



Biodiesel and Electric Boats

Green Fuel on Inland Waterways

Norfolk Broads

Making the environment second nature

Increasing awareness of global warming, fuel shortages and stringent water quality standards have encouraged the development of renewable and cleaner sources of fuel for boats with biodiesel and electric engines playing a major role. The Norfolk Broads and hire companies operating in the Broads have been leading the way in trialling and introducing these methods to the huge fleets of hire boats using their waters each year. In fact, in 2006 eight Broads hire boat companies will be participating in a two-year biodiesel trial:



- Faircraft Loynes, Wroxham
- Alexander Cruisers, Brundall
- Sabena Marine, Hoveton
- Barnes Brinkcraft, Hoveton
- Connoisseur Cruisers, Wroxham
- Silverline Marine, Brundall
- City Boats, Thorpe
- Woods Dyke Boatyard, Horning

Bio diesels are produced by recycling waste vegetable oil and fats or from specifically grown crops. By refining waste oils for use in engines, it reduces the amount of oil having to be disposed of and reduces the amount of carbon, sulphur, aromatic hydrocarbons, metals or crude oil residues emitted. It is worth noting that although accidental discharges of small amounts of biodiesel have less impact on the environment and aquatic life compared to petroleum diesel, they can still cause harm and steps should remain in place to reduce any spillages. For more information and facts about biodiesel and environmental implications, please see our fact sheet

Biodiesel

A number of yards in the Broads are trialling biodiesel with the Broads Authority providing financial support through its Sustainable Development Fund.

Faircraft Loynes, part of Norfolk Broads Direct based in Wroxham has four 100% biodiesel boats as part of their weekly hire fleet with one in operation for a complete season and the others having done part season. Although diesel boats can run on biodiesel with no adaptation to the engine, Chief Engineer Mick Derbyshire is running the boats from new to get a clear idea on what effect the fuel has on the engine. He has seen no difference in the performance of the boats and early indications show that fuel efficiency is similar to the rest of the fleet. This is however being monitored over time to achieve a more accurate set of results

They have been interested in the subject for years but lack of available fuel sources prevented the project becoming a viable option. This changed with the establishment of Norfolk



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based Global Commodities UK, the UK's only purpose built factory dedicated to the manufacture of biodiesel. It meant that they could have the fuel trucked in and stored in a conventional storage tank on site. Biodiesel is now becoming widely available across the Broads but Mick states that a full tank is more than sufficient for an average weeklong holiday so re-fuelling is not a major issue.

One concern about the use of biodiesel is that the freezing point is higher than conventional diesel causing it to crystallize in cold weather. Faircroft Loynes boats were operating throughout the cold snap this winter with no problems; consequently, Mick Derbyshire does not consider it a major risk to his fleet. Robin Godber from Alexander Cruisers, another company participating in the trial, echoed similar views but states that;

“Performance is slightly down, i.e. marginally less power, which for our operation is not a problem” and points out that their major concern is running the diesel heaters on biodiesel due to its consistency.

Electric Boats

Electric powered boats are particularly favoured for inland waterways as no exhaust emissions and no noise allows peaceful movement causing fewer disturbances to wildlife. The boats tend to cause less wake and less bank erosion as they run most efficiently at lower speeds. The Annual Broads Electric Boat Show, organised by the Electric Boat Association being labelled the ‘eco friendly boat show’, promotes these messages. There is of course the downside of electric power in that batteries are used that contain heavy metal components.

Electric conversion can also be used for both sail and power boats. White Moth, a traditional Norfolk wherry dating from 1915 (pictured right) weighing 26 tons underwent a conversion replacing the old diesel engine with an 8.5W electric motor and a sound encapsulated Panda AGT DC generator. Trials proved to be successful lasting for 5 hours at full speed (5 knots) without having to use a generator increasing to 8 hours at half speed. Her performance and manoeuvrability were also good.



To encourage the use and development of electric boats the Broads Society jointly funded by the Sustainable Development Fund and LEADER+ offer grants to private owners to convert diesel and petrol engines to electric and the Broads Authority have doubled the number of electric charging points in northern and southern rivers enabling the boats to travel further distances. This and the White Moth project are two of more than 10 electric boat projects that have benefited from SDF support. Electric charging pillars are operated by a £1 payment card and pillars can be found at:

Stalham	Hickling	Potter Heigham	Ludham Bridge
Coltishall	Hoveton	Horning	Ranworth
Stokesby	Burgh Castle	St Olaves	Reedham
Loddon	Rockland Broad	Bramerton	Norwich

A map of charging points and instructions for use has also been developed by the Broads Authority.

The Broads Authority's Sustainable Development Fund has funded another Broads company, Creative Marine to test the effectiveness and suitability of fitting nine sets of 12 volt panels on the roof of a 21 foot electric launch. Experts believe that light levels here on a sunny day can equal those of the Mediterranean and so is hoped the panels will be able to provide enough power to store in the batteries when the boat is not in use. Creative Marine will be monitoring light levels, tides, boat speed and power output.

The Future



The environmental impact of biodiesel and electric boats on watercourses is significantly less than fossil fuels. Currently biodiesel mixes are two to four pence a litre cheaper than regular diesel but still significantly higher than red diesel. The trials of biodiesel and developments in electric boats have been helped considerably by grants and funding contributing towards fuel costs.

Trials of biodiesel and electric boats show that there is potential for these methods of propulsion to have wider use in inland waterways. For nationwide use there may be a problem with the supply and distribution of biofuel from recycled oil and so dedicated crops would have to be grown. The Environment Agency stresses this change in agriculture would have to be managed carefully to protect the countryside, wildlife and resources.

The Broads has demonstrated that the use of electric powered boats on inland waterways can work and there is potential for future growth. By developing solar power generation to recharge the batteries it alleviates the environmental consequences of electricity generation for the charging points and provides a self powering boat enabling them to travel further afield.

More Information

For more details about biodiesel or electric boats, please contact:

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Details of projects funded by the Broads Authority SDF and other information about the work of

The Broads Authority may be found on their website www.broads-authority.gov.uk

Global Commodities fuel supplies are at www.globeco.co.uk or call 01362 821 582

Download **DEFRA's** fact sheet on biodiesel from www.defra.gov.uk/FARM/acu/energy/Biofuels-leaflet.pdf

Details of the **Electric Boat Association** can be found at www.electric-boat-association.org.uk

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