YOUR DECARBONISATION REPORT

Example Business Ltd.

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European Union
European Regional Development Fund

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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 September 2020, 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.

Should you require any further information or clarification please feel free to contact WECA on 0117 3321520 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

Based in Bristol, your business is used as an example to demonstrate what a Decarbonisation Report from the West of England Combined Authority might look like. Your premises is believed to have been built in the 1980s, with cavity walls assumed, a pitched metal roof and single-glazed windows.

Heating is provided by a boiler and radiators' system. The boiler is aging and likely to be inefficient. Cooling is provided to offices on the upper mezzanine by 3 air-conditioning units. Time and temperature controls are installed for both systems, as well as thermostatic valves on the radiators. Hot water is provided by small electric under-sink heaters. Lighting is provided by a variety of fluorescent T8 fittings.

The building struggles to maintain comfortable room temperatures in the winter and summer. This is likely to be caused by a lack of insulation of the building fabric, in particular the metal roof which retains little heat in the winter and conducts heat in the summer. The roof is due to be replaced in the near future, however it is unclear whether this will also include insulation.

With no manufacturing and minimal storage facilities, waste and water consumption is limited to office and domestic activity. Site works are handled by subcontractors, so the business does not directly operate a vehicle fleet.

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.

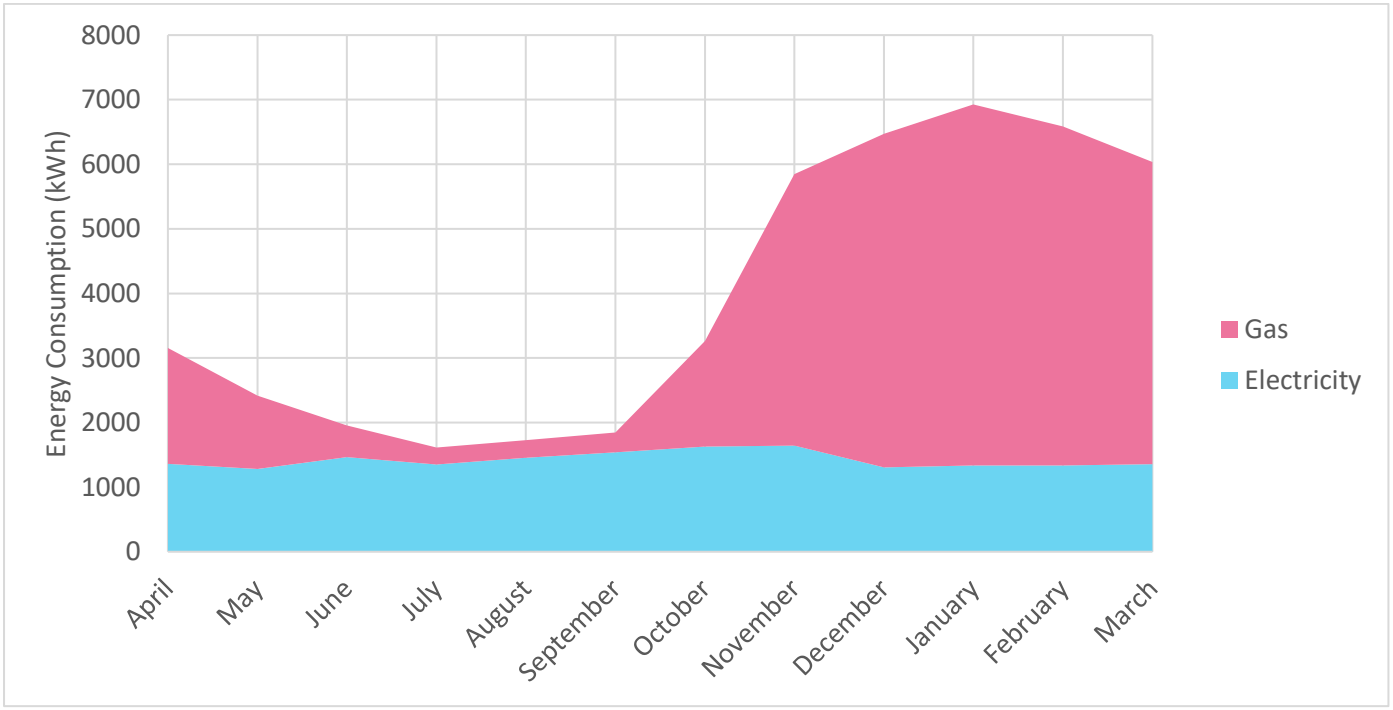
YOUR ANNUAL CARBON EMISSIONS

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

Utility	Annual Consumption	Annual CO_2e Emissions	Annual Cost
Electricity	16,973 kWh	7.6 tCO2e	£2,359
Gas	30,761 kWh	6.5 tCO2e	£892
Waste, Recycling	9 tonnes	0.2 tCO2e	
Waste, General	24 tonnes	0.5 tCO2e	
Travel, Car Mileage	5,588 miles	2.0 tCO2e	
Total		**45.1 tCO_2e**	

Monthly Energy Profile

Your monthly meter readings indicate a seasonal change in both your electricity and gas consumption. Electricity is slightly higher in the Summer, while gas is highest in the winter. This indicates that the main energy users in your business are heating and cooling.



Monthly electricity and gas consumption for Example Business

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	11,020 kWh (65%)	4.9 tCO_2e	£1,532
Air Source Heat Pump	23,713 kWh (50%)	3.4 tCO_2e	-£106
Roof Insulation	14,374 kWh (47%)	3.1 tCO_2e	£417
LED Lighting	2,800 kWh (17%)	1.2 tCO_2e	£389
Pipe Insulation	4,054 kWh (13%)	0.9 tCO_2e	£118
Double Glazing	3,870 kWh (13%)	0.8 tCO_2e	£112
Cavity Wall Insulation	1,659 kWh (5%)	0.4 tCO_2e	£48

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 10.8kWp capacity (30 panels) would be suitable for your needs. You have two electricity meters, so you may want to consider connecting part of the solar array to each meter or connecting most of your business to one meter to maximise the use of solar electricity.

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 10.8kWp of PV panels being installed on your south facing roof and using European data on levels of sunlight in your location. 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.

Roof Insulation

The roof of your business appears to be made of a single layer of metal with no insulation. You told us that you struggle to maintain a comfortable temperature in your premises during the winter and summer months. As metal is a heat conductor, your roof could be a major contributing factor to this issue meaning that you are wasting a significant amount of energy on heating and cooling during the year.

Applying insulation to the underside of the roof could significantly reduce heat loss during the winter and heat gain during the summer. You could cover and insulate over the existing rooflights to maximise the benefit or leave part or all of the rooflights clear if you find they currently provide a lot of natural light.

The energy and carbon savings calculated are based on insulating approximately 325m^2 of roof and reducing the heat loss by 75%.

Air Source Heat Pump

You have told us that your boiler is due to be replaced. While you could replace it with a new more efficient gas boiler, it might be possible to install an air source heat pump and remove gas heating from your business altogether.

Air source heat pumps produce heat by taking energy out of the air and compressing it to a high enough temperature to heat your premises. While gas-fired units exist, electric heat pumps are the most common technology. Their efficiency varies throughout the year, however they can achieve efficiencies of up to 350% (1 unit of electricity produces 3.5 units of heat) because they are using freely available renewable energy from outside. You can connect your existing pipes and radiators to a heat pump system, so you wouldn't need to change anything in your offices.

Heat pumps work best in insulated buildings, therefore for one to be potentially feasible in your premises you would need to insulate your roof as a minimum. A heat pump installer would be able to give you a better idea of what would be possible and the potential efficiencies you could achieve.

The energy and carbon savings calculated are based on replacing your gas boiler with an air source heat pump at an average 300% efficiency. As grid electricity is due to decarbonise in the future, your annual carbon saving compared to a gas boiler is likely to increase each year.

The cost of running a heat pump is likely to be slightly higher than your existing gas boiler because the national average unit price of electricity is over four times the unit price of gas. However, this could be offset by installing solar panels or implementing smarter heating controls to maximise your system's efficiency.

For more information and ideas on how to save energy with your heating system, see the Energy Saving Trust's webpages.

LED Lighting

The lighting in your business is predominantly made up of a variety of T8 fluorescent tube fittings.

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 20 fluorescent fittings with equivalent LEDs. You would need to arrange a survey with a lighting contractor to obtain a detailed quote for LED lighting appropriate to your business' needs.

Pipe Insulation

To maximise the efficiency of your heating system, you could ensure that all heating pipework around your boiler, hot water tank and to radiators is well insulated. Not only does this reduce gas consumption, but it also reduces the risk of overheating in areas where exposed pipes are located. Pipe insulation is a low-cost measure that can often be purchased from a DIY shop and installed yourself, however heating plumbers can also install it.

The energy and carbon savings calculated are based on insulating 20 metres of bare pipework around your boiler and the estimated reduction in heating and hot water energy consumption.

Double Glazing

The windows in your business are currently single glazed, meaning they are likely to lose a lot of heat in the winter months. New double glazing or secondary glazing could reduce heat loss through your windows by around 60% and improve comfort for staff, particularly on the north side of the building where you don't get any solar gain.

The energy and carbon savings calculated are based on replacing 50m^2 of single glazing with double glazing. It is likely that you would achieve a similar saving if the existing windows had secondary glazing professionally installed instead.

Cavity Wall Insulation

It is unclear whether the walls of your building have been insulated with cavity wall insulation, however based on there being no roof insulation it has been assumed that the walls are also uninsulated.

Cavity wall insulation could be installed by blowing wool or insulating beads into the empty cavity between the two layers of your external walls. This can reduce the heat loss through your walls by around 66%. The installation is often fast and can be carried out with minimal disruption.

The energy and carbon savings calculated are based on installing 50m^2 of cavity wall insulation to your external walls. You could achieve a similar saving by installing external wall insulation instead, if cavity wall insulation isn't feasible, however the capital cost for the installation would be significantly higher. You would need to speak to a specialist insulation contractor to understand what is possible and obtain a quote for the works.

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/