YOUR DECARBONISATION REPORT

Beam Ltd.

Prepared By: Adrian Pike
For the attention of: Terry Barnaby
26 August 2021

lccf@westofengland-ca.gov.uk
0117 332 1520

European Union
European Regional Development Fund

European Union
European Regional Development Fund

WEST OF ENGLAND Combined Authority

BACKGROUND

This free report has been produced by the West of England Combined Authority as part of the West of England Green Business Grant scheme, which is funded by the European Regional Development Fund (ERDF) and the West of England Recovery Fund. Following a survey of your business on 22nd July 2021, this report estimates your current carbon emissions and identifies steps you could take to decarbonise.

We have used information gained during the survey, as part of your Organisation Application and any subsequent information requests to produce this report. If further investigation or historical information is required then this is highlighted as appropriate. The improvements that make the most impact are shown first; however, we do not recommend any particular options, nor do we guarantee that measures will achieve the savings calculated and stated in this report.

Carbon emissions are calculated using the UK Government greenhouse gas reporting conversion factors 2017 for CO_2 equivalent (CO_2e), and include both direct (scope 1 and 2) and indirect (scope 3) emissions relating to the production and consumption of energy in the UK. Energy costs are calculated using the UK Government energy and emissions projections 2018, using 2020 retail prices. This report does not set out the planning consent or building regulations that may be required for these works.

If you would like any further information or clarification please feel free to contact the West of England Combined Authority on 0117 332 1520 or email LCCF@westofengland-ca.gov.uk.

Why are Decarbonisation, Energy Efficiency and Resource Efficiency Important?

The West of England Combined Authority declared a climate emergency in July 2019, alongside our local authority partners. We have committed to carbon neutrality by 2030, contributing towards maintaining global warming at less than 1.5°C above pre-industrial levels.

We are ambitious in supporting a green recovery from COVID-19, building on the positive behaviour changes brought about by the pandemic to help businesses to transition to low carbon approaches, as well as create new businesses and jobs.

Commercial electricity costs are forecast to increase by 14% over the next 15 years, therefore improving energy efficiency and investing in onsite renewable generation could reduce the impact of rising energy bills on your business overheads and bottom line.

The low carbon economy is predicted to grow by 11% per year up to 2030, creating around one million jobs nationally. This could represent 35,000 new jobs in the West of England by 2030, and 65,000 by 2050.

The water industry accounts for 1% of total UK greenhouse gas emissions. Using and wasting less hot and cold water through more efficient fittings can cut emissions, decarbonise the economy and support the creation of new technologies.

Approximately 80% of environmental impacts are determined at the design stage of a new product. By viewing waste as a design flaw and opting for circular practices we could significantly reduce waste and waste processing, and avoid the sourcing of unused, raw materials.

ABOUT YOUR BUSINESS

Northavon Business Centre, Dean Road, Yate, South Gloucestershire, BS37 5NH

Based in Yate, your business is an electronics and software engineering company, designing bespoke electronics and software for various clients in the UK and overseas. Your business occupies the upper floor of your premises and you sub-let the rooms on the ground floor to two other businesses.

Your premises were built in the 1970s and consist of cavity walls with bricks on the outside and thermalite blocks on the inside. A dormer was also added to your unit during the 1970s. The pitched roof has corrugated metal sheeting with 75mm rockwool insulation, and the windows (installed in 1975) are a mix of single glazed and double glazed with softwood frames.

Heating is provided by night storage heaters and electric oil filled heaters and there is a hot water boiler in the kitchen on a timer. You use natural ventilation i.e. open windows and fans, but upstairs it can overheat in the summer, and the building struggles to maintain warmth in the winter.

Lighting is mainly provided by fluorescent tubes, but there are also some LED light fittings.

Your IT equipment includes 3 servers, 5 routers, 4 computers with double monitors, oscilloscopes, signal generator and a high voltage measurement system.

You generate little waste and there are recycling boxes on site for paper, cardboard and plastic.

You have 3 members of staff who commute to work by car or bicycle.

Beam Ltd., Northavon Business Centre, Dean Road, Yate, BS37 5NH (Google Street View)

Your Recent Decarbonisation Activities

- You have invested in low energy servers.
- You have some energy efficient LED lighting.

DECARBONISATION STEPS TO SUCCESS

STEP 1 MONITOR	You can only manage what you measure, so keeping an eye on your utility bills is a good way to start your journey to decarbonisation. If you notice any increases or decreases in utility consumption or waste generation, take a moment to consider what might have caused it. It could be justified, or it could require further investigation and action.
STEP 2 REDUCE	Often the most cost-effective way of reducing carbon emissions is to cut down your consumption through energy and water efficiency improvements, reviewing business processes and manufacturing practices, and encouraging changes in staff behaviour.
STEP 3 REPLACE	If you can't do any more to reduce your consumption, you could identify where you can switch from unsustainable products to sustainable equivalents. This includes installing renewable energy generation on site, switching to sustainable transport options and sourcing recycled and more environmentally friendly materials.
STEP 4 OFFSET	If you believe you've exhausted all other avenues, you could offset your emissions through external means such as tree planting programmes. Some energy suppliers offer specific tariffs that include carbon emission offset costs.

YOUR ANNUAL CARBON EMISSIONS

The table below summarises your annual utility consumption and associated carbon emissions. This is based on information that you provided before the site visit, which has been extrapolated to provide an estimate of annual consumption, carbon emissions and cost. The site is served by electricity only:

Utility	Annual Consumption	Annual CO_2e Emissions	Annual Cost
Electricity - Day	5,007 kWh	2.2 tCO_2e	£696
Electricity - Night	4,876 kWh	2.2 tCO_2e	£678
Total	**9,883 kWh**	**4.4 tCO_2e**	**£1,374**

YOUR CARBON REDUCTION OPTIONS

Based on our survey and the information you have provided, we have identified the following potential ways in which you could save energy and carbon in your business, which are sorted in order of the greatest carbon impact:

Recommendation	Estimated Annual Consumption Saving	Estimated Annual CO_2e Saving	Estimated Annual Cost Saving
Solar Photovoltaic Panels	8,540 kWh (86%)	3.8 tCO_2e	£1,187
Air to Air Heat Pump	3,294 kWh (33%)	1.5 tCO_2e	£458
LED Lighting	2,176 kWh (22%)	1.0 tCO_2e	£302
Ceiling Insulation	1,477 kWh (15%)	0.7 tCO_2e	£205
Double Glazing	660 kWh (7%)	0.3 tCO_2e	£92

Solar Photovoltaic Panels

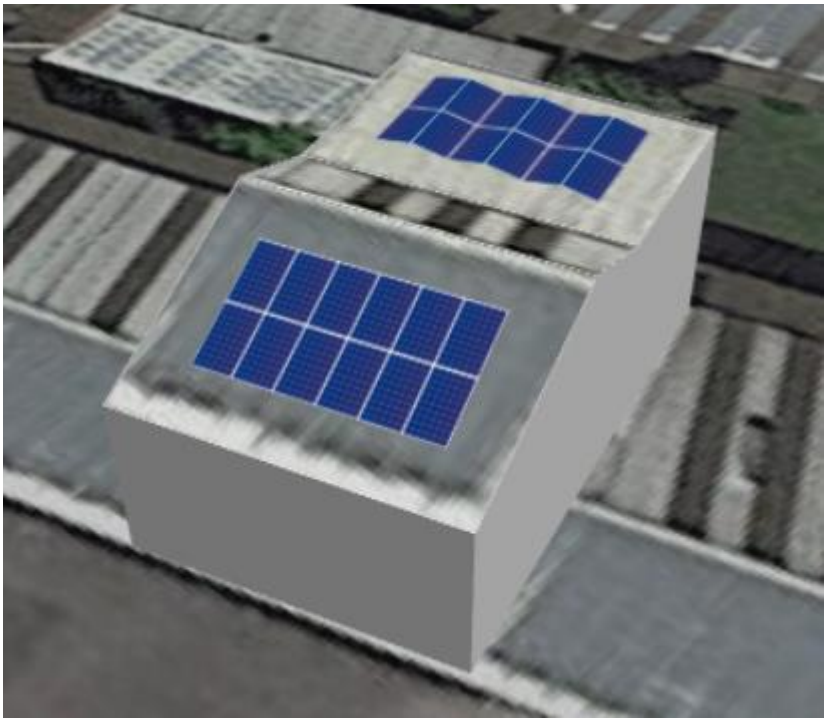
During the survey we identified that the roof of your business has the potential for solar panels to be installed. Solar photovoltaic (PV) panels capture sunlight and convert it to electricity which you can use in your business or export to the national grid. This can offset part of your electricity bill and reduce the carbon emissions of your electricity consumption.

Your electricity consumption is low, and we have identified ways that it could be reduced further. Solar panels provide the best return on investment if the system is matched to your electricity demand. Therefore, we estimate that an array of around 9.0kWp capacity would be suitable for your needs.

You have a 3-phase electricity supply to your business, therefore you could install 10.8kWp of solar panels with minimal permissions from the distribution network operator. You would need to obtain permission from your landlord to install PV panels on your roof, but since another business in your building complex has already installed solar PV, this could be a possibility.

The Feed-in-Tariff subsidy for renewable energy installations such as PV was closed to new applications in March 2019. The Smart Export Guarantee (SEG), which provides a payment from energy companies for any PV electricity you export to the grid, is now available to apply for. For more information take a look at Ofgem's webpages on the SEG.

The energy and carbon savings are based on 9.0kWp of PV panels being installed on your south facing roof and flat roof, with the latter as an east/west array. European data on levels of sunlight in your location have used. Energy and carbon savings assume that 100% of the electricity generated is used on site. You would need to obtain a detailed quote from a solar PV installer if you wanted to get a more accurate understanding of what is possible.



Indication of solar panel placement on roof (SolarEdge)

Air to Air Heat Pump

Your building is currently heated by electric storage heaters and electric oil filled heaters, which are expensive to run. You could install a system that provides both heating and cooling, known as an air-to-air heat pump.

An air-to-air heat pump is an air conditioning system that is able to operate in reverse to provide both heating and cooling to a space. They produce heat by extracting heat energy from the air outside and compressing it to a usable temperature. Heating and cooling are provided from fan-coil units that could be mounted on the wall, while the outdoor unit could be mounted on the ground or an external wall. An air-conditioning installer would be able to advise you on what is possible in your building and quote for the works.

Their efficiency varies throughout the year depending on the weather, however they can achieve heating efficiencies of up to 400% (1 unit of electricity produces 4 units of heat) because they are using freely available renewable heat energy from outside. Conversely, electric heaters provide heat at a maximum 100% efficiency.

You told us that you sometimes experience overheating in your premises. While air conditioning could reduce this on its own, you could end up using more electricity as a result. We recommend you consider increasing your roof insulation and maximising crossflow ventilation first, before relying on air conditioning and additional energy use to maintain a comfortable temperature.

The energy and carbon savings calculated are based on replacing your electric heaters with an air-to-air heat pump at an average 300% efficiency, taking into account the additional use of electricity for cooling in the summer. If you install solar panels as well, your system could be partially powered by solar electricity, reducing your energy costs and carbon emissions further.

LED Lighting

The lighting in your business is made up of T8 fluorescent tubes.

Equivalent LED fittings are available that are likely to reduce your lighting energy consumption by around 60%. Furthermore, your maintenance and replacement costs are reduced as LED lights tend to last around 50,000 hours, compared to 15,000 hours for fluorescent.

The energy and carbon savings calculated are based on replacing 36 fluorescent tubes with equivalent LED fittings. You would need to arrange a survey with a lighting contractor to obtain a detailed quote for LED lighting appropriate to your business' needs.

For more information, take a look at the Energy Saving Trust's guide on lighting: The Right Light.

Ceiling Insulation

Your roof is metal with a moderate amount of insulation (75mm rockwool). You could improve the heat retention of your premises by installing insulation on top of your false ceiling. This could either be laid on top of the existing ceiling tiles or be incorporated into new insulated ceiling tiles if the existing ones are in poor condition. Roof insulation not only helps to keep heat in when it is cold outside, but also helps to keep heat out during the summer.

Loft and roof insulation can often be bought in rolls and laid between joists or false ceiling wires by an insulation installer at relatively low cost. It is recommended to have at least 300mm of loft insulation in place to minimise heat loss, though an installer would be able to advise what is possible in your premises.

The energy and carbon savings calculated are based on adding 300mm insulation above the false ceiling with a 70% reduction in heat loss.

Double Glazing

Your premises has two single glazed windows which are likely to be losing heat and increasing electricity consumption. Replacing the windows with double glazing could reduce their heat loss by around 60%.

The energy and carbon savings calculated are based on replacing 6m^2 of single glazed windows with double glazing, with a 60% reduction in heat loss.

FURTHER INFORMATION

For more information regarding the energy reduction measures mentioned in this report as well as further advice on energy efficiency, the below organisations can provide guidance as well as potential suppliers and installers.

Carbon Trust - Advice and guidance on energy efficiency and sustainability - https://www.carbontrust.com/

Chartered Institute of Building Services Engineers (CIBSE) - Knowledge and supplier directory of building services - https://www.cibse.org/

CIGA - Cavity Insulation Guarantee Agency including advice and installer directory - https://ciga.co.uk/

Energy Saving Trust - Advice and guidance on energy efficiency and sustainability - https://www.energysavingtrust.org.uk/

Energy Technology List – List of approved energy and water saving products that qualify for Enhanced Capital Allowances - https://www.gov.uk/guidance/energy-technology-list

FENSA - Approved installers of windows and doors - https://www.fensa.org.uk/

Gas Safe Register – Approved installers of gas appliances including boilers - https://www.gassaferegister.co.uk/

HETAS – Approved products and installers of solid fuel burners and boilers - https://www.hetas.co.uk/

Microgeneration Certification Scheme (MCS) - Approved products and installers of renewable energy - https://mcscertified.com/

Planning Portal – UK Government - https://www.planningportal.co.uk/

Smart Export Guarantee (Ofgem) – Scheme that pays small-scale low carbon generators such as Solar PV for electricity exported to the National Grid - https://www.ofgem.gov.uk/environmental-programmes/smart-export-guarantee-seg/about-smart-export-guarantee-seg

SWIGA - Solid Wall Insulation Guarantee Agency including advice and installer directory - http://www.swiga.co.uk/

Timber Standard for Heat and Electricity (UK Gov) – Quality and sustainability standards for wood fuel used in biomass technologies - https://www.gov.uk/government/publications/timber-standard-for-heat-electricity

Water Regulations Advisory Scheme (WRAS) - Approved plumbers and water products - https://www.wras.co.uk/

Western Power Distribution – Advice on connecting energy generation to the grid - https://www.westernpower.co.uk/connections-landing/connecting-generation-or-energy-storage

National and Local Sustainable Travel Grants –
https://travelwest.info/for-businesses/grants-funding
https://beta.bathnes.gov.uk/bath-clean-air-zone
https://www.goultralow.com/