



Energy Saving Recommendations Report

for

Thames Cryogenics

March 2018

Survey of Thames Cryogenics Premises



European Union

**European Regional
Development Fund**



Bioregional



ORGANISATION OVERVIEW

Report overview

EiE carried out a site visit and met with Imran Hussein. All recommendations in this report are based on information and observations obtained during the site visit and information subsequently provided. 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	Thames Cryogenics	Gooch Drive Southmead Industrial Park Didcot OX11 7PR
Contact name	Imran Hussein	imran.hussein@thamescryogenics.com 01235 750 029
Date of site visit	27/02/2018	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.

Opportunity	Savings (kWh / yr)	Savings (£ / yr)	Cost (£)	Initial payback	Carbon Impact (tCO ₂ e / yr)
Upgrade lighting to LEDs	37,355	4,295	13,500	3.14	15.39
Replace fan convactor heaters	4,680	538	1250	2.32	1.93
Match night storage heating times to building occupancy	2,156	192	0	0	0.89
Consider radiant heaters	0	0	1,000	0	0.00
Provide signage	958	110	0	0	0.39
Consider alternative cooling for warehouse	0	0	Not known	0	0.00
Consider adding solar PV panels	24,340	2,799	37,000	13.22	10.03
TOTAL	69,489 kWh/yr	£7,934/yr	£52,750		28.63 tCO₂e / yr

Site details

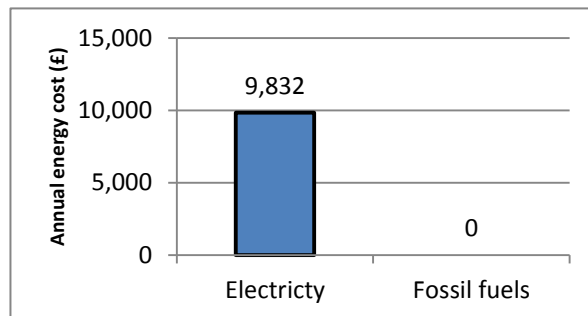
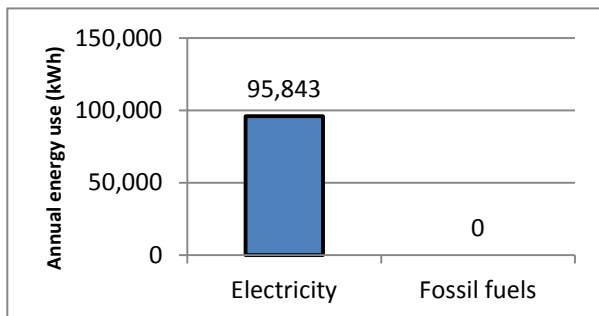
This 1993 building, in an industrial park, covers 620m² with a workshop area and a small mezzanine for additional storage, as well as offices on the ground and 1st floors and a double height. The building is heated with night storage heaters: fan blown for the workshop area and wall-mounted in the offices, supplemented with electric convactor heaters. There is no gas on site.

ENERGY PROFILE

Energy consumption annual profile

Fuel type	Annual Energy use (kWh)	Cost per kWh (p)	Standing charge (per month)	Approx. annual cost (£)
Electricity	Day 66,381 Night 29,462	Day rate 11.499 Night rate 7.305	£22.80 FIT average £35 CCL average £45	9,832

Energy profile breakdown for Thames Cryogenics consumption (left) and costs (right)



Consumption is based on figures provided from March 2017 to February 2018.

ENERGY SAVINGS RECOMMENDATIONS

Upgrade lighting to LEDs		
Energy saving (kWh)	Cost saving (£)	Cost of action (£)
37,355	4,295	13,500
<p>Lights currently installed in the building include fluorescent tubes in the offices and metal halide high bay lights in the warehouse. LED lights are more energy efficient and exist for nearly every fitting. They can reduce electricity use by up to 90% compared to other lighting. Additionally LEDs last up to 35,000 hours before they need to be replaced (fluorescent lights last 15,000 hours) resulting in reduced maintenance costs.</p> <p>Quotes for LED have already been obtained from 3 companies for replacement lighting on site.</p> <p>When selecting replacement lights there is also an opportunity to provide better lighting rather than using equivalent lights. Consider both the light quality preferred (known as colour temperature) that ranges from warm white, cool white or daylight and the level of brightness needed (measured in lumens).</p> <p>Ensure that, whichever supplier you use, they offer a minimum 5 year failure replacement guarantee and are prepared to let you test a number of LEDs to ensure the light quality is correct before making a final purchase.</p>		
<p>Actions</p> <ul style="list-style-type: none"> • Review lighting replacement quotes for accuracy, including hours of operation, number of lights to be replaced, etc. • Consider absence sensors as additional controls in some areas where lights regularly are left on. • Choose a preferred supplier and arrange for the work to be carried out. 		
<p>Costs and savings</p> <p>Costs are based on the Ecopare quote. This quote has been used as it was reported that this company visited the site and carried out a full review of lighting needs. Savings are based on Ecopare anticipated kWh savings but use the current kWh price of 11.499p/kWh and do not include a savings figure for maintenance savings.</p>		

ENERGY SAVINGS RECOMMENDATIONS

Replace fan convector heaters		
Energy saving (kWh)	Cost saving (£)	Cost of action (£)
4,680	538	1,250
<p>There are currently five fan convector heaters on your premises that were probably installed when your building was built in 1993. Their age will make them inefficient and they are not on timers, which results in the heaters being left on 24/7 controlled manually by staff using the thermostat only. This means that the heaters are likely to be on throughout the night and at weekends when the offices are not in use, which wastes energy.</p> <p>You have already replaced one of the convector heaters with a model with a built in timer. We recommend replacing the other 5 heaters with similar heaters with timers</p> <p>When installing the new heater ensure the following:</p> <ol style="list-style-type: none"> 1) The heater is fully guaranteed with a service agreement in place (preferably built into the cost) for a number of years. 2) Simple operating instructions are provided by the installer and are attached to the heater for future staff members. <p>Ensure new timers are set appropriately. Some of the current heaters are switched off by staff members when they leave the building. As a result staff return to a very cold office. Timers on new heaters could be set to turn the heaters on 30 minutes in advance of staff members arriving, therefore providing a more pleasant working environment.</p>		
<p>Actions</p> <ul style="list-style-type: none"> • Replace your existing heaters with modern equivalents with timers and thermostats. • To determine the exact size and number of heaters required consult a heating engineer. • Ensure timers are set appropriately to provide heating when the offices are occupied. Until fan convector heaters are replaced (see recommendation above), encourage staff to turn off their heaters over weekends at a minimum. 		
<p>Costs and savings</p> <p>New fan convector heaters cost approximately £250 installed x 5 heaters = £1,250. Savings assume that 5 x 1.5kW heaters are on 84 hours a week for 6 months of the year.</p>		

ENERGY SAVINGS RECOMMENDATIONS

Match night storage heating times to building occupancy

Energy saving (kWh)	Cost saving (£)	Cost of action (£)
2,156	192	0



The office heating is a mixture of night storage heaters and electric wall-mounted fan convactor heaters. The night storage heaters in the office are manually set by Mark to maximise heat output and seasonally adjusted.

The warehouse is heated by a night-storage heater with high level blown air ducting. It is on a timer which appears to be set on a 6 day programme to cover Saturday working.



If heating times do not match building occupancy, energy is wasted. Matching heating times to occupancy will reduce energy usage and costs and enhance comfort levels. We recommend reviewing night storage controls.

Instructions for heating controls for the night storage heaters can be found here:

[http://www.credaheating.co.uk/assets/kb/quick_start_guides/0/Creda Storage Heaters Quick Guide Issue 0.pdf](http://www.credaheating.co.uk/assets/kb/quick_start_guides/0/Creda_Storage_Heaters_Quick_Guide_Issue_0.pdf)

Actions

- Check the programming of the warehouse heating to confirm that it reflects occupancy e.g. does the night storage heating need to be charged up on a Friday night for Saturday working every week?
- Check that the office night storage heaters are correctly programmed for maximum efficiency by referring to the instructions.

Costs and savings

There is no cost to this action. Savings are based on a 5% saving on heating as a result of improved settings. Savings assume that heating using 25% of the day rate electricity and 90% of the night rate electricity.

ENERGY SAVINGS RECOMMENDATIONS

Consider radiant heaters

Energy saving (kWh)	Cost saving (£)	Cost of action (£)
0	0	1,000

The current heating in the warehouse consists of a large night storage unit with blown hot air ducting into the warehouse. Generally this style of heating creates a warm enough temperature for staff to work in however there are times when staff are doing more sedentary roles when they may get cold. Adding some radiant heaters over work stations where sedentary activities take place is a cost effective way of adding supplementary heating.

Infra-red radiant heaters are often used for instant heating in little used or poorly insulated spaces as they heat directly and quickly. Instead of heating the air like conventional heating systems, infra-red radiant heaters only heat the people in the room. Older versions have often been criticised for heating heads whilst leaving the floor area cold however there are many new improved radiant heaters now available. Radiant heaters, in this location, can provide heating more efficiently than other options and will focus heating exactly where you want it. The following Myth Buster link on radiant heating provides useful background information: <https://www.zehnder.co.uk/service/blog/9-Mythbusters-Radiant-Ceiling-Panels>

Specialist companies include:

1) Herschel Advantage IR360 £575: <https://www.herschel-infrared.co.uk/product/advantage-ir-360/>



Ceiling-mounted unit designed for spaces with adequate clearance from the ground (2.3 – 2.5m) and from the ceiling above (minimum 0.3m) and from the nearest wall (1.5m).

Can be purchased with Herschel iQ Single Zone heater control pack with temperature control to maintain a set temperature without overheating and a 1 hour boost function (£69).

2) EcoStrad Thermostrip Infrared Heater with timer control £300:

<https://www.infraredheatersdirect.co.uk/ecostrad-thermostrip-infrared-heater-2400w/>

Actions

- Obtain quotes for radiant heaters.
- Ensure that the contractor visits the premises to correctly specify the size of the radiant heaters to heat the room where appropriate.
- When installing the new heaters ensure the following:
 - The heaters are purchased with a no-quibble returns policy.
 - The heaters are fully guaranteed with a service agreement in place (preferably built into the cost) for a number of years.
 - Included in the installation is a training session on how to operate the heaters for optimal energy efficiency.
 - Simple operating instructions are attached to the heater for staff members.

Costs and savings

Cost are based on 2 x 2.4 kW heaters costing approximately £300 each plus £400 installation cost. There will be no savings as this is supplementary heating, though comfort will be increased.

ENERGY SAVINGS RECOMMENDATIONS

Provide signage		
Energy saving (kWh)	Cost saving (£)	Cost of action (£)
958	110	0
<p>Ensuring that appliances and equipment are turned off when not needed either during the day or at night will reduce energy use.</p> <p>We recommend providing clear signage beside the appliances and equipment will encourage users to turn items off when not needed. A useful link is here: https://www.carbontrust.com/resources/guides/energy-efficiency/posters-and-stickers-for-employee-awareness/</p>		
<p>Actions</p> <ul style="list-style-type: none"> • Identify lights, heaters, office equipment, etc. that regularly are left on when not needed, wasting energy. This may range from heaters and lights left on when no-one is using the room to a coffee machine regularly left on overnight. • Write simple signage to identify when these items can be turned off. E.g. 'last out of the office please check the photocopier, coffee machine and all lights are turned off'. • Change the signage regularly to keep the message fresh. Visuals are often more eye catching than only words. • Provide signage on how to operate the night storage and convector heaters in both the offices and the warehouse so that several people have this knowledge. 		
<p>Costs and savings</p> <p>There is no cost to this action. Savings estimated at 1% of total electricity use.</p>		

ENERGY SAVINGS RECOMMENDATIONS

Consider alternative cooling		
Energy saving (kWh)	Cost saving (£)	Cost of action (£)
0	0	Unknown
<p>Heat is generated in the work area through the equipment used and the staff get particularly hot in summer as they have to wear protective clothing due to the nature of the work. There are no vents or windows in the roof so heat remains trapped in hot weather, raising the need for mechanical ventilation or air conditioning for the warehouse.</p> <p>If roof skylights could be opened night purging of hot air would be possible, however this is not the case.</p> <p>There are some other options that can be considered by engaging contractors. These broadly include mechanical ventilation or evaporative cooling:</p> <p>Mechanical ventilation would ideally require extraction through the upper wall or roof where hot air accumulates in the summer. We recommend discussing this option with one or more companies to get an idea of costs and effectiveness. One issue of concern would be ensuring the extraction point has an insulated cover to help retain warmth in colder weather.</p> <p>Evaporative cooling can be added to an air circulation system by passing air over a source of moisture to reduce its temperature. While this system may cost a similar amount to install as air conditioning, it may have lower running costs over time. We recommend considering this solution if ventilation alone cannot help manage summer time overheating. Some information can be found here:</p> <p>http://www.ecocooling.co.uk/ http://www.encon-air.co.uk/evaporative-cooling/ https://www.aircon247.com/c/185613/1/evaporative-air-coolers.html</p>		
<p>Actions</p> <ul style="list-style-type: none"> Engage suppliers about adding ventilation to use for the occasional hot week in summer. Alternatively consider speaking with evaporative cooling suppliers to see if a solution is viable. Carefully consider the installation and running costs of a solution with the limits of the building. 		
<p>Costs and savings</p> <p>This action will not lead to saved energy, though it will improve staff comfort. Costs are unknown at this time.</p>		

ENERGY SAVINGS RECOMMENDATIONS

Consider adding solar PV panels		
Energy saving (kWh)	Cost saving (£)	Cost of action (£)
24,340	2,799	37,000
<p>Your flat roof could potentially be used to site solar PV panels to provide electricity for your business. By using the sun's energy to provide electricity you will reduce the amount of power you draw from the grid and therefore save money on your energy bills. Additionally, although at lower levels than in previous years, there is still a Government subsidy for solar PV that pays both for every kW of power generated and for the electricity exported back to the grid when it cannot be used on site.</p> <p>Solar power benefits the environment as it reduces the country's dependence on fossil fuels and, once fitted, the panels emit no pollution. We recommend considering the purchase of solar PV panels or consider entering a partnership to benefit from panels without direct investment.</p> <p>Useful information is at these links: http://lowcarbonhub.org/ - Low Carbon Hub. http://www.r-eco.coop/ - Oxfordshire solar installer and worker cooperative.</p> <p>There are also a large number of commercial companies that can quote for PV installation.</p>		
<p>Actions</p> <ul style="list-style-type: none"> • Solar panels will need to be installed by a specialist company who will both price up a system and assess the practicality of PV panels on your roof, e.g. will your flat roof would bear the weight? Will summer tree cover block out the sun on the panels? • Contact three solar panel contractors to obtain quotes. • Note, that if others are investing in the solar panels, the benefits to your organisation needs to be agreed in advance. 		
<p>Costs and savings</p> <p>Roof areas estimated at 20m x 10m - panel calculations from Solar Guide. https://www.solarguide.co.uk/solar-pv-calculator/6e8456c7-1be1-11e8-b496-06e895701c1e?show-assumptions=0#result</p> <p>The calculations use the current subsidies for this size of solar array. Accurate costing will be provided by the contracting companies.</p> <p>There may be an opportunity for the Low Carbon Hub to install solar panels on your roof at no charge. In this case part of the savings in electricity, along with the Government subsidy, is used to re-pay investors and invest in the local community.</p> <p>If the Feed in Tariff (FIT) is claimed you will not be able to apply for a grant for this action through OxFutures as this is considered double counting of subsidies. Loss of income from not receiving FITs would be approximately £900 per year for 20 years.</p>		

FURTHER RESOURCES

Funding

Possible sources of funding for the recommendations 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>