



Energy Saving Recommendations Report

for

Chapman Robinson & Moore Accountants

March 2018

Survey of CRM Offices



European Union

**European Regional
Development Fund**



Bioregional



ORGANISATION OVERVIEW

Report overview

EiE carried out a site visit and met with Mike Foster. 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	Chapman Robinson & Moore Accountants	30 Bankside Stationfields Kidlington OX5 1JE
Contact name	Mike Foster	mike@crmoxford.co.uk 01865 379 272
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 _{2e} / yr)
Replace hot water heaters	1,094	112	400	3.26	0.45
Upgrade lighting to LEDs	6,989	715	2,400	3.36	2.88
Install light level sensors	203	21	200	9.52	0.09
Repair or replace double glazing	0	0	200	n/a	0.00
Add draught proofing to external doors	0	0	20	n/a	0.00
Take and submit meter readings	0	0	0	n/a	0.00
Introduce an employee engagement energy saving programme	1,714	141	0	0.71	0.71
Consider air-source heating	Not known	Not known	Not known	Not known	Not known
Consider adding solar thermal panels	9,062	927	13,000	14.02	3.73
TOTAL	19,062 kWh/yr	£1,916/yr	£16,220		7.86 tCO_{2e} / yr

Site details

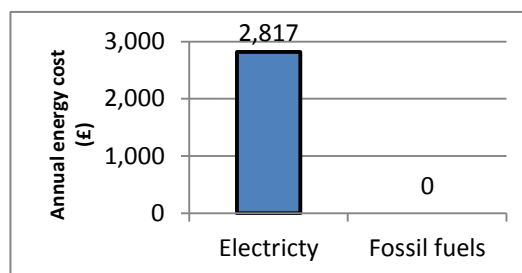
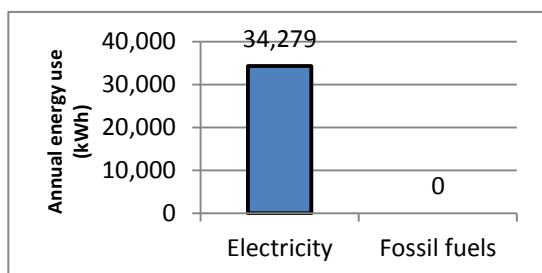
The CRM office building consists of two units (Units 29 and 30) in a small business park and was built in 1990. It has 2 floors of offices, some of which are sub-let, and a storage space for documents. The building is largely heated by electric night storage heaters.

ENERGY PROFILE

Energy consumption annual profile

Fuel type	Annual Energy use (kWh)	Cost per kWh (p)	Climate change levy (p/kWh)	Approx. annual cost (£)
Electricity	11,297	Day rate 10.23	0.559	1,156
	22,982	Night rate 7.23		1,661

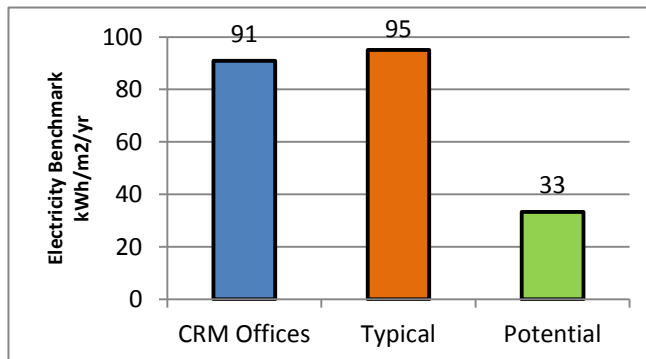
Energy profile breakdown for CRM Offices consumption (left) and costs (right)



Consumption is based on figures provided from 14/11/16 to 14/12/17.

Energy benchmarking

Consumption benchmarks by fuel type



Benchmarks are calculated using data provided and compared to CIBSE figures for the building category "General Office".

ENERGY SAVINGS RECOMMENDATIONS

Replace hot water heaters

Energy saving (kWh)	Cost saving (£)	Cost of action (£)
1,094	112	400



Hot water for both kitchenettes and the toilets is provided by two water heaters that probably date back to when the building opened in 1990. They are both approximately 25 litres, rated at 3kW each and, due to their age, are unlikely to be well insulated. They do not have any user controlled temperature setting and the heater supplying hot water to the kitchenette in Unit 29 runs very hot.

You can save energy and reduce the chance of scalding by replacing these 2 large hot water heaters with more efficient, well

insulated, smaller units. 15 litre heaters is estimated to be large enough for your needs as they re-heat quickly. An example of a 15 litre tank can be found here: <https://electricaldealsdirect.co.uk/water-heating/ariston-water-heaters.html>. This example is an over-sink heater however if space allows you may consider an under-sink model in the kitchenette instead.

Additionally, when replacing the heaters, take the opportunity to add timers that will enable the heaters to easily be switched off overnight and at weekends.

Actions

- Obtain a quote from your electrician to replace water heaters with well insulated heaters with timers.
- Once new heaters are installed, set the hot water temperature to 60°C.
- Set the timers to turn the heaters on 30 minutes before the building is occupied and to turn off when all staff leave the building.

Costs and savings

Costs are based on 2 x 15 litre water heaters (£120 each) as described above plus timers and half day installation cost. Savings are estimated at 1,094kWh a year based on more efficient heaters with timers.

ENERGY SAVINGS RECOMMENDATIONS

Upgrade lighting to LEDs			
Energy saving (kWh)	Cost saving (£)	Cost of action (£)	
6,989	715	2,400	
Lights currently installed in the building are as follows:			
	Current light	Replacement LED	Savings per year (based on 50 hours per week and 52 weeks a year)
Main Offices	Double 6ft 70W tubes = 140W Approximately 18 fittings in the building	LED light panels 600mm x 1200mm = 60W £70 each Cost = £1,260	3,744 kWh x 10.23p/kWh Savings / yr = £383
Reception, store and A1 group	Ceiling panels 4 x 2ft T8 tubes = 144W Approximately 12 fittings in the building	LED light panels 600mm x 600mm = 40W £25 each Cost = £300	3,245 kWh x 10.23p/kWh Savings / yr = £332
		Cost of lights £1,560	Savings per year £715
<p>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. Example LEDs can be found here:</p> <p>https://www.tlc-direct.co.uk, http://www.lightingsupermarket.com, https://www.ledhut.co.uk/</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>			
Actions			
<ul style="list-style-type: none"> Obtain quotes from 3 lighting suppliers for replacement of all non LED lights. Choose a supplier and arrange for new LEDs to be installed. 			
Costs and savings			
<p>Costs are based on £1,560 for lighting plus additional wiring needs and 2 days of labour @£500 = £2,400. Savings are based on the calculations in the above table.</p>			

ENERGY SAVINGS RECOMMENDATIONS

Install light level sensors		
Energy saving (kWh)	Cost saving (£)	Cost of action (£)
203	21	200
<p>Lights are left on in parts of the building where daylight is sufficient to light the space. The lights are rarely turned off by users in such circumstances. When you undertake a lighting upgrade project, this is the ideal time to add daylight sensors.</p> <p>Daylight or light level sensors automatically dim down or turn off the lights in a space when enough natural light is detected. A correctly installed daylight sensor can reduce energy use by up to 60% while ensuring that occupants have the right amount of light for their tasks.</p> <p>We recommend sensors that dim the lights rather than a simple on/off system as sensor are more user friendly.</p> <p>A helpful guide to Daylight sensor design and placement is at this link: http://www.lutron.com/TechnicalDocumentLibrary/3683587_Daylight_Sensor_Design_and_App_Guide_sg.pdf</p>		
<p>Actions</p> <ul style="list-style-type: none">• Identify areas of the building receiving sufficient natural daylight and where lights are left on.• When new lighting is installed request that it is controlled with daylight sensors in these areas.		
<p>Costs and savings</p> <p>Costs are based on 8 sensors @£25 per each. No installation costs are included as it is assumed that these would be fitted alongside new LED lighting. Savings use the figures in the previous recommendation and assume that 25% of the office lights could be off 20% of the time.</p>		

ENERGY SAVINGS RECOMMENDATIONS

Repair or replace double glazing

Energy saving (kWh)

0

Cost saving (£)

0

Cost of action (£)

0



The double glazed windows in reception are showing signs of wear and tear with evidence of condensation appearing between the panes of glass. This is known as 'blown' double glazing.

Some of the other double glazed windows, particularly upstairs in No 29, are in a poor state of repair with a resulting draught coming in.

Having the double glazing repaired or replaced will improve the insulation properties of the windows.

It may be possible to remove the condensation from the windows in reception and repair them, or the glass may need to be replaced without replacing the frames, which appear to be still in good condition. One local glazier who may carry out this work is Corin Mills of Witney (corin@millsweb.org 01993 704 476). Another option for a comparative quote is BS Glass based in Headington. See <http://bs-glassoxford.co.uk/glazing-and-window-repairs-oxford>

For the poorly fitting double glazed windows a schedule of replacement should be planned, prioritizing those windows that are causing the greatest discomfort due to draughts. When scheduling new double glazed units look for a FENSA (the Glass and Glazing Federation's certification scheme) accredited installer (<http://www.fensa.co.uk/>) that will give you confidence in the product. Among other benefits FENSA will issue a certificate which gives you warranty covering the cost of completing rectification work in respect of defects for a period of ten years.

Actions

- Draw up a list of priority windows where draughts are causing discomfort.
- Contact glaziers to obtain quotes for repairing the 'blown' double glazing and replacing the priority double glazed units.
- Choose a supplier and arrange for the work to be carried out.

Costs and savings

The cost of repair will vary depending on the number and current condition of the windows. The cost of new double glazed units is around £250/m².

Savings are negligible but this action will reduce discomfort from draughts in winter months, improve the working environment and, in the case of the blown windows, improve aesthetics.

ENERGY SAVINGS RECOMMENDATIONS

Add draught proofing to external doors

Energy saving (kWh)

0

Cost saving (£)

0

Cost of action (£)

0



There is a draught from a gap in your front entrance door. Additionally, although it has an automatic door closing device, it does not fully close.

Heat will escape in winter through any gaps around the door; draught proofing will greatly reduce this.

An example of draught stripping can be found online here:

<http://www.screwfix.com/p/stormguard-door-window-strips-brown-1-05m-5-pack/35308>

We recommend adding draught proofing to the door and repairing the closer.

Actions

- Add draught stripping to the door or door frame. If draught stripping is not suitable to attach (e.g. if the gap is not uniform), consider engaging a contractor to suggest improvements to the door frame.
- Ask a handyman to adjust the door closer when they are on-site anyway so that the door fully closes.

Costs and savings

Costs for a 2 packs of 5 x 1m heavy duty around-door strips are approximately £20. Savings are negligible but this action will help reduce discomfort in winter months.

ENERGY SAVINGS RECOMMENDATIONS

Take and submit meter readings		
Energy saving (kWh)	Cost saving (£)	Cost of action (£)
0	0	0
<p>Some of your electricity bills are based on estimated readings. By recording and submitting energy meter readings to your suppliers regularly and accurately, energy management, as well as monitoring bills, will be easier. This will be particularly useful to monitor the success of changes you make to lighting and hot water.</p> <p>We recommend recording a meter reading once a month and submitting them to your energy supplier.</p>		
<p>Actions</p> <ul style="list-style-type: none">• Arrange to record actual meter reading on the same day once per month. Enter these into a spread-sheet and calculate usage.• Submit meter reading to your energy supplier prior to invoicing (the timing of this is based on your bills). Depending on your supplier, readings can be submitted via website, email, or by telephone.• Use this information to form a baseline for your consumption so that the effect of energy improvement measures can be assessed.• When you have a year of readings, review information to ensure action is taken on noticeable increases in energy use.		
<p>Costs and savings</p> <p>There is no cost to this action. Staff time to collect and submit data will vary depending on the number of meters and method of collection.</p>		

ENERGY SAVINGS RECOMMENDATIONS

Introduce an employee engagement energy saving programme		
Energy saving (kWh)	Cost saving (£)	Cost of action (£)
1,714	141	0
<p>There is limited awareness of energy saving among your workforce. The period immediately following a time when changes have been made to improve energy efficiency, e.g. changing your lighting, resetting your storage heaters, or adding insulation, is the ideal time to start an employee engagement programme.</p> <p>Employee engagement in resource efficiency and carbon reduction can help change behaviour in the workplace. A well implemented employee engagement scheme can lead to energy savings of approximately 5-10% at work through reducing unnecessary energy consumption. It can also act as a catalyst for more effective employee communications. Additionally it can lead to improved environmental behaviour of staff in their home.</p> <p>Useful links are here: https://www.carbontrust.com/resources/guides/energy-efficiency/creating-an-awareness-campaign-download/ http://www.energylens.com/articles/energy-awareness http://www.ecomonitor.com/12-energy-saving-tips-for-your-workplace/</p>		
<p>Actions</p> <ul style="list-style-type: none"> • Form an eco-team of employees from a variety of departments and roles within the business. • Agree the initial focus of an energy saving campaign, e.g. turning lights off, reporting heating faults, closing windows in winter. • Agree the best way to communicate with staff, e.g. e-mail, posters, staff newsletter, department meetings. • Engage senior management in the programme. 		
<p>Costs and savings</p> <p>There is no cost to this action. Savings are estimated at 5% of total energy bill as a result of improved energy management through employee participation.</p>		

ENERGY SAVINGS RECOMMENDATIONS

Consider air-source heating		
Energy saving (kWh)	Cost saving (£)	Cost of action (£)
Not known	Not known	Not known
<p>The current night storage heating system was probably installed when the building was first occupied in 1990. You are considering alternative ways to heat the building and the premises are not connected to the gas network. You are also considering ways to supplement your current heating in the upstairs offices of number 29 which appears to be underspecified.</p> <p>An air-source heating system provides the opportunity to heat using a renewable resource of energy whilst reducing your energy bills. An air source heat pump (ASHP), placed outside at the side or back of the property would use a heat pump to boost heat from the air and transfer this to a heating system, reducing overall energy used.</p> <p>An air-to-air ASHP would be compatible with warm air convectors and convert outside air to warm fan blown air to heat the building. Two of the larger heating manufacturers that have moved into the air-to-air solutions market are Daiken Sky Air and Worcester Green Source.</p> <p>Air-to-air ASHPs normally deliver hot air via cassettes in the ceiling or hot air blowers which could be placed above the bookshelves. For further reading go to:</p> <p>https://www.carbontrust.com/media/147466/j8058_ctl151_how_to_implement_guide_on_air_source_heat_pumps_aw.pdf http://www.which.co.uk/energy/creating-an-energy-saving-home/guides/air-source-heat-pumps-explained https://www.carbontrust.com/resources/green-business-directory https://www.ofgem.gov.uk/environmental-programmes/non-domestic-rhi</p> <p>ASHPs are powered by electricity, pumping fluid in the outside loop, so there will still be running costs. Every unit of electricity used by the pump produces two to three units of heat making this an efficient way to heat a building. If coupled with solar technology producing electricity to power the pumps, this technology could provide background heating at very low running costs.</p> <p>Peter Cox, based near Bicester, has recently added an air source heating unit to his office. He would be happy to answer questions on price and performance. His e-mail is: pacox@grangemews.co.uk</p>		
<p>Actions</p> <ul style="list-style-type: none"> • Review the links (ABOVE) to find out more information about options for air source heat pumps. • Request a visit from at least 2 competent 'tech agnostic' heating companies (who are open to possibilities) for a definitive solution. A local company that may be able to help is Aldens based in Kidlington. http://www.aldenltd.co.uk. • Look on the Carbon Trust business directory (see links above) to identify other local ASHP experts. 		
<p>Costs and savings</p> <p>Cost and savings are dependent on the system chosen.</p>		

ENERGY SAVINGS RECOMMENDATIONS

Consider adding solar PV panels		
Energy saving (kWh)	Cost saving (£)	Cost of action (£)
9062	927	13,000
<p>Your south-east facing 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. Solar power benefits the environment as it reduces the country's dependence on fossil fuels and, once fitted, the panels emit no pollution.</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 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. For ever kW of electricity generated by the solar panels that you use on site you would pay a discounted rate.</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 roof bear the weight? Will summer tree cover block out the sun on the panels? • Contact three solar panel contractors to obtain quotes. 		
<p>Costs and savings</p> <p>Roof areas are estimated at 16m x 4m. Panel calculations are from: https://www.solarguide.co.uk/solar-pv-calculator/94506758-260b-11e8-b496-06e895701c1e?show-assumptions=0#results. The calculations use the current subsidies for this size of solar array. More accurate costing will be provided by the contracting companies.</p>		

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/>