Sakuu Corporation, an additive manufacturing and solid-state battery technology company, is collaborating with Livent Corporation under an existing joint development agreement for the use of Livent's proprietary LIOVIX printable lithium formulation in Sakuu's 3D battery printing process. LIOVIX is a unique printable formulation of lithium metal and other specialty materials that can improve the performance of lithium-ion batteries. The LIOVIX platform includes applications for pre-lithiation and lithium metal anode manufacturing. Sakuu has announced that it has achieved the first fully functional 3D printed lithium-metal battery, the first 3D printed patterned lithium-metalanode, and the first 3D printed lithium-metal battery in a custom form factor shape.

Replacing lithium

The increasing costs of lithium has caused researchers to consider dispensing with lithium altogether in batteries and instead use sodium or other elements. Sodium is cheaper and more available but sodium batteries have disadvantages, and lithium batteries remain the best in terms of delivering the concentrated charge needed to power cars and portable devices. Researchers from Arizona State University have adopted a different approach by mixing lithium and sodium in the same battery which promises to ease supply problems and result in cheaper batteries.
The researchers use a specialised technique developed and optimized in the Navrotsky laboratory (high temperature oxide melt solution calorimetry) to measure the energetic stability of the materials, while heating experiments determine their possible decomposition in use. So far, they have achieved a 10% mixture, and it seems thermodynamically stable. They believe this can be pushed up to around 20% before any significant difference in performancce is seen.

Electric TurboJet

The Australian EClass Outboards have just produced their first prototype of an electric TurboJet Outboard and are now in the process of conducting sea trials.
Turbo Jets or Jet Drives are invaluable for safe use if there are swimmers in the water and the lack of a propeller also minimises weed, net or other underwater foulings. In the past the solution has been to use propeller guards which are heavy and impact the performance of the boat. But the problem with petrol Jet drives and Turbo Jets is that the engine the noise can be deafening. This is now solved by the EClass electric motor which is quiet, non polluting and delivers a powerful performance.
The Eclass Electric Turbo Jet Drive Outboard will be available between 6kW and 18kW of propulsive power.

Mercury in production

Mercury Marine has begun serial production of its new 20e and 35e Avator electric outboards, with release for sale planned for late 2023. Mercury, a division of Brunswick Corporation, introduced its first electric propulsion product, the Avator 7.5e, at the Consumer Electronics Show in January 2023 and has recently started shipping these to dealers. Mercury has committed to the introduction of five Avator products in 2023.

Electric Turnable Saildrive

EPT Technologies' electric turnable saildrive is a complete electric propulsion system with a 360-degree rotation It has a powerful electric motor, high-efficiency lithium batteries, and utilises the maximum energy during the sail and battery recharge with the turnable mechanism. It can be adapted to work boats, sailboats, yachts, fishing boats, tugboats, catamarans, motorboats, and houseboats, among other vessels.
The key advantage of the drive is that no additional thruster is required behind the boat. Using the saildrive technology it can maintain speeds that vary between 16 to 20 knots and the system can be altered based on the boat's type, weight, length, requirements.
Specification details: Power 25 to 60 kW: RPM 500 to 2000: Voltage 1000 to 800 VDC: 360 degrees rotatable: Electric servo motor: Joystick control

Electric rotating outboard

French electric outboard manufacturer Temo has launched its latest electric outboard the Temo 1000, which is a larger and more powerful version of the Temo 450. Designed for large dinghies with up to six people and sailing boats up to eight metres, the Temo1000 is portable and silent with1.1kW power, which is comparable to 3.5hp. The new engine comes with a 360-degree rotating universal bracket for easy installation and the mounting point can also be adjusted directly on the engine regardless of the transom design of the dinghy or boat which means there's no need to choose between a long or short shaft because the Temo 1000 covers both lengths ranging from 42cm to 62cm.

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History and Heritage

In August this year Vision Marine Technologies broke the world speed record for electric boats and there is a report below. But UK Electric Boat Association was a prominent early pioneer in the history of electric boat speed records and the following is an extract from the Winter 2005 EBA magazine

On 1st November 2005 Helen Loney piloted the 15 ft electric hydroplane *An Stradag* to a new world speed record, registered with the international governing body for waterborne sports, the Union International Motonautique. The average speed for the double run was 68.09 mph with the first run clocked at 70.61 mph. *An Stradag* (The Spark), with her original owner the Countess of Arran, set the first world electric water speed record of 50.825 mph in 1989. The boat then became a museum exhibit until in 2005 it was bought by Henry Engelen. With encouragement from the founder editor of Electric Boat News, Kevin Desmond, Henry assembled a team to refurbish and re-engineer *An Stradag* with a view to making another attempt on the record. As well as Kevin the team included other people who were involved in the original record attempt: the boat's designer Lorne Campbell, Emrhys Barrell who drove the support boat and the designer of the motors, Cedric Lynch. On August 8th Henry brought *An Stradag* south to Hambleden where Colin and Lucie Henwood had offered work space in one of their boat sheds. Cedric Lynch, with Arvind Rabadia of Agni Motors, began the installation of four specially made 25 kW motors running on 144 volts, Chris Pattison started repairs and modifications to the hull and Emrhys Barrell and Ian Rutter of the Thames Electric Launch Company began the work of designing, sourcing, building and installing the electrical systems. CMP offered 40 AGM batteries together with expert advice from Phil Horsley and Paul Bates and Curtis lent four Mosfet controllers. Cedric and Arvind cut away the original motor frame so that the new motors could be fitted. Each pair of motors was designed to drive the two original surface running counter-rotating props by chain drive.

2005 team: Kevin, Henry, Cedric, Chris Loney, Arvind, Ian, Emrhys and Helen

1989 team

Over 100 mph and new electric boat world record

Vision Marine Technologies joined with a specialist consortium to make boating industry history by breaking the 100 mph water speed barrier on an electric powered boat. In partnership with Hellkat Powerboats, Vision Marine created the V32, a 32 foot catamaran hull specifically designed to accommodate the necessary battery banks to power a pair of Vision Marine's flagship E-Motion™ electric outboards with the sole intention of breaking records. The V32 was designed from the ground up by Vision Marine's internal engineering team and Shaun Torrente of Shaun Torrente Racing, who was also in charge of rigging, setting up, and testing the V32 in Florida throughout the course of several months. The boat was powered by a battery pack developed by Vision Marine in partnership with Octillion Power Systems. Nextfour Solutions supplemented the boats monitoring systems, and Pat Weissman of Weissman Marine engineered the E-Motion outboard motors.
Vision Marine thinks that the commercial boating market is in need of a performance electric outboard that can accommodate a wide range of vessel applications.

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