Energy Performance Certificates (EPC)
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Air Conditioning Inspection
Thermal Imaging Survey
Sustainability Reports
Environmental Audits
Renewable Energy
Part L Compliance

FADING FOOTPRINTS Ltd

Sustainability Report

Ash Place
Tree House Park
Kidderminster
WR4 9FP

Sustainability Report
Fully costed efficiency report
Carbon, Water & Energy Reduction

Financial Report
Accurate payback periods
5 year R.O.I
Energy spend reduction

Carbon Savings
Reduce CO2
Cost per tonne of CO2

Compliance
Carbon Reduction Commitment.
Corporate Social Responsibility

Fading Footprints Ltd, Brooklands Court, Tunstall Road, Leeds LS11 5HL 0113 210 2400 info@fadingfootprints.co.uk

Executive Summary

Significant opportunities are present in this building to reduce energy and water consumption, cut costs and reduce carbon emissions.

The current spend on metered utilities during the assessment period is £ 124294.29

Potential savings form all standard measures indentified in this report are £ 29791.61

This represents a reduction of 24%

The payback period for the total project as modelled is 5 years and 4 months.

Solar technologies, if deployed, will yield an annual return of £ 11331.54 (based on current energy costs and feed in tariffs).

Summary Table

Recommendations and Key Actions	Estimated Annual Savings					Estimated Cost	Payback Period	Cost per tCO2
	£	CO_2t	KWh Elec	KWh Heating	cu m	£	(years)	£
Lighting Changes	10419.79	46.746	87052			22329.90	2.14	477.69
HVAC fan power savings	1341.33	7.786	14499			2505.77	1.87	321.83
HVAC heat savings	433.99	2.663		14014		810.74	1.87	304.45
HVAC cooling savings	858.12	4.981	9276			1683.48	1.96	337.98
Building Fabric Cooling Loss	49.97	0.290	540				Immediate	
Distribution Insulation	100.92	0.619		3259		350.00	3.47	565.43
Timers on electrical equipment	703.37	4.083	7603			344.00	0.49	84.25
Motor controllers on fridges & freezers	243.12	1.411	2628			180.00	0.74	127.57
Enable standby facilities on PC	389.24	2.259	4208				Immediate	
Other electrical savings	868.11	5.039	9384			150.00	0.17	29.77
Other heat savings	1574.58	8.802	28080	-33035		3000.00	1.91	340.83
Water temperature reduction	355.54	2.181		11480			Immediate	
Urinal Controls	3471.96	0.694			1577	1650.00	0.48	2377.52
Hot water end use savings	1715.65	1.568		6664	685	269.94	0.16	172.16
Other water savings	58.22	0.012			26	90.00	1.55	7500.00
Voltage Optimisation	7536.97	43.750	81472			17711.30	2.35	404.83
Totals	30120.88	132.884	244742	2382	2288	51075.13	1.7	

Summary Table for Photovoltaics and Solar Thermal

Recommendations and Key Actions	Estimated Annual Savings					Estimated Cost	Payback Period	Cost per tCO2
	£	CO_2t	KWh Elec	KWh Heating	cu m	£	(years)	£
photovoltaics	11331.54	19.379	36088			158360.00	13.98	8171.73
Totals	11331.54	19.379	36088	0	0	158360	13.98	

Return on Investment Indicators

5 Year ROI calculator
Standard measures

Year	Annual Savings	Cumulative Total	Capital Cost	Cash Flow
1st	30120.88	30120.88	51075.13	-20954.25
2nd	31626.92	61747.80		10672.67
3rd	33208.27	94956.07		43880.94
4th	34868.68	129824.75		78749.62
5th	36612.11	166436.86		115361.73
5 Years ROI is =325.87 %				

25 Year ROI calculator
Solar Technologies

Year	Annual Savings	Capital Cost	Cash Flow
1st	11331.54	158360.00	-147028.46
5th	56657.70		-101702.3
10th	113315.40		-45044.6
15th	169973.10		11613.1
20th	226630.80		68270.8
25th	283288.50		124928.5
25 Years ROI is =78.89 %			

Thank you for commissioning a FFL Energy Assessment. We look forward to working with you to help lower your CO_2 emissions and reduce your energy and water bills. Within this report you will find the recommendations that our assessor has made to improve the efficiency of your building. These recommendations, both physical and behavioural, will payback their capital investment within approximately 1.7 years, a number of them will payback immediately.

The areas which your FFL assessor will have looked at are wide ranging, reaching across your whole operation, and have the unique benefit of a holistic approach to energy efficiency. Many different measures will have been modelled using our auditing software, but only those which represent value for money and a good return on investment have been selected for your consideration. Your overall use of energy has been assessed and the results are closely based on your actual consumption figures. The assessor will have also taken into account the status of the building (if is it listed or in a conservation area), the tenure of the building, occupant behaviour patterns and a number of other factors before arriving at this result.

Please study the results carefully and feel free to discuss the various savings opportunities identified with your assessor.He or she will be able to answer any initial questions you might have. Please be aware that the measures suggested are interlinked. Please ask you FFL consultant for advice on how implementing some measures but not others may affect the results.

Thank you once again for your instructions.

Building Synopsis

Ash Place is a relatively modern office block occupied by the retail sales division of npower. Completed in 2001 it is built to the 1995 Building Regulations and hence features cavity walls with some insulation built in, and has a metal clad system roof. All windows are double glazed. The total building area is stated at 4476m2.

Office accommodation is arranged over three floors in total and takes the form of two wings connected to a central atrium. The building is orientated broadly north east to south west. The ground floor north wing houses a range of staff facilities including a full canteen with catering kitchens, and a dry gym with changing rooms and showers. This area also houses a repair room for PCs , the main comms/server room plus storage and meeting room areas. The central section is split into two sections; the front area being a full height atrium, with the rear section housing male and female toilets and cleaners storage cupboards on all floors. The south wing on the ground floor offers large open plan offices with meeting rooms, staff locker space, a networked printer/copier and vending machines. This pattern is repeated with slight variations on the north and south wings on all floors above. There is a personnel lift in the centre of the atrium, which also affords access to the plant room which is located on the top floor above the full height section of the central atrium.

This plant room houses the main air handling plant which has a pair of modern condensing gas boilers which temper inlet air via the air handling unit's heating coil, and also supply radiators in the ground floor atrium area. There is a large chiller unit to the rear which feeds the cooling coil. A separate smaller chiller is believed to feed the hospitality suite. The AHU itself houses a constant volume supply and extract system and there is a Trend BMS controlling the functions of this plant. In addition, there are a number of relatively modern local split systems installed which provide additional cooling to the IT rooms, the PC repair room and an area of the top floor, (south wing) which has been sectioned off as a studio. The occupants of this top floor also had plug-in fans deployed and this area was a clear 2° warmer than the rest of the building at the time of the visit. This is likely due to solar heat gain being greatest during the afternoon in this area of roof. Main heating and cooling is delivered via ceiling mounted fan coil units fed from the main boilers and chiller. There is also a separate extraction system serving just the toilets.

Domestic hot water is supplied to all points by a large electrically heated hot water cylinder. The exceptions are the showers in the gym changing areas which are point of use and sinks in the first aid and hospitality kitchens which are served by a 10 litre electric multipoint heater.

Lighting is predominantly by quad-fitting 2' T8 fluorescent tubes with high frequency ballasts. There are a few standard ballast T8 tubes in the stairwell/fire exits areas attached to the extremities of the wings. There are also a number of tungsten halogen spot lamps, in the meeting rooms and scattered around the open plan offices and we were informed that these are low voltage.The tungsten halogen lamps were off in the main during our visit, except for meeting rooms which were being manually switched according to demand.

The catering kitchens have a dishwasher which is currently cold water fed.

Limitations and Assumptions

Hours of occupancy for this building were stated as 7am to 7pm. The number of occupants is 446.

We were able to visit all main areas of this building and interrogate the Trend BMS.

The building fabric itself, being of relatively modern design, has not been considered for upgrading in energy efficiency terms, beyond dealing with the over-heating problems in the south wing.

Actual consumption from May 2009 to April 2010

Existing Operations	Existing Costs			
	£	T CO_2	KWh	cu m
Electricity	107131.46	514.870	958790	
Gas	10011.84	51.344	270229	
Water	7150.97	0.000		3217
Total	124294.27	566.214	983491	3217

Recommendations Identified

Electrical

It is recommended that a variable speed drive be fitted to the circulation pump for the heating weathercircuit and linked also to the BMS. This will reduce the energy consumed by this pump in line with reductions achieved via the HVAC measures.

Fit standby savers.

Recommendation	Estimated Annual Savings				Estimated Cost	Payback Period(years)	Cost per T Co_2
Electrical	£	CO_2 T	KWh	cu m			
	868.11	5.039	9384		150.00	0.17	29.77

Fabric cooling

Recommendation	Estimated Annual Savings				Estimated Cost	Payback Period(years)	Cost per T Co_2
Fabric cooling	£	CO_2 T	KWh	cu m			
	49.97	0.290	540		0.00	0.00	0.00

HVAC Savings

Adjust ON times of HVAC plant as set in Trend BMS system

The Trend BMS was found to have the ON time as 5am. This system features optimum start stop controls which calculate the appropriate latest time the system needs to fire up in order to condition the building to the desired temperature at the start of the day (stated as 7am). This control takes into account the outside air temperature automatically. The start time should be re-set to 7.00am and the control left to do its' work. Savings for this adjustment are included in the section on the AHU below

It is suggested that variable speed drives be fitted to the supply and both extraction fan motors and linked to the Trend system. A fan motor running at 80% of capacity draws approximately half the energy of one running at full speed, so fans throttled back at set times of the day yield a significant energy saving

Cooling

Recommendation	Estimated Annual Savings				Estimated Cost	Payback Period(years)	Cost per T Co_2
Cooling	£	CO_2 T	KWh	cu m			
	858.12	4.981	9276		1683.48	1.96	337.96

Fan power

Recommendation	Estimated Annual Savings				Estimated Cost	Payback Period(years)	Cost per T Co_2
Fan power	£	CO_2 T	KWh	cu m			
	1341.33	7.786	14499		2505.77	1.87	321.83

Heating

Recommendation	Estimated Annual Savings				Estimated Cost	Payback Period(years)	Cost per T Co_2
Heating	£	CO_2 T	KWh	cu m			
	433.99	2.663	14014		810.74	1.87	304.47

Enable standby facilities on pcs

All the monitors in use in the building have a standby facility built into them, which enables the monitor to go to sleep after a pre-set period of time of inactivity. These should be activated in all cases, and new monitors introduced should be checked to ensure all are operational going forward

Recommendation	Estimated Annual Savings				Estimated Cost	Payback Period(years)	Cost per T Co_2
Enable standby facilities on pcs	£	CO_2 T	KWh	cu m			
	389.24	2.259	4208		0.00	0.00	0.00

Photovoltaic

The large area of available roof space, plus the high electrical demands of the building and the effects of the new feed-in tariff mean that the installation of a photovoltaic array is worthy of serious consideration. The array size suggested is 597m2 which is calculated to produce 66.31kwp when deploying monocrystalline silicate panels

Recommendation	Estimated Annual Savings				Estimated Cost	Payback Period(years)	Cost per T Co_2
Photovoltaic	£	CO_2 T	KWh	cu m			
	11331.54	19.379	36088		158360.00	13.98	8171.73

Vending machines

There is a selection of vending machines providing hot and cooleddrinks, and non perishable dry goods. These are left on overnight which is not necessary. Suitable timing devices fitted to these machines will eliminate wastage overnight.

Recommendation	Estimated Annual Savings				Estimated Cost	Payback Period(years)	Cost per T Co_2
Vending machines	£	CO_2 T	KWh	cu m			
	703.37	4.083	7603		344.00	0.49	84.25

Coldwater

It is recommended that tap aerators be fitted to all cold water taps to restrict the flow to a maiximum of 7.5l per mintue. This will reduce overall water consumption.

Recommendation	Estimated Annual Savings				Estimated Cost	Payback Period(years)	Cost per T Co_2
Coldwater	£	CO_2 T	KWh	cu m			
	58.22	0.012	0	26	90.00	1.55	7736.21

Lighting

There are two possible methods of improving the energy efficiency of the main lighting system; replacing the existing tubes with T5 plug in equivalents or using a plug in LED strip light equivalent. Both possibilities were considered but the LED option is significantly more expensive, and there is still a question mark over the length of life of LEDs. Therefore, we have recommended the T5 option here. However, a quantity of halogen spotlights were in evidence, and we have modelled replacing these with LED plug in equivalents.

Recommendation	Estimated Annual Savings				Estimated Cost	Payback Period(years)	Cost per T Co_2
Lighting	£	CO_2 T	KWh	cu m			
	10419.79	46.746	87052		22329.90	2.14	477.69

Urinals

The urinals in the building lack proper controls, meaning that they continue to flush through out the hours when the building is unoccupied. Installing PIR flushing controls will eliminate unnecessary flushing and save significant water consumption.

Recommendation	Estimated Annual Savings				Estimated Cost	Payback Period(years)	Cost per T Co_2
Urinals	£	CO_2 T	KWh	cu m			
	3471.96	0.694	0	1577	1650.00	0.48	2378.23

Water heating

It is recommended that the existing electric water heater be replaced with a direct gas fired storage calorifier which in addition to costing significantly less to run, also means the boilers can remain off during the warmer months. This should also be connected to all hot water outlets including the kitchens and the dishwashers. Connecting to the dishwasher specifically reduces the load on the electric heater within the appliance. Please note: the kwh demand in this instance increases due to the relative efficiencies of electricity and gas water heating.

Recommendation	Estimated Annual Savings				Estimated Cost	Payback Period(years)	Cost per T Co_2
Water heating	£	CO_2 T	KWh	cu m			
	1574.58	8.802	-4955		3000.00	1.91	340.82

Water temperature reduction

It is recommended that the washing machines which are currently set to wash at 90 degrees, be used at 40 degrees in conjunction with a more modern detergent designed to offer good cleaning results but at a lower temperature. This yields significant savings but at little or no additional operational costs.

Recommendation	Estimated Annual Savings				Estimated Cost	Payback Period(years)	Cost per T Co_2
Water temperature reduction	£	CO_2 T	KWh	cu m			
	355.54	2.181	11480		0.00	0.00	0.00

Hot water

It is recommended that Watersave shower heads be installed in all showers except those in the gym changing area (electric point of use). The Watersave heads have the capability to reduce the water throughput from around 15 litres per minute to 7.58 litres per minute, whilst maintaining a feeling of force and with no reduction in cleaning power.

Recommendation	Estimated Annual Savings				Estimated Cost	Payback Period(years)	Cost per T Co_2
Hot water	£	CO_2 T	KWh	cu m			
	1715.65	1.568	6664	685	269.94	0.16	172.18

Voltage optimization

The National Grid delivers power in the UK at approximately 230 to 240v. All lighting and appliances sold in the EU are designed to run at 220v. If the supply voltage within the building can be stepped down this gives a drop in the amount of electrical energy demanded by the building. A full survey is required before specification can go ahead.

Recommendation	Estimated Annual Savings				Estimated Cost	Payback Period(years)	Cost per T Co_2
Voltage Optimisation	£	CO_2 T	KWh	cu m			
	7536.97	43.750	81472		17711.30	2.35	404.83

Conclusions

The total potential annual savings identified as presenting a sound business case total £29791.61 which represents a 24% reduction in current spend. The investment required to achieve this revenue cost saving is £59413which gives a simple payback of 2 years and 0 months. This is calculated at current energy prices, and current indicative capital costs, and as energy costs inexorably rise, so the potential return on investment increases commensurately.

Savings of £397 p.a were identified as being achievable immediately at zero cost. The cost of doing nothing is £2482 per month.

The photovoltaic array carries a payback of approximately 12 years, but is designed to last for at least 25 years.

Benchmarking and Display Energy Certificate Rating

At present this building would achieve a rating of	If all recommendations actioned the above improvements would render a rating of
109 E	78 D

General Information

Achieving a lower carbon future makes sound business sense. Not only will you benefit from lower energy costs, but as the price of energy and water increase, so these savings are magnified.

Implementing an energy awareness policy amongst your Family and Friends can also be an excellent way of cutting energy bills at very little cost. Simple measures such as turning off a light, reporting and fixing a dripping tap or introducing policies on the use of heating and air conditioning can yield significant results at little cost. Further advice is available from your FFL consultant.

The Carbon Trust offer 0% loans subject to status on many of the measures identified in this report. This means the capital costs of implementation of these measures may be able to be financed from the resultant energy savings. Please ask for details.

Your attention is drawn to the Energy Technology List and the Enhanced Capital Allowances scheme to encourage investment in the most energy efficient technologies. Choosing plant or equipment from this list triggers 100% Capital Allowances in the year of installation, making energy efficiency tax efficient as well.

Disclaimer:

This report has been prepared using best endeavours and is based on the results of a non-invasive energy survey plus information supplied by the client. Where applicable, recognised industry standard data is used. The potential savings are based on the usage pattern, opening hours, consumption data energy costs and population levels as indicated to the assessor during the survey process and significant changes to these factors can affect the actual savings achieved. Heating and cooling patterns are based on recognised degree day data for the site but significant weather events may also affect the actual savings achieved. Capital costs are based on manufacturer's estimates and are indicative only. These costs have not been confirmed by manufacturers/installers and may vary due to local site conditions. A reputable supplier should always be consulted and firm quotations received before going ahead with any of the measures identified. Carbon Dioxide reduction figures are calculated using the CO2 emission factors employed by CLG in the production of DECs, and different organisations or methodologies may employ alternative factors.

All electrical and gas services work must be carried out by suitably qualified personnel. Where applicable a structural survey should be undertaken prior to installation. Statutory consents may be required, including but not limited to Planning, Building Regulations and Conservation Area consents. Neither FFL nor the Assessor shall be held liable for any breaches of statutory consents which may be required. The client shall be responsible for checking and complying with all such requirements.

The measures identified within this Report are often inter-related and savings are calculated on the assumption that all measures identified shall be enacted. Selectively enacting measures in isolation may therefore affect the actual savings achieved. Your FFL Assessor is able to re-model the report to reflect such changes on request subject to an additional charge.

No allowance is made for changes to the supply price of energy or water and savings are based on the assumption that supply shall continue at the most recent rate notified to the Assessor. Projected DEC ratings and bandings are based on the assumption that all measures shall be enacted, and in accordance with manufacturer's instructions and industry best practice.

E & OE