



Energy Saving Recommendations Report

for

Oxford River Cruises Ltd

October 2017



European Union

European Regional
Development Fund



Bioregional



ORGANISATION OVERVIEW

Report overview

EiE carried out a site visit and interviewed key staff. All recommendations in this report are based on information and observations obtained during the site visit. The report is set out in order of recommended priority based on ease of implementation, carbon impact, cost and factors discussed on site.

Client details

Organisation name	Oxford River Cruises Ltd.	1 Folly Bridge Oxford OX1 4JU
Contact name	Giles Dobson	giles@oxfordrivercruises.com 07834 827530
Date of site visit	26th September 2017	Carried out by Moira Dorey

Energy savings recommendations - summary

Below is a summary of the opportunities recommended in this report. Costs and savings have been estimated using available information; an explanation is provided in detail for each opportunity. Estimations have been made based on energy data provided. Where savings estimations are not given further details/surveys would be required.

Opportunity	Savings (kWh / yr)	Savings (£ / yr)	Cost (£)	Initial payback	Carbon Impact (tCO ₂ e / yr)
Arrange for electricity sub-meter to be installed	0	0	230	0	0
Consider adding solar PV panels to boats	-	-	-	-	-
Consider retrofitting hybrid engine to replace current diesel engine in large boat	-	-	-	-	-
Consider adding further solar PV panels to large boat if hybrid engine installed	-	-	-	-	-
TOTAL	0 kWh/yr	£0/yr	£230		0.00 tCO₂e / yr

Site details

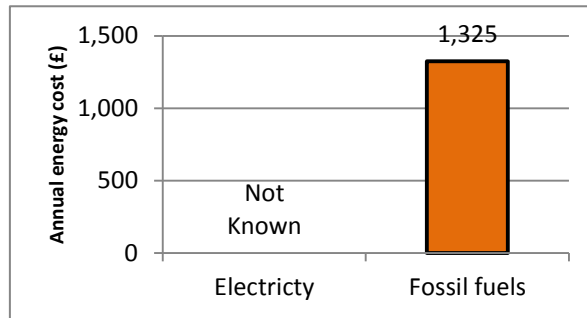
Oxford River Cruises, based at The Folly restaurant, operates 3 pleasure boats on the Thames. 2 of the boats are fully electric, with the 3rd and largest boat currently a diesel engine. The 2 smaller boats are unheated with the larger boat having both electric and diesel heating for parties during colder months. Electricity to power the boats is supplied by The Folly restaurant.

ENERGY PROFILE

Energy consumption annual profile

Fuel type	Annual Energy use (kWh)	Cost per kWh (p)	Standing charge (p/day)	Approx. annual cost (£)
Electricity	Not Known	11.62	38.67	Not Known
Diesel	0	0	0	1,325

Energy profile breakdown for electricity and diesel costs



Consumption is based on figures provided from April 16 to April 17

ENERGY SAVINGS RECOMMENDATIONS

Arrange for electricity sub-meter to be installed		
Energy saving (kWh)	Cost saving (£)	Cost of action (£)
0	0	230
<p>Electricity to power the boats is obtained from The Folly restaurant. There is no sub-meter to split usage between the two operations. Sub-metering would provide accurate readings of the electricity used by the boats, which would not only benefit Oxford River Cruises but will also allow The Folly to more accurately control the electricity used in the restaurant premises.</p> <p>Your electricity supplier may be able to install a sub-meter however there are a number of other companies that also offer this service. For examples and further information see:</p> <p>http://www.crucible-technologies.co.uk/product-categories/Electricity-sub-meters http://efficiency-direct.co.uk/ http://www.elcomponent.co.uk/site/product/view-category/category-99/elcomponent-meters.html</p> <p>Once the sub-meter is installed, read it on a weekly basis, at the same time each week, to build up a pattern of usage. Sub-metering can also be used to measure how much electricity it takes to power up each boat and maintain the services on board.</p>		
<p>Actions</p> <ul style="list-style-type: none">• Contact your energy supplier to ask if they can install a sub-meter and the cost of this service.• Contact 3 alternative suppliers to obtain quotes for sub-metering.• Aim to install a sub-meter before the electric boats are back in use in the spring.• Read and record meter readings regularly		
<p>Cost and savings calculations</p> <p>Costs are estimated at £180 for the meter (from Elcomponent) plus £50 installation cost. Increase control may lead to savings however this is difficult to quantify at this stage.</p>		

ENERGY SAVINGS RECOMMENDATIONS

Consider adding solar PV panels to boats

Energy saving (kWh)	Cost saving (£)	Cost of action (£)
0	0	0



During the audit visit we discussed solar panels for the electric boats.

Initial research suggests that there is a rule of thumb that for every 100 amp power of battery you have, a 10w solar panel, even in the UK, will replace the natural discharge. Your smaller all-electric boats are 105amps therefore a small solar panel could replace natural discharge. Anything above 10W is going to put extra charge into your battery.

Your larger boat has a fridge on board. Research suggests that, to power a small fridge and some lights on a boat would take 2 x 100w solar panels.

Solar panels work best in full sun and tree cover will reduce their effectiveness. If you are considering installing PV panels on your boats you will need to ensure that building and tree cover does not over-shade the panels.

You may find these links helpful:

<https://www.marlec.co.uk/solar-power/boats-and-marine/?v=79cba1185463>

Introduction to Solar Energy & Solar Panels for your boat with Marlec:

https://www.youtube.com/watch?v=xcf8J4LM_rk&feature=youtu.be

How to Select & Install the Solar Charging System on Your Boat - CY's Ask the Experts:

<https://www.youtube.com/watch?v=2CfjIb6LueM>

Actions

- Use sub-metering to calculate electricity loss through discharge and electricity used to operating on board electric appliance
- Consider options for parking the boats to reduce shade issues
- Discuss options with a number of suppliers

Costs and savings calculations

10W solar panel from Marlec costs £100

2 x 100W solar panels cost in the region of £500

The cost of solar panels to operate the fridge onboard needs to be views against the cost of powering a small fridge via the mains. A small fridge switched on throughout the year powered from the mains cost about £50 in electricity.

Cost and savings are not entered as further research and quotes are required.

ENERGY SAVINGS RECOMMENDATIONS

Consider retrofitting hybrid engine to replace current diesel engine in large boat		
Energy saving (kWh)	Cost saving (£)	Cost of action (£)
0	0	0
<p>You are considering replacing the diesel engine on your larger boat for a hybrid engine which would reduce the use of polluting diesel as a fuel. The following article from UK Marine carries out an analysis of the impact of boat engines on the marine environment.</p> <p>http://www.ukmarinesac.org.uk/activities/recreation/r03_01.htm</p> <p>Regarding diesel engines the articles says that:</p> <p>‘Diesel engines are more fuel efficient than 4 stroke or 2 stroke petrol engines and therefore emit lower overall CO and CO₂. However, they produce greater quantities of SO₂, Nitrogen Dioxide and particulates. In terms of marine features, it is the effect of hydrocarbons and lead in the water column and sediment that are of key significance’.</p> <p>When considering changing to a hybrid engine the following link may be helpful:</p> <p>http://www.2-speed.com/2008/09/a-diesel-electric-hybrid-arrives-for-boats/</p>		
Actions		
<ul style="list-style-type: none">• Continue to research emerging technology on hybrid boat engines• Obtain quotes for replacement engines• Seek funding opportunities for financial support through waterways support charities		
Cost and savings calculations		
Further research and quotes needed.		

Consider adding further solar PV panels to large boat if hybrid engine installed**Energy saving (kWh)****Cost saving (£)****Cost of action (£)**

0

0

0

If your large boat is converted to a hybrid engine there may be further opportunities for installing solar panels to provide electricity to operate the boat. Specialist marine PV panels may not be necessary and it would be worth discussing option with a number of solar PV panel installers.

Useful information is at these links:

<http://lowcarbonhub.org/> - Low Carbon Hub.

<http://www.r-eco.coop/> - Oxfordshire solar installer and worker cooperative.

<http://www.solartech.org.uk/> - Oxfordshire based.

<http://www.solarcentury.com> – Large London based well-known installer.

Solar panels work best in full sun and tree cover will reduce their effectiveness. If you are considering installing PV panels on this boat you will need to ensure that building and tree cover does not over-shade the panels.

Actions

Consider adding PV panels to large boat when a hybrid engine is installed.

Savings calculations

Further research and quotes needed.

FURTHER RESOURCES

FUNDING

Possible sources of funding for the recommendation in this report:

OxFutures – 25% funding towards the cost of energy reduction and generation measures. Contact Alison Grunewald E-mail: alison.grunewald@lowcarbonhub.org

Carbon Trust Green Business Fund - <https://www.carbontrust.com/client-services/programmes/green-business-fund/>