



**INLAND  
WATERWAYS  
ASSOCIATION**

# *IWA Guide to:* **GREENER BOATING**



*Want to make your boating more sustainable  
but not sure where to start?*

*Let us guide you through what you can  
do now and have a look at the boats of  
the future.*



Paul Rodgers  
IWA National Chair

“ For many of us, a large part of the joy of boating is being able to spend time outdoors on Britain’s beautiful network of canals and rivers. As such, it is vital that we protect the unique waterways environment.

The Inland Waterways Association (IWA) wants boating on the inland waterways to be more sustainable and for us to play our part in reducing carbon emissions as much as possible. We will continue to research and lobby government and navigation authorities to make greener boating a priority for decision-making.

This guide will introduce you to some of the ways in which we can make that vision a reality, including simple ways to make your boating greener and more cost effective now.

## GREEN BOATING: AT A GLANCE



**2050**  
target date  
for zero CO2  
emissions <sup>(1)</sup>



**80,000**  
powered craft  
on inland  
waterways <sup>(2)</sup>



**1%**  
of London  
emissions are  
from vessels <sup>(3)</sup>

<sup>(1)</sup> HM Government, Reducing emissions from road transport: Road to Zero Strategy. Available online: <https://www.gov.uk/government/publications/reducing-emissions-from-road-transport-road-to-zerostrategy>

<sup>(2)</sup> Boat Safety Scheme, Examiner Training Course, 2017. Available online: <https://www.boatsafetyscheme.org/media/293875/A2i-BSS-Examiner-Training-Course-Intro-overview-andbackground-7Dec2017.pdf>

<sup>(3)</sup> 1 Port of London Authority, Air Quality Update, June 2020. Available online: <https://www.pla.co.uk/Environment/Air-Quality-and-Green-Tariff/Air-Quality>

# GREEN BOATING NOW

There are around 80,000 boats on the inland waterways system with engines that may well still have a useful life of over 50 years. Not only would it be counter-productive to replace all the existing diesel engines, it would also be much too expensive.

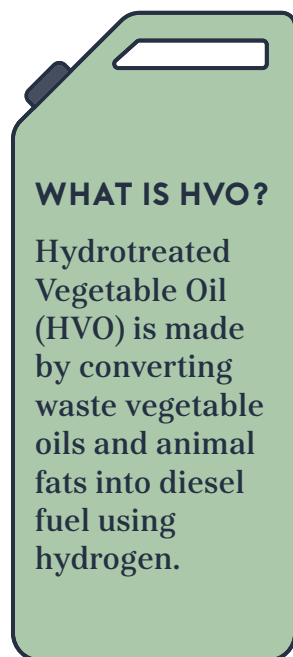


*The best solution we have identified is to replace fossil diesel fuel with an alternative as close to carbon neutral as possible.*









## BIOFUELS

Whilst the 1st generation of biodiesel suffered from problems such as diesel bug and blocked fuel systems, 2nd generation biofuel has none of these problems and is more than 90% carbon neutral. When 'green' hydrogen becomes available, this will rise to virtually 100%. As such, it looks like it will be the drop-in replacement fuel for those keen to run their existing diesel engines into a zero carbon future.

Hydrotreated Vegetable Oil (HVO) is a 2nd generation biofuel that is gradually becoming readily available for regular commercial marine use. Whilst it is currently still a more expensive fuel option, we are campaigning for tax cuts to reduce the cost of HVO for boaters.



### HVO:

-  is made from waste oils (and not directly produced on land otherwise reserved for growing food)
-  mixes with all other diesel fuels
-  has full approval from current engine manufacturers
-  does not attract water or promote the development and growth of diesel bug
-  is completely stable when stored (up to 10 years)
-  remains free-flowing down to at least -25°C
-  produces less air pollution than mineral diesel
-  can give up to a 10% reduction in fuel consumption

# 5 WAYS TO MAKE YOUR BOATING GREENER



## INSTALL SOLAR PANELS

Solar panels will help keep your batteries topped up instead of running your engine while you are moored.



## BURN DRY AND WELL-SEASONED WOOD

If you burn logs in a solid fuel stove, make sure that they are dry and well-seasoned. You might consider installing a pellet-burning stove.



## KNOW YOUR SPEED

While you are boating, particularly on shallow canals, if you try to go too fast you will burn more fuel but will not go any faster.



## TURN OFF THE ENGINE WHEN YOU CAN

If you can, turn your engine off when you are stationary such as when you are queuing for locks. This will save you lots of fuel as well as improving the air that you breath.



## SWITCH TO BIOFUELS

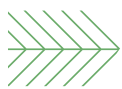
We will be campaigning to get the cost of alternative fuels, such as HVO, down. In the meantime, if you can afford to pay a little bit extra for your fuel, you could consider using it straight away.



# BOATS OF THE FUTURE







Inland waterway boats of the future will likely be driven by an electric motor powered by batteries. They will be able to be charged by using both shore power and on-board solar panels.

Currently, batteries are only capable of propelling a boat for about two to three days, but developments are expected to lead this to double within a few years. Without this development, supercapacitors charged by fuel cells are likely to become the power source of choice.



*Neither electricity nor hydrogen are truly 'green' at the moment, but this will need to be solved at a national level for all forms of transport.*

## NEW-BUILD BOATS OF THE FUTURE WILL MOST LIKELY:

-  Be powered by an electric motor
-  Have a battery bank large enough for at least one day's cruising
-  Charge the battery by shore connection and on-board solar cells
-  Have a fuel cell for on-board charging (if battery improvements do not happen)
-  Have a hydrogen tank to supply the fuel cell
-  Use an electronic management system



# BATTERY VS HYDROGEN POWER



## BATTERY POWER

PROS	CONS
Weight is not a problem and space is more readily available than in a car.	Battery range and recharge times are currently less than ideal.
Power requirements are much less than cars so well within the range of current technology.	Rapid charging points are costly, which is likely to prevent them from being installed.
Batteries can easily (if slowly) be recharged.	Solar panels and wind turbines are unlikely ever to be able to provide all the energy required.
Range and recharge times will improve.	Batteries are, of course, only 'green' if the electricity used to charge them is 'green', which is currently only partly true.



## HYDROGEN POWER

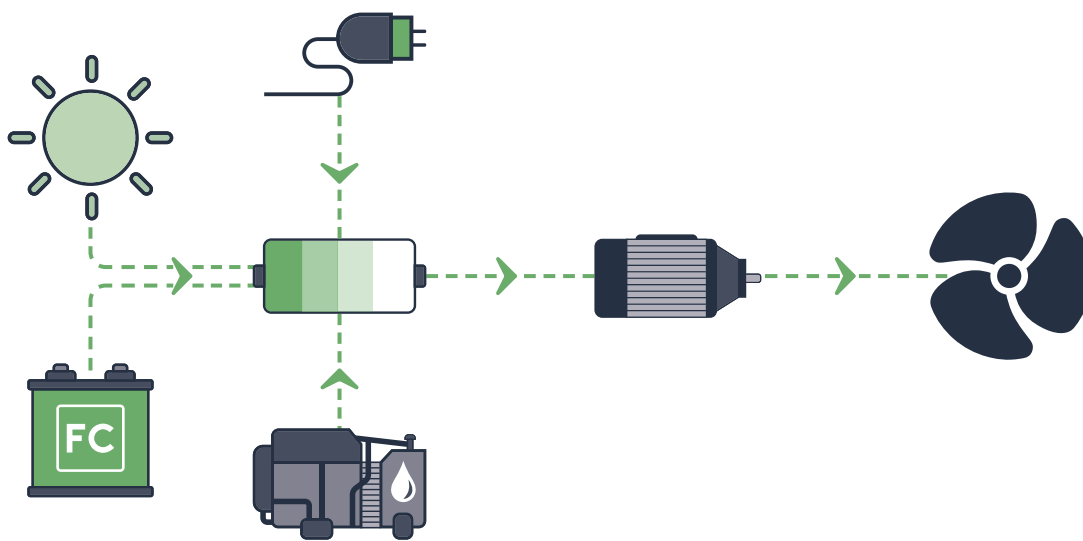
PROS	CONS
Hydrogen can easily be converted into electricity in a fuel cell.	The use of hydrogen in small boats is inefficient; currently, only around 35% of the electricity used to produce it can be recovered from a fuel cell.
The technology is well developed (and will develop further).	Hydrogen will never be as intrinsically safe as a diesel system yet can be engineered to be no more hazardous than a petrol system.
The size of existing cells is sufficient to charge boat batteries.	Currently hydrogen is not 'green' as it is mainly manufactured from hydrocarbon liquids and gases. It could be made 'semi-green' with CO2 capture.
Fuel cells produce about as much heat as electricity, much of which should be usable.	
Refueling can be much faster than recharging batteries.	

# ELECTRIC BOATS

As with road vehicles, there are two basic systems: **electric drive** and **hybrid drive**.

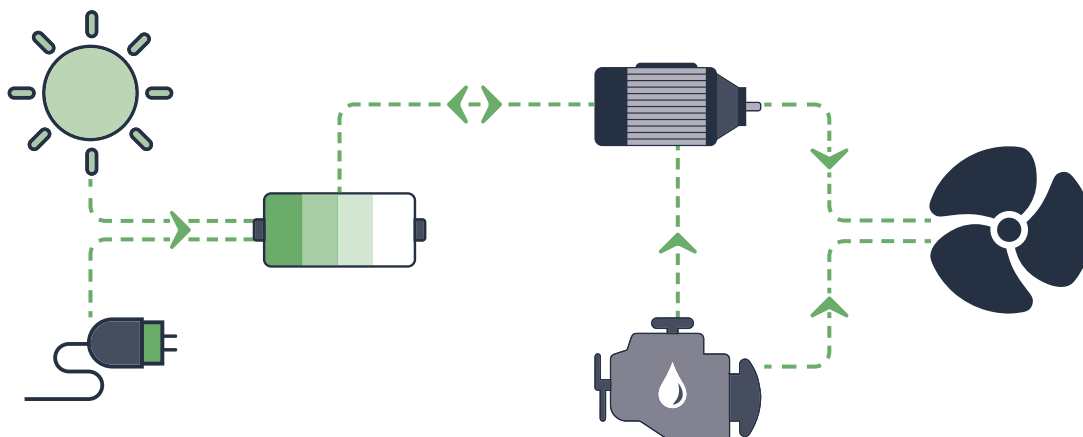
## ELECTRIC DRIVE

An **electric drive** has the propellor driven by an electric motor that is powered from a battery. The battery may be charged from a variety of sources including a small diesel generator or a fuel cell. A boat will probably have a choice of several methods.



## HYBRID DRIVE

A **hybrid drive** has an electric motor, powered from a battery and an internal combustion engine that are both able to drive the propellor. The motor, driven by the engine, can also be used as a generator to charge the battery. The battery may also be charged from shore power or solar panels.



# OUR VISION FOR THE WATERWAYS

IWA is the charity that works to protect and restore the country's inland waterways. We are passionate about having a growing, thriving network of canals and navigable rivers for everyone to enjoy – both now and in the future.

That's why we want boating on canals and rivers to be more sustainable and – even though the current overall contribution to UK carbon emissions from boats is very small – we want to help reduce emissions on the waterways.

**Our vision for the future of the inland waterways includes:**

## 300 MORE CHARGING POINTS



This is an essential step towards electric propulsion. In the meantime, it would reduce emissions from stoves for heating and engines run for charging batteries.



## MORE DREDGING

A national dredging programme on the inland waterways would make propulsion of all boats significantly more efficient. It will also improve water quality and management at times of both high and low flow.



## BIOFUELS

HVO is already approved by most, if not all, current diesel engine manufacturers and we are trialing it in engines from manufacturers who are no longer trading. We are conducting trials of HVO in a variety of domestic devices used for heating, cooking and water heating. We are also campaigning for tax cuts to make this almost carbon neutral alternative more affordable.

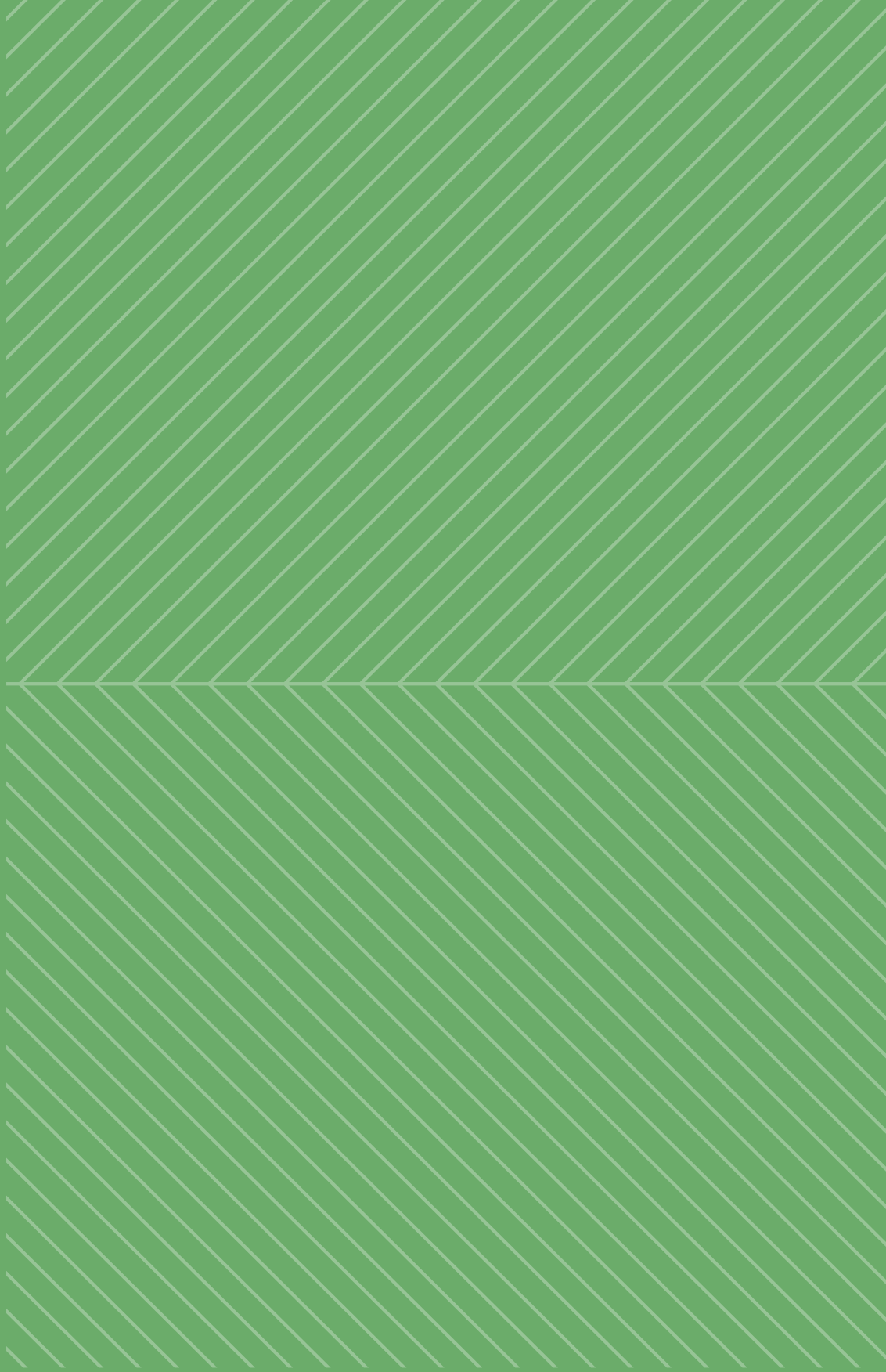


## FURTHER TECHNOLOGIES

Future developments will inevitably piggy-back on automotive ones. Work on hydrogen production and distribution is already underway. Before hydrogen becomes available, solid oxide cells powered by propane could cut emissions by about 80% and the use of supercapacitors instead of batteries could eliminate charging losses.

Support our work to protect and restore the waterways: [waterways.org.uk/join](https://www.waterways.org.uk/join)





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