Energy Audit and Survey Report

Café Terrazzo, Unit C7, Kendal

Café Terrazzo

Version Control

Author	Reviewer	Date	Version
Matt Fulford	David Legge	19th March 2018	1.0

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1. Executive Summary

An energy survey of Café Terrazzo, Unit C7, Kendal was undertaken by Ultimate Utility Brokers Ltd to support the drive to reduce energy consumption across the organisation (Café Terrazzo). This energy audit has been prepared in line with BS EN 16247-1:2012 standards and while the report has not been specifically commissioned for the sole purpose of compliance with the Energy Savings Opportunities Scheme (ESOS), this audit report can be used and include in any ESOS Phase Two evidence pack.

The Café Terrazzo, Unit C7, Kendal is a retail unit within a shopping centre used as a cafe. It has space over two floors, ground floor with bar, café and kitchen and basement with WC's, staff facilities, store and office. There is both gas and electricity supplied to the site although the gas is used for catering use only.

Our key findings and recommendations have been summarised in the table below (sorted by payback) and are described within the body of this report. Ultimate Utility Brokers would be pleased to support the implementation of any or all of these measures.

Energy saving recommendation	Estimated Annual Energy Saving (kWh)	Estimated Annual Cost Saving (£)	% Energy Reduction	Estimated capital cost (£)	Simple Payback (years)	CO_2 savings (tCO_2e/yr)
Train catering staff on energy efficient catering practices	3,182	£404	2.90%	£400	0.99	1.31
Install SavaWatt devices on fridges and freezers	3,180	£404	2.90%	£980	2.43	1.31
Fit timed fused spurs to hot water heaters	324	£41	0.30%	£180	4.38	0.13
Install Cheetah kitchen hood extract controls	8,486	£1,077	7.73%	£5,000	4.64	3.50
Adjust settings on existing PIRs	606	£77	0.55%	£400	5.20	0.25
Change existing lighting for low energy lamps/fittings	3,220	£409	2.93%	£2,774	6.79	1.33

Based on current contracted prices of 12.69p/kWh for electricity.

If all measures were implemented this would save the organisation £2,411 per year. Assuming an average energy price inflation of 5% this would mean that over the next 20 years the value of implementing all these recommendations would be £78,164 (see section 6.2).

2. Introduction

This report is provided to Café Terrazzo to identify the energy saving opportunities available to the client.

Café Terrazzo consists of riverside ground floor restaurant/café with in an edge of town shopping centre in Kendal. The centre is a relatively modern construction (circa 10-20 years old). The organisation operates this café as well as an event catering business which operates from a separate site.

An energy survey of the Café Terrazzo, Unit C7, Kendal was completed on the 8th March 2018 by Matt Fulford. Matt is a highly experienced energy auditor with over 15 years' experience in sustainability and energy matters in the built environment. He is a chartered surveyor with RICS, a Certified Measurement and Verification Professional (CMVP) for energy savings measures and a CIBSE Low Carbon Energy Assessor. He has audited hundreds of buildings of varying types.

The unit has the restaurant for around 70 covers, bar and kitchen on the ground floor with toilers, office, store and staff facilities within the basement.

Building Ownership	Leased
Location	Town/City Centre
Gross Internal Floor Area	472 m^2
Listed Status	Unlisted
Sustainability Certification	None Known

The building is open and operated for the following times during the week

Sunday to Wednesday	9am to 5pm
Thursday to Saturday	9am to 9pm

There is ad hoc use outside of these time for private functions and the like. These additional hours have not been included in any savings calculations.

3. Energy Compliance Check

There are a number of energy related areas where organisations have a statutory duty to comply with various regulations. As part of this audit we have checked the compliance on a number of these areas as follows.

Compliance Area	When does it apply?	Does is apply to you?	Do you comply?	Potential enforcement penalties
Energy Saving Opportunities Scheme (ESOS)	To organisations with over 250 employees (PT or FT) or with over certain turnover and asset holding.	No	Not Applicable	A fine of up to £5,000 per day and £500 per working day until breach is remedied (to a max of £40,000)
Display Energy Certification	To buildings which are over 250m^2 and are occupied by a public authority and can be visited by the public.	No	Not Applicable	£500 fine for failing to display a DEC and £1,000 for failing to have a DEC/Advisory Report.
Air Conditioning Inspection (TM44)	To buildings where the total rated output of the air conditioning systems is over 12kW	Yes	No	Penalty for not having the required certificate is fixed at £300.
Heat Network Regulations	Buildings which have centralised heating, hot water and/or chilled water system serving more than one final customer	No	Not Applicable	A fine of up to £5,000 or criminal prosecution
Energy Performance Certificate (EPC) / Minimum Energy Efficiency Standards	An EPC is required on all new buildings and buildings when they are let or sold. From 1st April 2018 commercial property with an F or G rating cannot be let.	Yes	Yes – EPC D18	The maximum fine is 20% of the rateable value with minimum £10,000 and maximum of £150,000

From the review, it has been found that Café Terrazzo is currently non-compliant with the Air Conditioning Inspection requirement and it should discuss this with the landlord and take action to remedy this in order to avoid the potential penalties outlined. Ultimate Utility Brokers is able to provide compliance services to help you meet all your energy related statutory requirements.

Further information on these requirements is available on the following links.

Air Conditioning Inspections

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/51121/A_guide_to_air_conditioning_inspections_for_buildings.pdf

EPCs/MEES

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/401378/Non_Dom_PRS_Energy_Efficiency_Regulations_-_Gov_Response__FINAL_1_1__04_02_15_.pdf

4. Energy Usage Details

Café Terrazzo, Unit C7, Kendal uses 109,736 kWh/year of electricity, costing Café Terrazzo in the region of £14,000 per year. It also used gas for catering usage only but there is some uncertainty on the exact consumption levels from this.

This data has been taken from the half hour energy provided by the suppliers of the site. Café Terrazzo, Unit C7, Kendal has one main electricity meter, serial number K07M00586 with MPAN 1630000860028. There is one gas meter serving the site, serial number 69216358/2010.

Utility	Meter Serial	Type	Pulsed output	Location
Electricity	K07M00586	3 phase 200A	Yes	Shopping centre elec intake room
Gas	69216358/2010	Jeavons	Pulse block but no AMR	In back of kitchen behind access panel.

Half hour meter data has been provided for the purpose of this report and this has been used to verify the data. It is recommended that all the AMR metering is collected on a single web based portal such as Stark so that regular automated energy profiles can be easily produced and shared with the site team. UUB can arrange for this to be put in place.

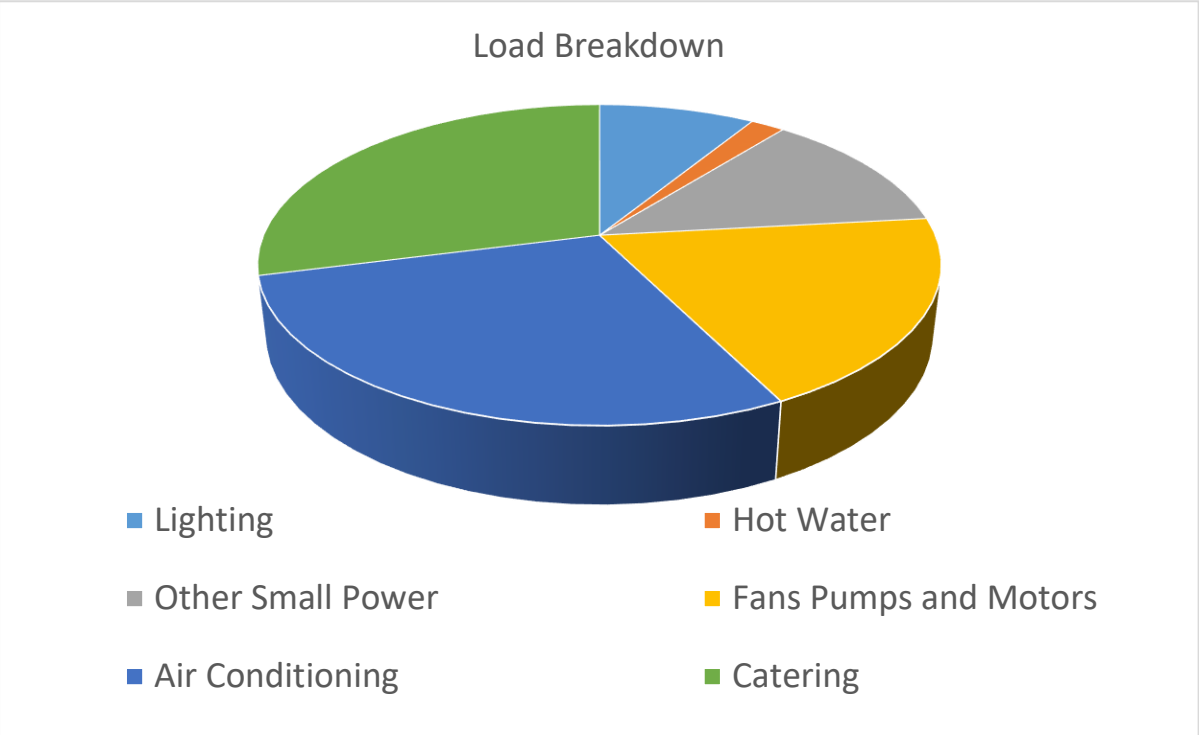
4.1 Energy Profiling

The main energy consuming plant can be summarised as follows:

Service	Description	Estimated Proportion of Usage
Lighting	LED downlights in restaurant and T5 fluorescent in basement. Some CFL downlighters and GU10 spots behind bar	9%
Hot Water	Electric point of use hot water units	2%
Other Small Power	Fridges, freezers, small kitchen appliances, tills, sound system, alarms and the like.	13%
Fans Pumps and Motors	Kitchen supply and extract canopy above cooking area	19%
Air Conditioning	Air conditioning units used to provide heating to the restaurant area	28%
Catering	Electricity used for major kitchen appliances, mainly electric oven	29%

4.3 Significant Energy Loads

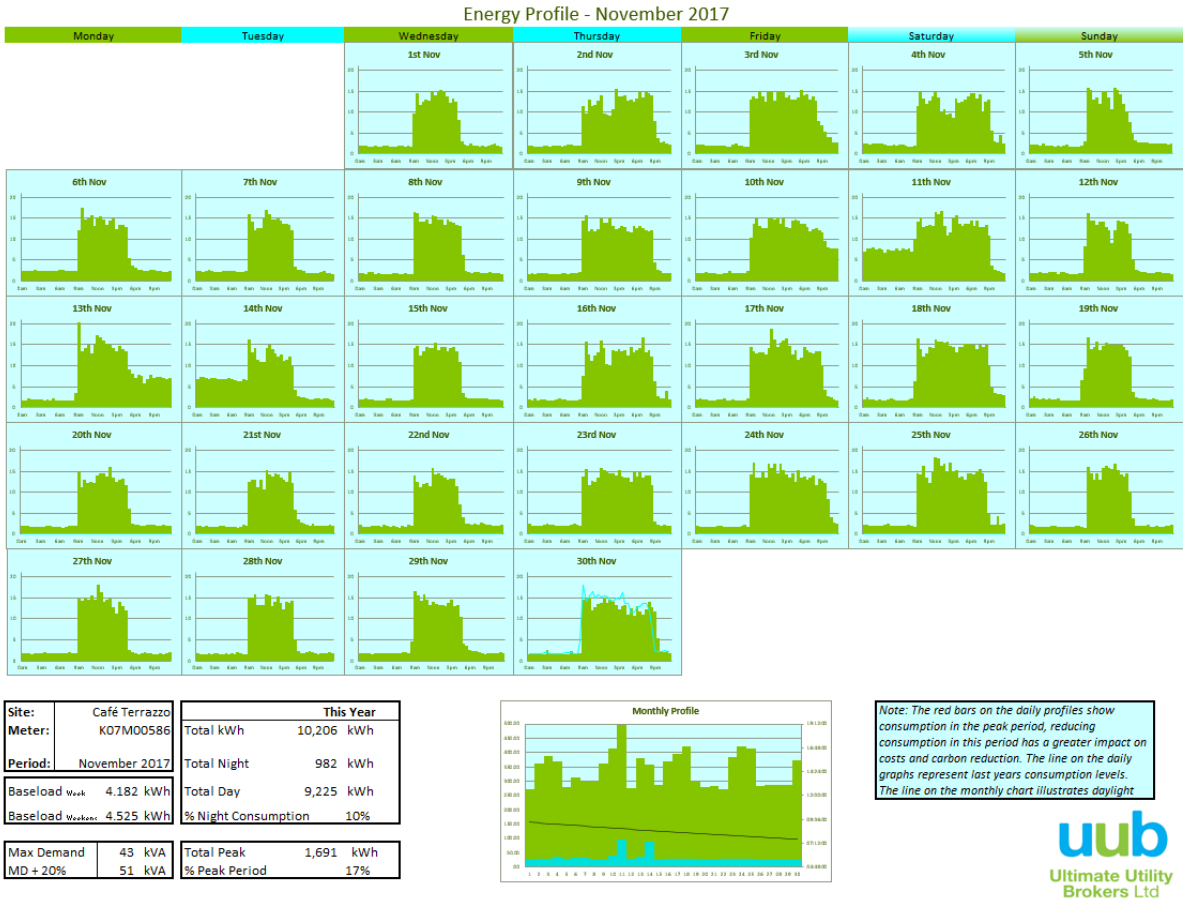
Based on the loads that were observed on site, it is estimated that the load breakdown for Café Terrazzo, Unit C7, Kendal described above can be considered as:



As can been seen from this data, the air conditioning and catering use by the oven (as the other major appliances are gas) makes up by far the largest proportion of the energy usage on site. The other significant loads includes the kitchen extract unit.

4.4 Energy Usage Profiles

The automatic meter reading devices on the site allow for detailed energy profiling. The electricity usage has been reviewed for the period of November 2017.



This shows a relatively good electrical consumption with a low overnight base load of around 2kW per half hour period which is very low and covers the base electricity usage for refrigeration. The consumption levels rise immediately to a peak of around 10 to 12kW per half hour for times which align very well to the opening times with longer consumption seen on Thursday, Friday and Saturdays with the longer opening hours.

There a two points of note. On two overnight periods (10th to 11th) and (13th to 14th) there was a much higher overnight consumption. This would suggest that either the kitchen extract or the air conditioning was left on for those two evenings. Each overnight period this happen costs an additional £14 to the business.

It is also notable that the consumption goes up sharply at 9am and then falls off sharply at closing time. This indicates an ‘all on or all off’ approach. There may be opportunities where the oven or extract or heating does not need to be full on from 9am to 5pm. In particular the oven should be turned off when not in use even during the day.

4.5 Energy Benchmarking

The annual energy usage has been examined against the industry benchmark for cafes (which are included under the 'Resturant' category) from CIBSE TM46:2008. It should be noted that these benchmarks make use of data from 2004 and that the parameters the benchmarks are based upon, such as occupancy hours, could provide wide ranging variations.

	Size (m^2 GIA)	Annual Energy Usage (kWh)	Actual kWh/m^2	Benchmark kWh/m^2	Variance from Benchmark
Café Terrazzo, Unit C7, Kendal (elec)	472	109,736	232.49	90	158.3%
Café Terrazzo, Unit C7, Kendal (gas)	472	Unknown	Unknown	370	-100.0%
TOTAL	472	109,736	232.49	460	-49.5%

The benchmark is based on:

Usage times: Weekdays and evenings

Building features: Storage and preparation of food which is then cooked and served to users; seating space for eating is provided

Services included: Heating, lighting, cooling, food storage, heating of food,

The Café Terrazzo, Unit C7, Kendal has an average energy use of 232.49 kWh/m^2/yr.

As the heating is served from the electricity supply the consideration of the combined benchmark is most appropriate. Unfortunately, the annual gas consumption is not known but it would appear that as this is limited to the kitchen gas appliances (fryer, hot plate etc.) this would be limited. Therefore, overall the unit has below benchmark consumption levels which is reflective of the good overnight switch off and relative efficient lighting and appliances.

5. Costing and Paybacks of Saving Recommendations

The costs, savings and simple paybacks for each recommendation have been detailed within the executive summary (section 1) of this report.

Please note that all capital cost figures provided are estimates and have been provided based on previous prices for similar projects, market testing or budgets from suppliers direct. They do not include for any main contractor overheads if bundled together in such a way, project management internally or externally, or VAT and the like.

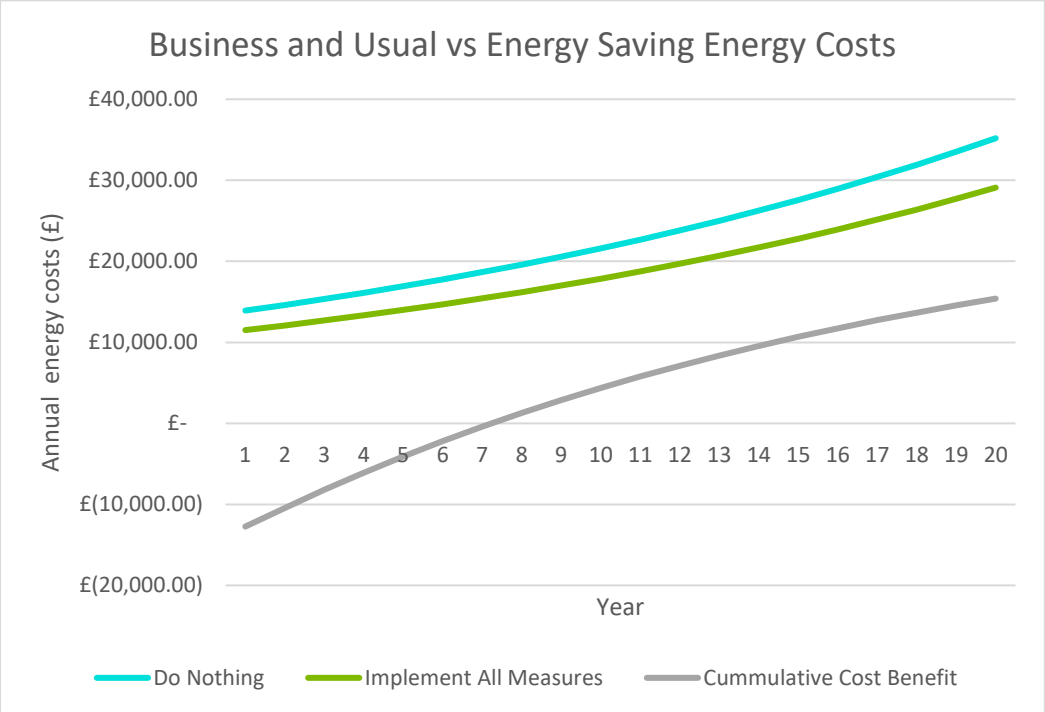
All operational energy savings are estimated using the current energy consumption data over a 12-month period as detailed in section 3.1. Any changes outside of the scope of this report may impact the estimated savings.

Savings cannot be assumed to be cumulative.

5.1 Life Cycle Costing (Portfolio)

To demonstrate the full life cycle cost benefit of undertaking the energy saving works a simply 'business as usual vs. energy saving' has been shown alongside a full cost benefit analysis for the portfolio of measures.

The cost benefit analysis uses and energy price inflation rate of 5% and a discount rate of 6%. The graph below shows the value of the whole project over 20 years which has a Net Present Value (NPV) £14,704 and an Internal Rate of Return (IRR) of 18.3%. This clearly demonstrate the value of investing in to energy efficiency using the same metrics as may be used for other financial investments by the organisation.



6. Saving Recommendations (Electrical)

6.1 Lighting (fittings)

The lighting makes up a relatively small overall energy load within the building, and large areas such as the main restaurant are lit by efficient LED or T5 fittings.

There still remains a small number of inefficient halogen downlighters behind the bar on the display shelves.

It is recommended that the compact flourescent fittings scheduled in Appendix 1 are all changed for LED. This is a simple bulb replacement and can be undertaken in-house. The recommended replacement lamps can be sourced on line from suppliers such as https://www.lampshoponline.com/philips-6-5w-led-pl-c-4p-corepro-3000k.html. (Note you should check the existing lamps before ordering as to whether it is 2 or 4 pin.)

If all the lights were changed the total capital cost (supplied and fitted) would be £2,774. The annual cost saving would be £409 resulting in a payback of around 6.8 years.

6.2 Lighting (control for internal lights)

Several of the lighting circuits within the basement already have motion / daylight sensors installed on them. However, it was noted during the audit that these sensors are not currently set up to work to their full potential.

It is recommended that the existing lighting sensors installed within the building are reviewed and optimised so that the time lag before they turn off the lights, and the light level at which they allow the artificial light to be turned on is adjusted so that it is suitable for the space. Depending on the type of light fitting installed it is normally recommended that areas such as store rooms and cleaners' cupboards switch off after just 1 minute, corridors and stair lobbies after 2 minutes and WCs after 5 minutes. Generally lighting levels should be around 300lux but it is highly dependent on the use of the space.

The careful optimisation of the existing lighting controls can be undertaken in-house by removing the cover on the motion sensor and using a small screwdriver to turn down the dial with the time/clock face icon to about 1/3rd.

6.3 Refrigeration Controls

Across the site there are various domestic and commercial refrigeration units such as fridges and freezers within the commercial kitchen and bar area. These units run 24/7 and contribute to the baseload electrical consumption of the building.

To reduce the electrical consumption of these appliances it is recommended that they are all fitted with a SavaWatt unit. These units work by automatically detecting the load of the compressor and turning down the power when it is not in full load. This reduces the energy

consumption of the refrigeration unit by around 18% while maintaining the cooling of the appliance. It does this by reducing the voltage delivered to the unit when it is idling but allowing the full energy to the unit when it is required.

Supply and installation for commercial units and further details can only be undertaken by SavaWatt directly http://savawatt.com/. The installation does not cause any significant disruption to operations and can be undertaken during normal operating times.

6.4 Cooker Extract Hoods

Within the commercial catering kitchen there is a large extraction unit over the main cooking area. This is required for gas safety and to extract all the steam and odours from the cooking processes. Currently the extract fan runs at a fixed speed regardless of how much cooking is going on at the time.

It is recommended that a control system is added to the existing extract fan arrangement whereby temperature and humidity sensors are installed into the extract canopy which control the fan speed. This reduces the fan speed when there is less cooking going on and high levels of extract are not needed and increases it when it is required. It maintains a level of background extraction required for gas safety. Up to 80% savings on the power used by the extract fan can be achieved.

The supply and installation of such a kitchen extract control system can be undertaken by using the Cheetah system http://quintex.co.uk/demand-controlled-ventilation/ .

7. Saving Recommendations (Heating and Hot Water)

7.1 Timed Fused Spur to Hot Water Heaters

There are various electric hot water heaters located around the site. These only need to heat the water to the required temperature when the building is in occupation but at the moment these heaters are directly wired in without any form of time control and therefore maintain their set temperature 24/7.

It is recommended that the heaters are fitted with a 24 hour/7 day timeclock to replace the fused spur switch. An example of such a unit would be a TimeGuard FST77. They should be set up with times to match the times that the building is occupied and this will prevent the standing losses from the unit wasting energy during periods when the building is not occupied.

Such units can be purchased at any electrical wholesaler and fitted by your existing electrician or any NICEIC registered electrical contractor.

7.2 Consider Alternative Methods of Heating the Restaurant

The building current has three air conditioning units designed to provide heat and cooling to the space. It is not used in cooling mode and the heating is turned on only during opening times but reported to be ineffective during colder weather. As cooling is not required, a more direct and successful method of heating may be advantageous to consider along with the landlord.

The installation of direct electric fan heaters mounted in the ceiling in place of the air conditioning units made prove to be more successful in providing heat to the space and also allow for these units to be turned on and off only when heat is required (rather than having to run in the background for longer periods in order to maintain any degree of comfort. While these units are not low energy they would consume no more than the current air conditioning set up and would hopefully provide a warmer environment and could therefore be used for shorter durations. An example of this sort of heater would be http://www.bnthermic.co.uk/heaters/fan-assisted-heaters/.

Another possible solution would be to use far infrared heaters to treat this space. With ceiling or wall mounted panels or suspended units are available from suppliers such as https://www.herschel-infrared.co.uk/application/pubs-cafe-restaurant-heating/ . These do provide a different type of heat and one would have to ensure the spacing of these was sufficient to cover all areas, but they would be a lower running cost solution.

8. Saving Recommendations (Behaviours)

8.1 Train Catering Staff on Energy Efficient Behaviours

Within commercial kitchens there are very many high energy using appliances such as ovens, fryers and hot plates.

It is not uncommon for these appliances to be used in a way which is wasteful of energy and in particular it is often found that appliances are left on far longer than needed especially before use in the mis-guided notion that they are 'warming up'. The supplies of modern kitchen equipment advise that ovens will warm up in 4 to 5 minutes and fryers will reach operating temperature in 8 to 10 mins.

It is recommended that each piece of equipment is labelled with its warm up time and the staff are trained to only switch on the equipment for that period before use. It was very notable that this kitchen had all the appliances switched on but none were being used, this included the oven which was on but empty, both hot plates, both fryer baskets and even the grille which was fully on but not being used.

Other positive energy behaviours which may be of benefit include:

Do not leave walk in fridge and freezer doors open and consider installing door alarms on these doors to avoid this.

Ensure good airflow within fridges and freezers by not overloading especially around the evaporator units and removing products from boxes to improve air flow.

Further information and useful checklists on energy saving within kitchens can be obtained from:

https://www.carbontrust.com/media/138492/j7895_ctv066_food_prep_and_catering_03.pdf

9. Other Observations

It was noted that the air conditioning units are used to heat only due to leaking condense pipework which causes issues when in cooling mode. The building is capable of being passively cooled by opening the large river front doors so only requires heating.

Our thanks for to the management and staff of Terrazzo for their support in insight during the audit.

Appendix 1 – Schedule of Lighting to be Replaced or Upgraded

Room/Location	Number of Fittings	Recommended Upgrade	Annual Saving (£)	Total Cost (£)	Payback
Staff locker room	2	NO CHANGE			
Basement store	2	NO CHANGE			
Office	1	NO CHANGE			
Basement corridor	2	NO CHANGE			
Basement WC lobby	2	CorePro 6.5W	£25.16	£66.80	2.65
Men WC	3	CorePro 6.5W	£37.75	£100.20	2.65
Men WC	2	NO CHANGE			
Ladies WC	6	CorePro 6.5W	£91.00	£200.40	2.20
Ladies WC	3	NO CHANGE			
Basement corridor	5	2D LED	£37.96	£688.00	18.12
Disabled WC And lobby	2	CorePro 6.5W	£41.53	£66.80	1.61
Resturant	63	NO CHANGE			
Behind bar	6	GU10 LED	£137.31	£383.40	2.79
Kitchen	5	NO CHANGE			
Canopy	2	5ft Double LED	£37.91	£514.00	13.56