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 Broads Authority



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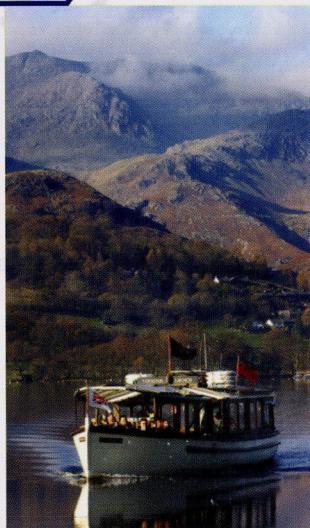
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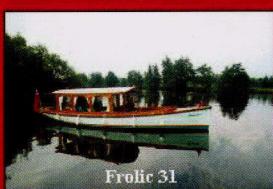
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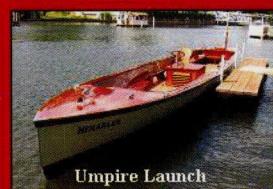
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# EBA Calendar



Electric canoe

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Green boats on show

Page 11



The biggest solar boat in the world

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## March

19th - 21st	EBA interest	British Leisure Show Windsor Race Course, Berkshire
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## May

22nd - 23rd	EBA Event	Great Ouse Cruising Weekend Cambridgeshire
29th - 31st	EBA represented	Welsh Waterways Festival Newport, Gwent incorporating IWA Trailboat Festival

## June

2nd - 5th	EBA represented	Royal Bath and West Show Shepton Mallet, Somerset
4th - 6th	EBA represented	Beale Park Boat Show Lower Basildon, Berkshire
19th - 20th	EBA Event	AGM and Cruising Weekend Bradford-on-Avon, Somerset

## July

3rd - 4th	EBA represented	Lakes Green Boat Gathering Coniston, Cumbria
10th - 11th	EBA represented	Steam, Electric & Boating Festival, Sudbury, Suffolk
17th - 18th	EBA represented	Thames Traditional Boat Rally Henley-on-Thames, Oxfordshire
25th	EBA Event	Thames Cruise Benson, Oxfordshire

## August

28th - 30th	EBA represented	Inland Waterways Festival and Boat Show Beale Park, Berkshire
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## September

25th	EBA event	Norfolk Cruise and Dinner
26th	EBA represented	Green Boat Show Salhouse Broad, Norfolk

Please note that events and dates may change, while some are still being planned. For more details of the above, or notice of other events, contact the Secretary or check the websites.

Cover Picture:

Electric slipper launch at the London Boat Show

Photo: Ian Rutter

see report on page 2

# Contents & Editorial

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I'm sorry to report that after a great deal of hard work by the EBA committee, with help and advice from EBA members, our application for charitable status has been turned down. Rules have been tightened in recent years and everything a charity does must be for public benefit. In order to operate as a charity the EBA would have to make fundamental changes to the organisation. We would not be allowed to organise social events or advertise products and services of interest to members.

Charitable status would have enabled the EBA to apply for grants to further our aim of promoting environmentally friendly boating. But the committee feels that changing the Association to comply with Charity Commission rules would not be in the interest of our members. We would, however, welcome advice from any member with experience in business systems who could help us by looking at how we could make the Association more efficient.

On a more positive note, our calendar opposite shows an interesting variety of boating events coming up, starting with a brand new show at Windsor. So EBA members have a lot to look forward to – perhaps even some sunshine – in the months ahead.

**Secretary: Barbara Penniall**

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Details of the other EBA Committee Members are on page 20.

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### Copy Deadlines:

Material to be considered for inclusion in the next edition of Electric Boat News should be sent to the Editor (preferably by email) by the following date:

Summer 1st July

Website: [www.electric-boats.org.uk](http://www.electric-boats.org.uk)

ISSN 0969-031X

Electric Boat News is published quarterly by the Electric Boat Association

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Printed by: Ethedo Press Ethedo House, Spearmast Industrial Park, Lane End Road, High Wycombe, Buckinghamshire HP12 4JG

# The London International Boat Show



Seabob



Mastervolt GPX-5 hybrid power system

**In spite of the wintry conditions in early January over 100,000 people visited the Tullett Prebon International London Boat Show to see boats priced from £500 to £11 million, along with a great variety of equipment, chandlery and clothing. Report by Sylvia Rutter with pictures from Ian Rutter.**

**M**ore than 500 exhibitors braved snow and ice to get to the show with a number expressing an interest in electric power. Even sales people on the Yamaha stand said that they were looking at electric motors for use in marinas and eco-friendly lakes. Probably the smallest electric boat on display was the tiny Seabob which is usually sold to superyacht owners as a day fun boat. On the surface it can travel at up to 23 kph but it will also take divers down to 40 metres; it will run for up to an hour and a half on one charge depending on speed.

A new 24 volt Sonic Saildrive system was on show, designed for use with LEMCO 24V or 36V high torque permanent magnet DC motors as an

auxiliary propulsion system for sailing boats. And there was an interesting hybrid power system from Mastervolt, the GPX-5, which won a design award in November at the Marine Equipment Trade Show in Amsterdam. Mastervolt have recently taken over fellow Dutch company Bellman, which has been selling marine electric and hybrid propulsion technology over the last ten years. Mastervolt Bellman aims to offer complete systems for all kinds of electric and hybrid boats, reinforcing its commitment to green energy.

Exhibitors at the show included a number of EBA business members. The beautifully varnished 30 ft electric slipper launch pictured on the front cover was built by Peter Freebody & Co. and displayed by kind permission of the owners following its first season on the water. *Oui Oui Too* is the most recent example of Freebody's slipper stern range, based on a design dating back to the early 1900s and available in electric, petrol or diesel versions.

Another new boat was the Windrush 25 cabin launch from Bossoms. Powered by



Regatta 23



a Vetus 2.2 kW electric propulsion system, giving a cruising range of ten hours at five knots, it was finished just in time for the 2009 London Boat Show and has now successfully completed its 'sea trials'. The aim of its designer John Moxham was to combine the best of traditional English style with contemporary technology in a classic boat using 21st century materials. The 'Weekender' version on display at the show has seating for six people plus skipper and includes a galley and shower, but the boat can also be built to order as an open launch or with a forward cabin

The Salters stand included a variety of electric boats from small skiffs to a 23 ft cabin launch with a 48 volt 2.5 kW direct drive DC motor. The Regatta 23 on display was sold in November to Grove Ferry River Trips based near Canterbury. Now named *Ellen Mary* it will be used for

public trips on the River Stour in Kent from 13th March, starting just in time for Mother's Day on the 14th. Salters were also showing their well-known GRP skiffs, which can be used with electric outboards, along with their simulated clinker Skipper 15 Electric and their electric 19 ft 6 in Mystic day launch, which is popular for both the hire trade and private use.

Christoph Ballin had come over from southern Germany (where there was 'only' around 20 cm of snow he said) to show the prototype Torquedo Travel electric outboard which was being tested for market launch in March. The two new Travel models, with integrated lithium-manganese batteries, are quieter and more powerful than earlier versions and include a warning alarm if the battery is getting low. They can also be solar-charged during operation.

Fischer Panda were demonstrating their new hybrid drive system with a central cockpit control, due to be launched in March/April. This will include the company's own inverter and controller as a combined unit.

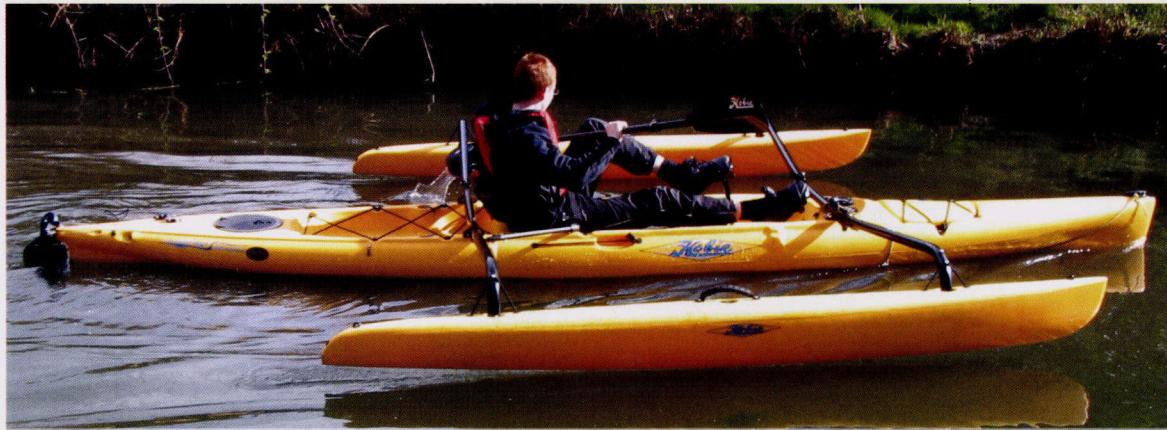
Navigators & General said that the EBA insurance scheme was working well and they were pleased that electric boaters were such careful owners!

All the EBA business members at the show commented that, in view of the bad weather, they were pleasantly surprised at the number of visitors and at the number of serious enquiries they had received.



Windrush 25

# Electric Motors for Kayaks and Canoes



Luke Tyler on Hobie Adventure trimaran kayak with outriggers and mirage drive pedal system, which can be replaced with integral Torqeedo Ultralight motor and propeller system modified to fit in the drive well

## EBA member Sheena Tyler, a keen kayaker, describes some of the options for her preferred form of boating.

**O**n my local canals I can traverse a set of locks in moments. I simply pick up my boat and carry it past them. This is because my boat is a kayak, weighing just 15 kg. And when Cedric Lynch made his record-breaking solar-powered run he was in a canoe. With their long, narrow-beam hulls these fast, sleek craft have many advantages for motorising. They draw minimum power, enabling the smallest of motors to be used, so minimising cost. Add to this the ease of portage. With the efficient hull form, it is a satisfying option to switch to muscle-powered propulsion too. 'Paddle when you can, motor when you're tired' can be a good motto for fitness.

But there are a number of challenges to motorising these craft – problems I've wrestled with for years. The first is the position of the motor. In open canoes, motor mounts are often clamped on to the gunwales. Unfortunately motors on hull sides have the tendency to 'crab' i.e. propel the boat sideways. Even if corrected by a rudder or keel this can lead to a loss of

efficiency. A variant is to mount the motor on an outrigger pole, ideally using outriggers where the additional hulls are big enough to redistribute the forces applied by the motor into a forward direction.

Transom-mounting over the stern may also be a solution, but many canoes lack a transom. Also a transom location can be too far back from the seat if the controls are housed with the motor, as are most canoe trolling motors. Another option, which keeps the motor's forces acting

through the centre of the boat, is to mount through the floor of the hull. John Royal has used this method which gives him good access to the controls and eliminates crabbing. His addition of a flooding keel also improves stability, enabling access to clear the propeller if it is weed-fouled, by leaning out into the water and under the boat. This could be challenging in very cold water, though!

A similar position is adopted by Ocean Kayak with their newly launched Torque kayak. To inspect the propeller, the motor-propeller system is simply lifted out of its deck housing, which can be done on the water. A variant of this is on the Hobie Adventure Island. Their recent innovation is to insert a modified Torqeedo Ultralight motor into the location designed for the mirage drive pedal system. Yet another solution is to catamaranise two kayaks, and place the

motor between them, thus equalising the motor's forces between the two hulls. Wingman Kayaks of New Zealand and Easy Rider Kayaks in the USA manufacture their boats with connecting poles to allow this option.

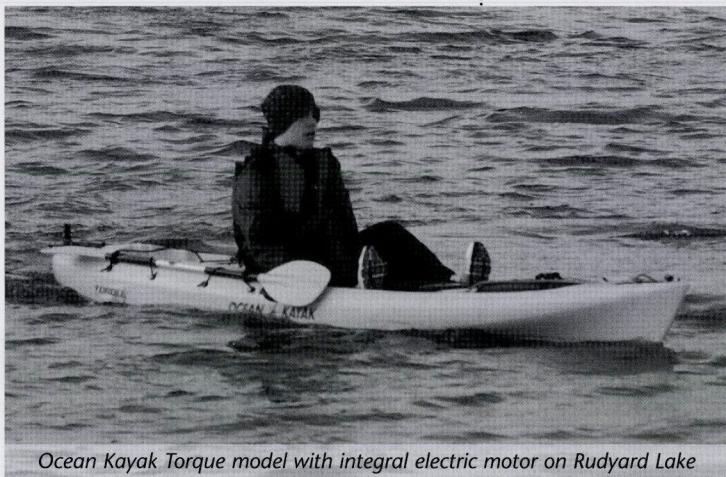
Electric motors on kayaks are becoming increasingly popular, particularly with anglers. There are two basic designs of kayak: the sit-on-top (SOT) which is more raft-like and inherently buoyant; and the sit-in, with its enclosed cockpit. SOTs are easy to self-rescue in a capsize – you just climb back in and there is no cockpit from which to bale out water. Most SOTs preclude gunwale-clamping because of their sculptured contours. A small number



Hull of John Royal's canoe showing propeller and flooding keel

of SOTs, notably Ocean Kayak angler versions, include motor fitments on the stern of the deck. Screwing into the decks often invalidates kayak warranties (unless they are factory-fitted mountings), but in practice very few plastic SOTs fail. More high performance, costly composite (resin-based or GRP) boats can take deck mountings, but these may need reinforcements, and with lighter lay-ups the stresses may cause the deck to fail.

For mounting on deck or outrigger, a



*Ocean Kayak Torque model with integral electric motor on Rudyard Lake*

number of electric motors are suitable, including those from Rhino, Minn Kota, Honda and Flover, with freshwater versions generally under £200 (excluding battery). Specifically for kayaks, Stealthdrive and Torqeedo's Ultralight motors mount on the rudder or stern-most end of the deck, respectively. This certainly overcomes any crabbing, and both systems have a safety cut-off in a capsize. Both motors are efficient, enabling cruising distances of several hours at 3 mph, depending on conditions, boat type and batteries. But although the Ultralight includes a battery and is fully submersible, for the £1270 price tag you could buy two good kayaks. Rudderless kayaks are unsuitable for the Stealthdrive motor (unless you are prepared to make and fit a dedicated mounting) and even some kayak brands which do have rudders are not suited to the Stealthdrive, notably those on Hobie kayaks. Neither do all kayaks have a flat deck which the Torqeedo Ultralight requires. Both motors have a cable-connected remote control unit because the cockpit is too remote from arm's reach to the motor. This remote control device can easily be lost, especially in a capsize, so a solution could be to deck-mount it, typically on the seat floor, although this is less easy in a sit-in kayak. When you are in a kayak remote from land, a stern/rudder-mounted motor can be too far removed from the seat to free a weed/kelp-fouled propeller and canoeists do tend to explore in locations where this is likely. Crawling along the deck to access the propeller can

be a recipe for a capsize. The longer the kayak, the more remote you are from motor access, and the bigger this problem becomes. And yet to motorise a long-length expedition kayak in a safe way remains an attractive option to extend the range.

One solution would be to revisit the outrigger option. Well-designed outrigger kayaks include the Hobie Adventure Island and Easy Rider Kayaks, and Solway Dory build an outrigger sailing canoe, the 'Osprey'. Outriggers add a huge margin of safety and stability. Universal outrigger systems suitable for most kayaks and canoes are manufactured by Kayrak of Canada, who have single- and double-pole systems, with the option of removable or permanent mountings and various motor mounts. An American company produces a solar-

assisted hull-strapped outrigger system, the SPK-1, complete with Minn Kota motor and a battery.

Something to be aware of is the shaft length to the propeller. Canoes, high-volume kayaks and any motor mounted on outrigger poles need a longer shaft than a deck-fitted motor on a low-volume kayak such as the Cobra range, to avoid the propeller being too near the surface and cavitating.

Torqeedo have taken a quantum leap forward by using lithium manganese (LIMA) batteries. The equivalent lead-acid battery weighing 8 to 10 kg would be too heavy for me to haul to and from the kayak regularly but the Ultralight battery weighs just 2.5 kg. Until recently, such batteries have been extremely expensive, and to some degree this is reflected in the high cost of the Ultralight. This battery is only sold and supplied integrally with the motor. A less expensive alternative would be to use a cheaper brand of motor in conjunction with a lithium-iron (LiFe) battery. These safe batteries should not be confused with the lithium polymer batteries used in say, mobile phones, which have on occasions exploded.

A discharged deep

cycle lead acid battery requires 12–24 hours to charge and typically has a life of a few hundred deep charge cycles. In contrast, the BMI LiFePO4 battery has a 3000 cycles warranty, and can be recharged to greater than 90% capacity in only 15 minutes (much faster than for the LIMA batteries). Moreover, in LIMA and LiPO4 batteries there is no 'voltage sag' compared with lead acid batteries, so maximum power is available until full discharge. A 20Ahr BMI LiFePO4 battery costs 460 US dollars - see [www.lithbattoz.com.au](http://www.lithbattoz.com.au)

As solar cell technology advances, it would be good to be able to charge kayak motors on the water using photovoltaic cells (as opposed to recharging from mains power on the riverbank). However, some of the most promising kayak motors are also the most integrated ones, making it difficult or impossible to charge them in this way. Also, such motors need to be affordable, and with less sophisticated gadgetry (such as controllers with GPS) prices could be reduced. The maximum speed I can attain with the best two of the above motors is around 5.5 mph (unless employing demonstration propellers, which are not supplied as standard). In a marathon boat you can paddle faster than this. The comparison with muscle power makes you realise that achievements with these motors are still modest. But we should remember Cedric Lynch. If you want a boat with minimum drag and the least demands on a motor; if you want to experiment with electric boat ideas and would like sometimes to alternate with muscle power in the equation - and you don't like canal locks - try a canoe or kayak.

**Thanks to Andrew Dron of Ocean Kayak for the kind loan of the new Torque kayak; to John Royal for a ride in his canoe; to John Arnold for a ride on his kayak fitted with the Torqeedo Ultralight motor; to Örjan Landgren for assistance in testing the boats; and to Ray Perry, Rudyard Lake Ranger.**



*Motor and propeller unit on Ocean Kayak Torque in rear tank well aft of seat*

## PARLIAMENTARIANS OF THE YEAR

This year the Inland Waterways Association has honoured two Members of Parliament, Bob Laxton and Michael Fabricant, with their 'Parliamentarian of the Year' award. IWA national chairman Clive Henderson said that they just couldn't split the difference between the two leading candidates so the award was made jointly.

Michael Fabricant, MP for Lichfield, has been a long standing supporter of the IWA and canals in general for many years and has held well-supported Adjournment Debates on waterways funding issues. Bob Laxton, Member for Derby North, is the chairman of the Parliamentary Waterways Group, of which the EBA is a member, and has tabled more Early Day Motions on the waterways than any other MP.



BROD ROSS

Michael Fabricant, Clive Henderson and Bob Laxton

## New Swedish Electric Boat

Swedish company Nimbus say they are the first boat builders in the world to take a large, electrically powered boat from the drawing board to the market. Their new 27 ft cabin cruiser the Nimbus 27 E-power has a range of up to 20 nautical miles, or 37 km,

at a cruising speed of 22 knots. Top speed is 27 knots. The batteries charge up in three hours from a 3-phase 400V/32A power point and can also be charged from a standard 220V power point in 28 hours. The boat has been built in collaboration with Electroengine AB, which offers electric power systems for cars as well as boats. The company says that the price will be initially 30 to 40% higher than for an equivalent diesel boat, but because running and



maintenance costs are much lower it will be a good long term buy as well as good for the environment. The new technology will not be confined to the Nimbus 27 E-power but can be fitted in other boats which the company builds.

For more information contact Magnus Andersson of Nimbus on 073 8534638 or Thomas Bergfjord of Electroengine on 070 799970 or see the website [www.nimbus.se](http://www.nimbus.se)

## Two New Boats in France

Phil Horsley and Kevin Desmond have sent information about a new solar-electric catamaran ferry now operating in the old port of Marseilles. Developed by Jean & Frasca Design, and built for Alternatives Energies by the Gatto Shipyard of nearby Martigues the boat replaces the diesel *César*, in service since 1953. To avoid complicated manoeuvres, the new ferry is double ended with two 12 kW brushless electric rudder-propeller motors at both the bow and stern which can pivot 180° and a driving cabin at each end. Over 12 hours it makes a crossing at seven knots every three minutes and can carry 40 passengers. While several features of the traditional ferries have been retained, two banks of Saft nickel-cadmium batteries of 400V /135Ah are installed in the hulls, supplemented by 25 square metres of solar panels, positioned on the roof.

Kevin also has news from France of an electric workboat which has been built for marina and port use with state-of-the-art ship-to-shore communication. *Remora* (named after a saltwater fish) has touch screen controls with an onboard computer program using GPS and linked by WIFI to the management program of the harbour master of the port where the boat is working. Based on a trimaran designed as a tender for a luxury yacht, *Remora* has rigid-inflatable Hypalon 866 floats. Its two directional Torqeedo/E3H motor pods, 4 kW each, supplied by four lead-acid Powerblock XFC batteries (48V x 202Ah) give the vessel 5 knots for 9 hours with a maximum speed of 12 knots.



Electric Ferry in Marseilles



## Beale Park Boat Show

The 2010 show is now taking bookings from exhibitors and asking interested parties to register for speaker slots in its Talks & Demonstrations marquee. The EBA stand will be at the show, offering help and advice to members and anyone interested in 'going electric', and EBA business members will have boats and equipment on display.

The show will be open from 10 a.m. to 6 p.m. on Friday and Saturday 4th and 5th June and 10 a.m. to 5 p.m. on Sunday 6th June. Visitors to the beautiful location on the Thames near Pangbourne can enjoy boat rides on the river or try out boats on the park's seven-acre lake.

**For more information telephone 0118 976 7498 or visit [www.bealeparkboatshow.co.uk](http://www.bealeparkboatshow.co.uk)**

## Lakes Green Boat Gathering

Last April saw the first Lakes Green Boat Gathering held on Coniston Water and designed to encourage all forms of water transport with reduced carbon emissions. It was a successful event in an ideal location but the organisers thought they were lucky with the weather – at least for two thirds of the time! So this year the Gathering is moving later in the year to combine with the Coniston Water Festival and will be held on Saturday 3rd and Sunday 4th July.

**Organiser Gordon Hall, MD of EBA business member EnviroBoat Developments, would like anyone interested in taking a stand or in bringing their boat (or both) to please contact him by e-mail (preferably) on [gh@enviroboat.com](mailto:gh@enviroboat.com) or telephone 015394 36900.**

## TIMOTHY WEST TO OPEN FESTIVAL

The Inland Waterways Association has announced that their National Festival and Boat Show will be opened by actor Timothy West CBE - subject to filming commitments. The show will be held at Beale Park on the Thames over the August Bank Holiday weekend 28th – 30th August and is expected to attract up to 600 visiting boats.

Well-known for many roles in stage, film and television productions, Timothy West is also a keen boater and waterways supporter. With his wife Prunella Scales he has owned a boat since 1979 which was the first to cruise the full extent of the newly re-opened Kennet & Avon Canal in 1990. He is also a Vice President of the Waterways Trust, the Kennet & Avon Canal Trust and a patron of the Huddersfield Canal Society.

**For more information on the festival visit [www.waterways.org.uk/Events/NationalFestival2010](http://www.waterways.org.uk/Events/NationalFestival2010) or contact [gillian.bolt@waterways.org.uk](mailto:gillian.bolt@waterways.org.uk)**

## Steam and Electric on the Stour

EBA members are invited to join steam and electric boaters on the River Stour over the weekend of 10th and 11th July for a weekend of boating and land based activities. The River Stour Trust will be providing a barbecue for visitors arriving on the Saturday but the main event will be on the Sunday when boats will parade on the river.

**For more information see the website [www.riverstourtrust.org](http://www.riverstourtrust.org), telephone 01787 313199 or e-mail the event organiser Andrew Sheldon on [sheldon.andrew@sky.com](mailto:sheldon.andrew@sky.com)**

# Round the World on Solar Power

**Kevin Desmond,  
Founder Editor  
of EB News,  
reports on an  
exciting project.**

**N**ext year, if all goes well, PlanetSolar will become the first solar-electric hybrid to circumnavigate the globe, east-west along an equatorial route, at an average speed of 10 knots. Casting off from a Mediterranean port, its route will take in the Atlantic Ocean, the Panama Canal, the Pacific, the Indian Ocean and then, via the Suez Canal, back to the Mediterranean - 40,000 kilometres in 120 days of solar ocean cruising.

PlanetSolar, officially unveiled on February 25th this year, is a multihull vessel 31 metres long, 15 metres wide, 7.5 metres high and weighing 60 tons - the largest solar-powered vessel in the world. Each of its twin props measures 2 metres in diameter. The surface of its

33,000+ solar cells is 500 square metres, equivalent to two tennis courts. Panel output is 22% and the power received by the sun is 103.4 kW (138.7HP). There are two electric motors with a total output of 120 kW, and average engine power is 20 kW (26.8HP).

The project is the brainchild of 35-year-old engineer and adventurer Raphaël Domjan from Neuchâtel in Switzerland, an ambulance driver, high mountain guide, and rescue specialist in dangerous environments, who will be the skipper. His navigator is Gérard d'Abouville, one of the great names in recent maritime history. In 1980 d'Abouville became the first person to row across the Atlantic Ocean. Eleven years later, he rowed across the Pacific, despite capsizing several times in atrocious sea conditions.

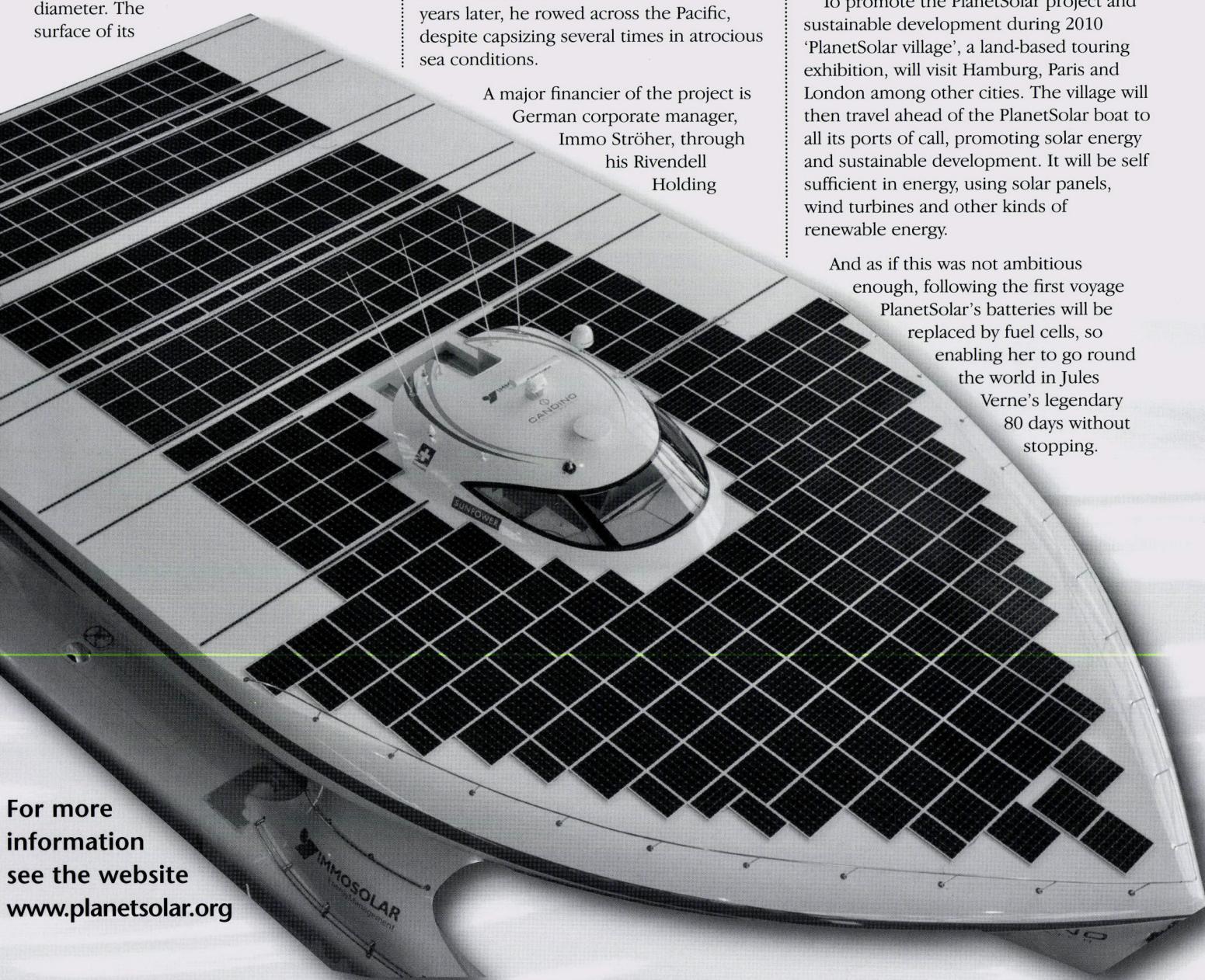
A major financier of the project is German corporate manager, Immo Ströher, through his Rivendell Holding

Company based in Zug, Switzerland. The company invests mainly in projects involving regenerative energies, recycling and the improvement of the environment. Other sponsors include Candino Watches, a partner in the Festina Group.

Led by a technical team from France and Switzerland, the first feasibility studies were made in 2004-5, with the computer-aided design of the boat beginning in 2006. By the end of the following year, initial wind tunnel and water tank tests were being carried out at the Australian Maritime College in Tasmania. Building of the full-scale hull began on January 6th 2009 at Knierim Yachtbau on the Kiel Canal.

To promote the PlanetSolar project and sustainable development during 2010 'PlanetSolar village', a land-based touring exhibition, will visit Hamburg, Paris and London among other cities. The village will then travel ahead of the PlanetSolar boat to all its ports of call, promoting solar energy and sustainable development. It will be self sufficient in energy, using solar panels, wind turbines and other kinds of renewable energy.

And as if this was not ambitious enough, following the first voyage PlanetSolar's batteries will be replaced by fuel cells, so enabling her to go round the world in Jules Verne's legendary 80 days without stopping.



**For more  
information  
see the website  
[www.planetsolar.org](http://www.planetsolar.org)**



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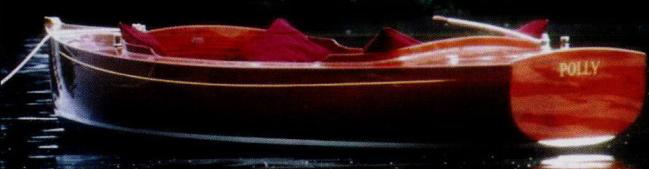
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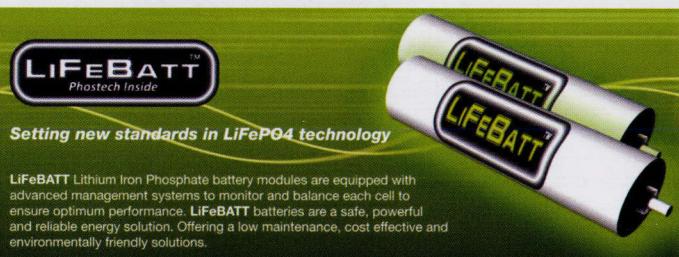


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**Electric boaters spent an enjoyable weekend in September with a Saturday EBA cruise before Sunday's Green Boat Show. EBA Secretary Barbara Penniall describes the cruising day and Tobi Baker, from the Organising Team, reports on the Green Boat Show.**

**I**t has been quite some time since we have been lucky enough to enjoy perfect cruising weather, but no-one could complain about the 2009 September day – one of the hottest of the year – when the EBA flotilla set off on its annual Norfolk cruise. Excellent launching and facilities for storing cars and trailers were provided at Ludham thanks to the generosity and co-operation of Colin and Wendy Buttifant.

The Goldrings arrived in force, Nick and Yvonne, Barry and Val with *Silent Explorer* and *Silent Adventure*, having experienced an eventful journey from Berkshire with a shredded tyre on a towing vehicle and a swift change to a space saver tyre to try to reach Ludham in time. John Hustwick and I had brought his launch *Rhapsody* to the Swallowtail Boatyard the previous day and were now joined by Hilary Goldsmith and Mark Rainer. Jack Street launched his Seahopper *Grabachance*, Roger and Julia Woodhouse their canoe *5 Amp* and John Arnold and his son Lee arrived with an inflatable fitted with his Torqeedo outboard. James Cox had cruised round in *Tumult* and Rod and Judy Birks brought *Winsome* to join the boats as we set off into Womack Water.

It really was a perfect day. The sun shone and the waters were absolutely still as we silently cruised into the River Thurne and then into the Bure. Barry had driven away to try to get a new tyre, so Janet and Tony Dunning took the helm of

*Silent Explorer*

*Grabachance and Silent Explorer*



## A Green Weekend

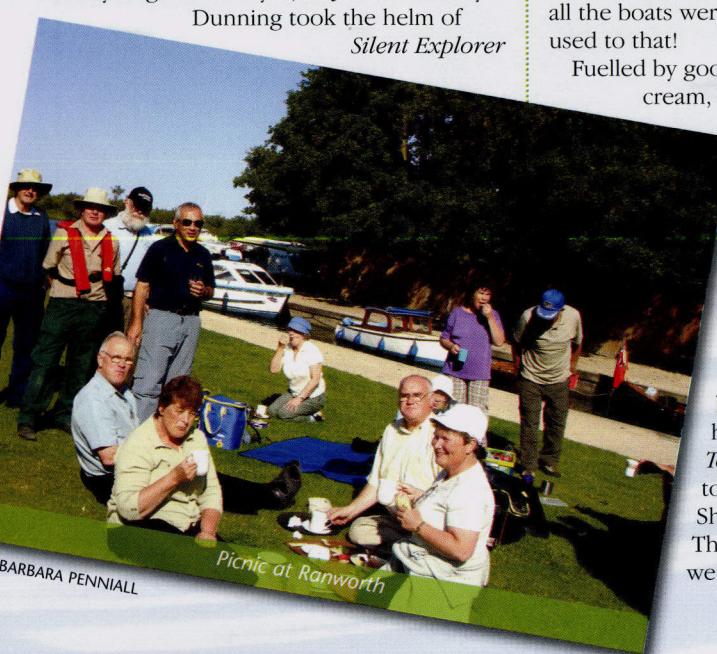
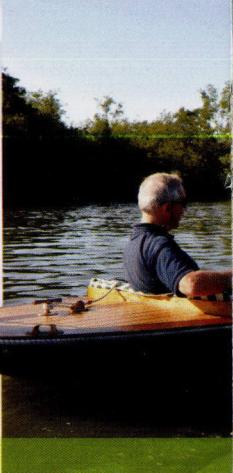
and it was a very happy band of eight electric craft travelling in convoy, weaving in and out, passing drinks and refreshments from boat to boat. We pulled into the Ranworth Information Centre where there was ample mooring and a café. Barry was waiting for us and we all settled down for a picnic lunch in ideal surroundings. Other visitors to the Centre were intrigued by the variety of silent craft that had crept into the moorings and we had to answer a number of questions about the various propulsion systems. Of course all the boats were admired – we do get used to that!

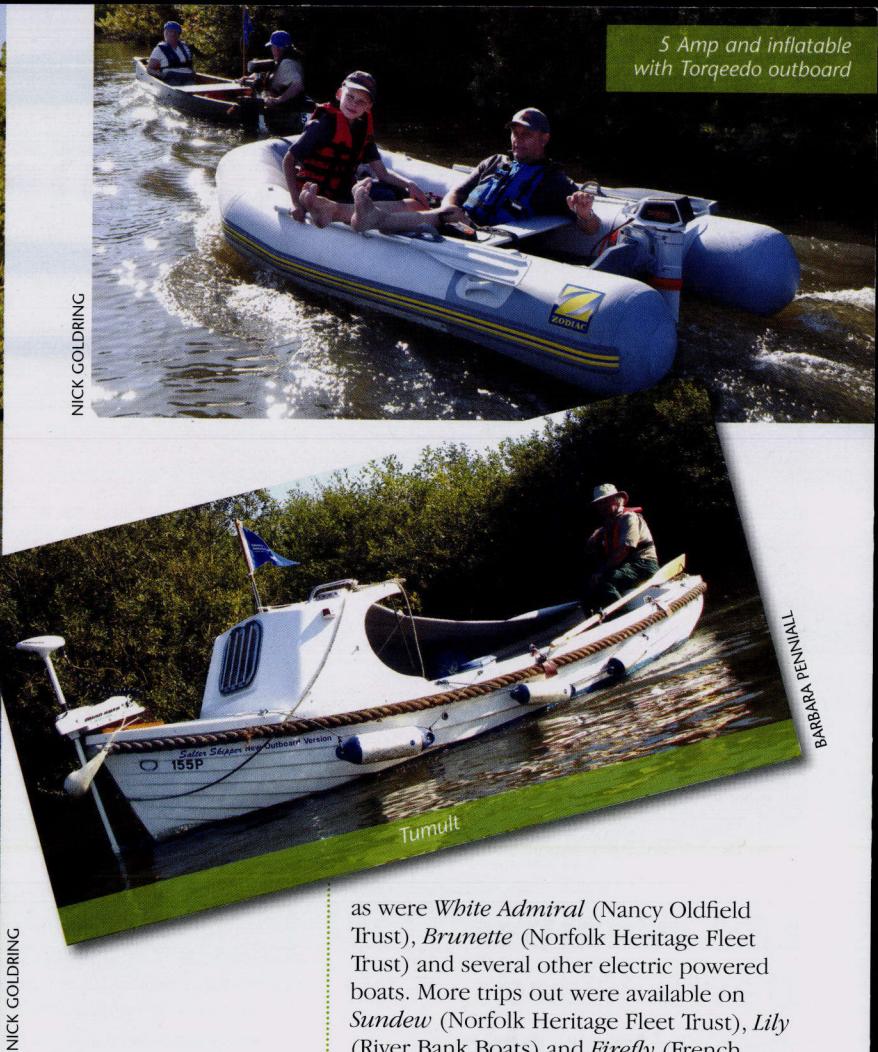
Fuelled by good food, wine and ice cream, we continued along the River Bure with 'bank to bank' sunshine, good company and a lot of laughter. As we reached Horning, we knew David and Jean Williams would give us a warm welcome at their riverside home. Unfortunately David had been unable to join us with his solar powered launch *Terrapin*, but was preparing to be at the Green Boat Show the following day. Thanks to David's hospitality, we were able to moor all the

boats and charge those that required a boost for the trip the next day. Cars were retrieved and lifts offered to find vehicles left at Ludham and then the party dispersed to various accommodation in preparation for the evening.

The Staithe 'N' Willow at Horning had closed their restaurant for the evening and hosted a dinner for 37 EBA members. It was quite a logistical feat to make sure everyone received the meal they had ordered and the staff managed very well. The convivial atmosphere from the day spilled into the evening and everyone seemed in good spirits – certainly judging by the noise level. We may be silent boaters, but we are certainly not quiet socially!

It was the end of a perfect cruising day, made possible by the co-operation and hospitality of Swallowtail Boatyard, David and Jean Williams and the Staithe 'N' Willow. Mostly our thanks go to the members who make these events such good fun with their good humour, help and ability to 'go with the flow'.





# in Norfolk

NICK GOLDRING

NICK GOLDRING

BARBARA PENNIALL

The fourth Broads Green Boat Show took place on Salhouse Broad on Sunday 13th September. In previous years the show has been blessed with fine, warm weather and hopes were high when the day before was perfect, with clear blue skies and hot autumn sunshine. However, Sunday dawned cloudy and grey with a cold north wind and through the day there were brief spells of drizzle. Undaunted, the exhibitors arrived early and set up stands and displays ready for the opening at 10.00 am.

Once again an electric water taxi ran from Granary Staithe in Hoveton to ferry visitors to the show, and ample car parking for visitors and exhibitors was provided in

adjacent fields. New exhibitors this year included Broads Spirituality, Cossey's Yard Ceramics and The North Walsham and Dilham Canal Trust. The Nutmeg Puppet Company and The Broads Authority set up several stands for



children's entertainment: badge making and a puppet workshop were very popular (not only with children, but some adults too!). The Broad House Hotel and The Salhouse Bell provided refreshments and edibles and a bicycle-powered smoothie-maker gave an opportunity for visitors to work up an appetite while blending their own drink.

Free samples and advice from the Broads Authority were available in the marquee along with informative stands from Birmingham University, EnviroBoat Developments, The Three Rivers Association, the RSPB and Broadland Cycle Hire. Chris Crowther, author of the recently released *Stillwaters*, was signing copies of his works. The Electric Boat Association's stand outside, alongside Pb Batteries, was constantly busy, dispensing advice and information on all aspects of electric propulsion systems. The Climax Jazz band, despite being blown about, complemented the show with some beautiful playing, drawing the crowds up to the marquee. Several free boat trips were available for all those wishing to try out 'greener' water transportation. The Broads Canoe Hire Association had canoes and full kit to be sampled in a free 30 minute paddle around the Broad. *Helen of Ramworth* ran every hour taking people across the Bure to Hoveton Great Broad Nature Trail while the *Charles Collier* was moored up on display

as were *White Admiral* (Nancy Oldfield Trust), *Brunette* (Norfolk Heritage Fleet Trust) and several other electric powered boats. More trips out were available on *Sundew* (Norfolk Heritage Fleet Trust), *Lily* (River Bank Boats) and *Firefly* (French Marine). John Arnold was demonstrating Torqeedo electric outboard motors on a small rib and sit-on kayak.

At 12 pm a relaxed parade of green boats took place around Salhouse Broad, which displayed them wonderfully. Peter Howe, wrapped up in his jacket against the buffeting wind and drizzle, led the procession in style on board the *George Thetford*, the yacht with an inboard electric auxiliary, followed by a canoe borrowed from the Canoe Hire Association stand and all the other show boats.

Although attendance was down because of the poor weather, there were over 500 visitors this year, a third of whom arrived by boat. With thirty exhibitors over the whole area, displaying boats, technology, local produce and food, there was plenty to see, try and do. GBS09 was a great success and we shall look forward to next September for more Green Boating. Please see the website [www.broadsgreenboatshow.co.uk](http://www.broadsgreenboatshow.co.uk) for a full list of exhibitors and information about the show.

Many thanks to the Broads Authority, with particular mention of Dan Hoare and Rachael Evitt, for supporting the event, to Salhouse Broad for hosting it and to Peter Howe for unwavering enthusiasm and dedication to the Green Boat Show - a Silent Sensation. Our gratitude as always goes to Mr Henry Cator for his kind permission to use the land for this important Broadland show.

# THE STORY of PEACE



Peace at home mooring

## EBA Member David Ward describes the conversion of his 26 ft Sea Otter to electric propulsion.

I have been boating on canals and rivers for nigh on 30 years and on many occasions have pondered how wonderful it would be if I were able to convert my 'infernal' combustion engine to electric power. Boating would be even more peaceful and relaxing without that constant noise. I am not an engineer and therefore would need someone to do the conversion. By chance, two years ago, we met just such a person. He could not convert our Wilderness boat, but he could do a small narrow boat.

I have viewed Sea Otter boats at boat shows since the very first one which appeared at the trailboat festival at Welshpool many years ago, but it was only a couple of years ago that I actually bought one. We purchased our 26 ft Sea Otter second hand from Walton Marine in October 2007 and trailed it home.

Our boat was born/launched in 2001. A fairly standard craft with a few extras like

a 20 hp diesel engine, cassette loo etc and called *Psyche*, which we have now changed to *Peace*. We think it had originally been bought as a day boat because it did not seem as if anyone had slept on it nor used the shower. But it was very clean and in excellent condition. The diesel engine had done less than 800 hours in 7 years.

I have always felt that the open plan layout looks good in a showroom or exhibition, but wondered how well it would work on the water for a cruise of any length. We found our boat lacking a number of useful creature comforts e.g. there were no drawers anywhere and the fridge was not to be run 24/7 or else it would flatten the battery.

While the conversion to electric power was taking place, we made a number of changes inside, adding insulation in all lockers and under the floor, installing drawers and changing the fridge. We put opening portholes in the kitchen and loo,

## Joe Whitby

Examiner – Boat Safety Scheme

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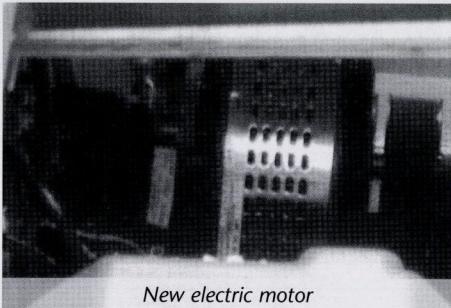
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New electric motor

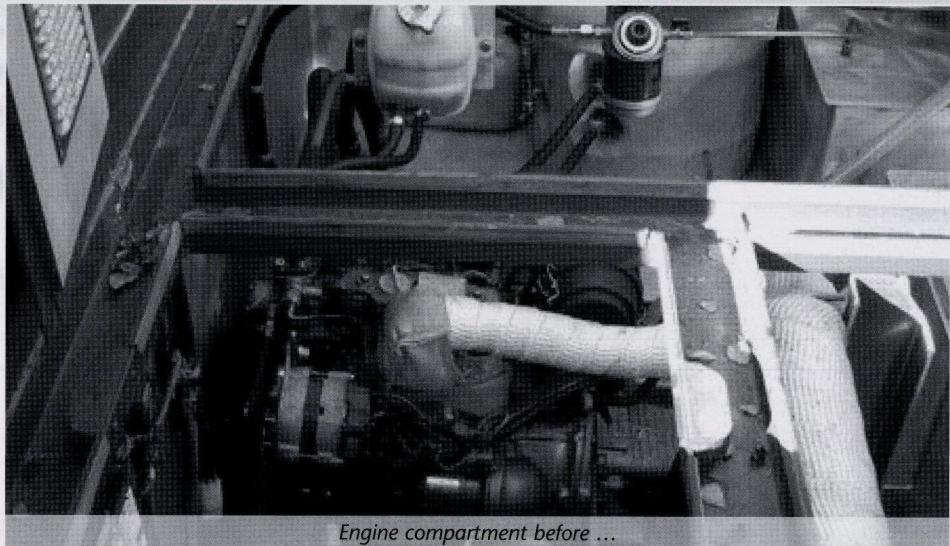
changed all the lights to LEDs, built a large wall cupboard for all the crockery and glasses, fixed a long shelf to hold books, papers etc., changed the main upholstery to give us very comfortable six inch thick seats/beds and installed a removable solid fuel stove for a cosier form of winter heat. In a small boat such as ours you cannot afford the luxury of wasted space.

As our electric motor is about the size of a large cake tin and thus much smaller than the original diesel, we have been able to have an area in the engine compartment to store my Brompton bike plus basket and helmet, gas barbecue, spare can of diesel and two folding chairs. The trailer was also upgraded to three 1.5 ton axles and 6 waterproof hubs and wheels.

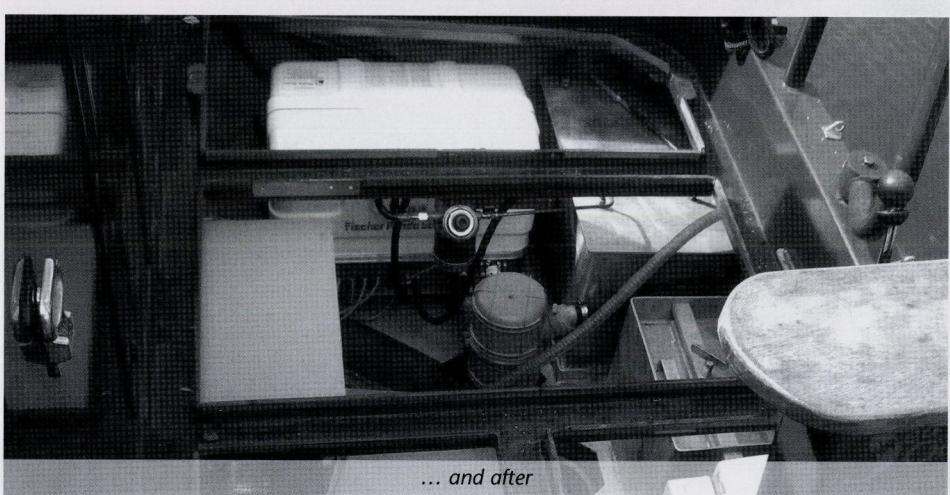
Under the rear deck, out went the diesel engine and gear box. In went the 10 hp 48 volt Lynch 200 electric motor and no gear box – to go astern the motor goes backwards and, of course, in neutral the motor is stopped. Power to recharge the batteries comes from a small Fischer Panda AGT 4000 48V diesel generator which is so quiet you can hardly hear it, especially as the exhaust comes out at the stern rather than at the port side on normal Sea Otters. The choice of batteries is a difficult and important one. Bearing in mind that this is a trailable boat, weight is VERY important. We have found that the weight of extra batteries plus diesel generator roughly equates to that of the diesel engine plus gearbox and full calorifier which we took out. So trim is about the same. Hot water now comes from a Propex Malaga gas fired water heater.

In September we traileed the boat up to Ellesmere on the Llangollen Canal for her maiden voyage (apart from days out) and during the next five weeks cruised down the canal system to Enslow on the South Oxford Canal where we slipped out. From our log I can report that we cruised 297 miles plus 131 locks and with several stationary days took only 142.75 hours. Our diesel consumption was 52.8 litres. We enjoyed the experience very much – we had the stove alight most of the time as we were cruising late in the season.

We had been told that the best batteries for us would be four Elecsol 270 Ah ones weighing 60kg each. But on the extended cruise they took too long to recharge. We consulted Barden Batteries who advised



Engine compartment before ...



... and after

us to change to four 214 Ah Odyssey AGM batteries. With the generator now being able to recharge at 70 amps rather than the 50 amps with the Elecsol batteries, we should be able to run for two hours on pure electric before the charger kicks in automatically for about half an hour rather than two hours with the old batteries. Four 45 watt Solara solar panels give the final top-up.

We also have two more 45 watt solar panels to give a boost to the service battery which gets its power from the 48 volt system via a DC/DC converter and the small starter battery. We have to use solar panels which are very thin and can be screwed to the roof, as anything more bulky would cause too much drag as we trail down the motorway at 50mph!

Under electric power there is very little noise, just a subdued whine. The splash of water around the hull is almost as loud. To other waterway users in front of us we are silent – even when the generator is running. We accelerate very quickly to 4 mph at 50 amps, then cut the power down to 25-30 amps, but there is up to 150 amps of power in reserve if needed. To go astern and stop we use about 80 amps for a minute or so. The controls are almost immediate – there is only a minuscule time

lag. An electric motor gives maximum torque from one revolution. In all other respects the boat behaves just like any other Sea Otter except that it is very much quieter. Going up/down locks on pure electric power is a dream with no polluting fumes and so quiet.

The reason for converting to electric power was not so much to save money (although our canal authority gives us a 50% discount on our annual licence fee), but to fulfil a project I have had for many years and at the same time improve our quality of life by boating quietly and using less fuel with the minimum of pollution. The power input of our electric motor is 9.6kW and the output power is 8.4kW, so with a 4 ton boat the power weight/ratio works out at 2.1 kW/ton and the motor works at 86% efficiency.

We now have a very comfortable trailable boat made of aluminium-alloy which is much stronger than GRP, and we can take it (with care) wherever we want to go. In the spring we will take it to the River Thames where we have booked a mooring. Later in the year we will be attending the IWA Rally at Beale Park and will moor with the other Sea Otters.

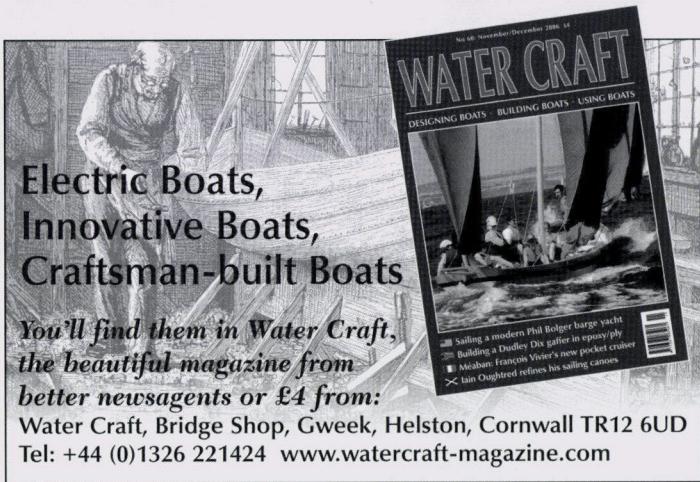
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¼ PAGE COLOUR	75	85
½ PAGE B/W	100	110
½ PAGE COLOUR	120	130
FULL PAGE B/W	150	160
FULL PAGE COLOUR	180	190

# A Green Boat in Africa

**Kevin Desmond**  
**reports on a new**  
**boat with a new**  
**'green' propulsion**  
**system.**

**A** new boat described as 'the first fossil fuel free sailing catamaran with retractable propulsion/generation system' was launched in Durban, South Africa on 10th December and is now undertaking trials off the Wild Coast. *Green eMotion* is a FastCat 445 built by Dutch Company African Cats with a new patented hybrid electric drive system. Managing Director Gideon Goudsmit explains: "Green eMotion's hybrid electric drives, called motogens, are on hydraulically operated legs. Swing down one motor or both for propulsion or for regeneration purposes, swing them out of the water

when sailing to eliminate drag or when at rest to avoid marine growth (or to beach the boat with no risk of damage to the props). Once trials off the Wild Coast are complete, we will sail her to Europe doing the final evaluation with a two-way transatlantic crossing."

Six 160 amp 25.5 volt lithium iron phosphate batteries provide the two motogens with their energy. Their positioning closer to the centre of gravity of the vessel makes the yacht safer and more comfortable. The large, four-bladed lightweight slow rotating props have a higher efficiency than the folding or feathering props normally used and this is possible because they are retractable. Their facing forward (tractor-style) increases propulsion and regeneration by 10 to 20 %.

A 200 watt wind generator is mounted on top of the mast to keep the batteries charged when moored. The advantage in mounting the unit on top is threefold: less

noise, higher efficiency and a good-sized wind vane. This wind generator is spray painted in Glow in the Dark for added visibility. 6 x 300 watt solar panels also top up the batteries.

An induction stove and an electric oven have been installed to make the yacht completely fossil fuel free. The warm water from cooling them is ducted to the bathrooms, reducing the electricity normally required.

The patented propulsion system is called Green Motion and later this year it will become available to other boat builders in a range from 5 to 30 kW motors, both underwater and inboard systems. The same system has been installed for a monohull racer, the single motogen retracting directly up into the hull.

**For more information see the website [africancats.com](http://africancats.com)**



# Noticeboard

## Welcome to New Members

Private Members	Location	Boat where notified
Stuart Boam	Coalville, Leics.	Silver Lady (tbc) - 20 ft cruiser in style of gentleman's launch (under construction)
Peter Brewer	Maidenhead, Berks.	Alma - Duffy Balboa Cove 18
Stuart Brown	Dingwall, Rossshire	De-esse - Hunter 701 7 metre Bermuda rig cruiser
Peter Greenfield	Helston, Cornwall	Chebacco - 26ft cat ketch
Peter Scott	Goring-on-Thames, Oxon.	Lisbeth
Terry Smith	Colchester, Essex	Wayfarer - 16 ft dinghy
Mark Stockley	Shenfield, Essex	Millennium Star - 25 ft slipper stern, David Brownjohn launch
Michael Watson (welcome back Michael)	Hampton, Middx.	Silent Slipper - 25 ft electric slipper launch
Michael Watt	Peterhead, Aberdeenshire	Cullykhan - converted fishing trawler
Peter Wight	Stockport, Cheshire	

## Business Member

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## Annual General Meeting

This year's AGM will be held on Saturday 19th June at Bradford-on-Avon as part of a weekend of cruising in the West Country. Members will shortly be receiving an official invitation by e-mail or post but details are already on the EBA website.

## Events Co-ordinator

The Association is delighted to welcome Veronica Selby as EBA Events Co-ordinator. Veronica will deal with the administration involved in EBA events and will be working closely with EBA Secretary Barbara Penniall and local organisers in areas where events are taking place. Contact details for Veronica are on page 20.

## Membership Subscriptions

EBA Membership Secretary Tony Dunning is simplifying the membership renewal process. In future the subscription renewal date for all U.K. private members who do not pay by standing order will be 1st April each year. There are no changes for members who pay with standing orders, which are renewed automatically when they become due, and no changes for overseas or business members. Any members who would like to change to payment by standing order, which makes the work of the Membership Secretary much easier, should please contact Tony on membership@eboat.org.uk or telephone 01946 820875.

## Email addresses

The appeal for email addresses in the last magazine had a very disappointing response. It saves the EBA time and money if Barbara can contact members by email with news of forthcoming events. Barbara would like to assure members that addresses are kept confidential and will not be passed on to anyone else. If you have not yet given your email address to the EBA, or have changed it since joining, could you please send details to Barbara on secretary@eboat.org.uk.

## EBA Shop

Would members be interested in buying more items of clothing and accessories, such as fleeces and hats? Barbara is investigating a company which could supply a wider range of goods for the EBA shop. Please let Barbara know what you think about this.

## Charging Points

Barbara represented the EBA at a meeting of the River Thames Alliance on 12th February to discuss moorings. She emphasised that any new moorings being planned should include provision for hook-up points for electric boaters and was assured that this had been the case with the new moorings at Wallingford, due to be opened in May.

Ian Rutter is continuing to liaise with the Environment Agency over their new card system for electric boat charging, which should be in operation for the start of the new boating season in April. Members are reminded that if they are planning to stop at a Thames lock where a hook up point is provided they should telephone ahead before 4 p.m. to reserve the space.

## Picture Archive

The EBA is building up an archive of early pictures of electric boats. If anyone has suitable slides, Ian Rutter has a slide scanner and would be pleased to scan them in. Please telephone Ian on 01628 476158 or email ianrutter@talktalk.net.

Information sheets from the  
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**2. SOLAR PHOTOVOLTAICS** by Paul Lynn

**3. ELECTRIFYING YOUR BOAT** by Hawthorne & Wagstaffe

**4. HULL DESIGN FOR ELECTRIC BOATS**  
by Andrew N Wolstenholme

**5. LEAD ACID BATTERIES – OPERATION & MAINTENANCE**  
by CMP Batteries

**6. HIGH SPEED ELECTRIC BOATS** by Lorne Campbell

**7. HYBRID POWER** by John Hustwick

**8. TRAILERS AND TRAILING** by Paul Lynn

**9. FITTING OUT AND LAYING UP YOUR BOAT** by John Hustwick and Ian Rutter

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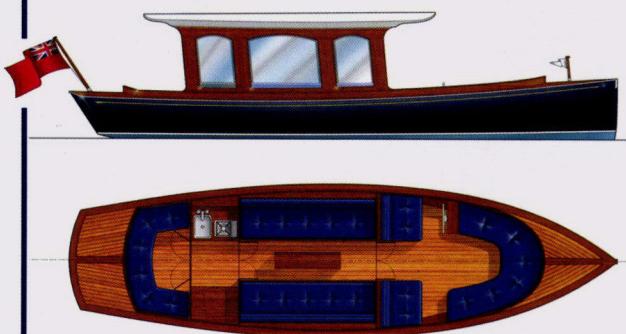
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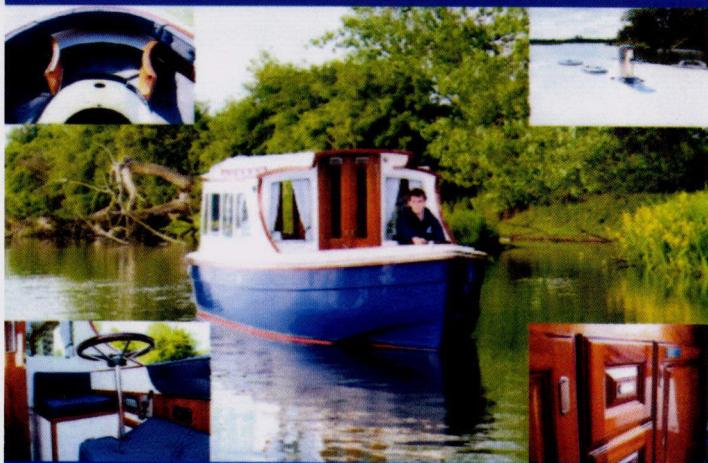
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Viking Marine provided mechanical design and fabrication for the conversion of Dutch Barge SARA for electric propulsion (see article in summer 09 issue).

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# The Hymar Project

**Kevin Desmond describes a new project to develop hybrid propulsion systems for marine use.**



Nigel Calder

The three-year project named HYMAR (Hybrid Marine) involves a group of European partners from seven countries. These companies will produce a range of technological refinements to improve the efficiency of hybrid-electric propulsion systems, suitable for commercial and recreational vessels up to 24 metres.

The European Union Marine Industries Group is investing 2.2 million euros in the project, with the aim of developing an 'optimised and fully integrated' marine hybrid-electric drive as 'a necessary first step towards the complete replacement of the internal combustion engine'. The new products will include dynamically shifting motor and generator controllers, an energy management module, a torque-adapted self-pitching propeller, a rim-drive motor-propulsor and nozzle, a design for a keel-mounted hybrid drive which builders can purchase as a bolt-on unit and an advanced TPPL (thin-plate, pure-lead) battery designed specifically for hybrid propulsion. Other advanced batteries will be tested as well as suitable biofuels and fuel cells with the hybrid platform if they become available at realistic prices.

European partners in the HYMAR project are Bosch Engineering (Germany) for the

controller; Steyr Motors (Austria) for the motor; Mastervolt (Netherlands) for the power electronics; Bruntons Propellers (UK) and INSEAN (Italy) for the propellers; Enersys (UK) for energy storage; Malö Yachts (Sweden) for the test boat and ancillary services and Electric Marine

Propulsion (Florida, USA) for marine hybrid implementation experience. Electric Marine Propulsion is participating through a newly established European firm, E motion Special Projects (ESP), headquartered in Brockham, Surrey.

HYMAR is the brainchild of Nigel Calder, British boating journalist and marine electrical systems expert. He wrote the funding proposal with assistance from Ken Wittamore of the International Council of Marine Industry Associations. In 2008 Calder tested a preliminary HYMAR experimental system from EMP in a floating laboratory, the 46ft yacht *Nada* built by the Malö yard, in Swedish waters. The initial system on *Nada* included a prototype 22 kW brushless permanent magnet DC generator, a prototype 16 kW brushless permanent magnet DC electric motor and a 14 kWh bank of 'Odyssey' TPPL batteries. Testing proved that the underlying assumptions and predictions of the project were fundamentally correct.

In 2009 this test rig was removed from the boat in order to enable an extensive database to be collected with conventional inboard diesel technology. This will be used as a baseline for comparing future hybrid systems. In the meantime, the information gathered during the initial 2008 hybrid tests is being used to create a new line of generators, electric motors and controllers. It is anticipated that a redesigned prototype will be ready for testing in 2010.

Calder, ever the realist comments: "There are literally dozens of people jumping into serial hybrids right now, many of them with technology taken directly from the hybrid bus market. With what I know, unfortunately I can guarantee that most of them will fail. However, I really do believe that through the HYMAR project and associated efforts this nut will get cracked."



*Nada*

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*Pictures and details of all these boats are on the EBA website [www.electric-boats.org.uk](http://www.electric-boats.org.uk) under 'Free Ads'.*

*Members wanting to buy or sell electric boats, motors, fittings or associated equipment are invited to submit a 50-word entry direct to the Editor (Note: No agents or brokers). The information contained in members' private advertisements is provided by the advertiser and the Editor is unable to vouch for their accuracy.*

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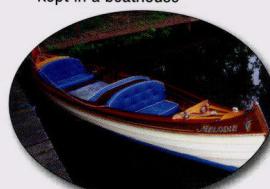
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