SevernWye
ENERGY AGENCY

Brockweir and Hewelsfield Village Shop

Forest of Dean

Target 2050 Energy Action Plan

March 2011

Report

LOCAL ACTION

Brockweir and Hewelsfield Village Shop
Target 2050 Energy Audit
Report prepared by *owencallender*

SevernWye
ENERGY AGENCY

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Project Background

The Target 2050 SME project aims to support businesses in the Forest of Dean in achieving a step change in their energy consumption, and putting themselves on a more sustainable footing for the future. The project is funded through the Local Action Group, and runs through to January 2013.

The first stage of the LAG funded SME project involves Severn Wye Energy Agency offering direct support to 66 businesses in the district. Each business will benefit from an on-site meeting with SWEA's experts, an on-site energy audit, and a detailed energy action plan report highlighting the key points arising from this. Two additional days of support will be provided once a business signs up to an agreed action plan to include only those measures that the business will consider implementing.

This report contains the survey findings and recommendations for Brockweir and Hewelsfield Village Shop.

Supported by the European Agricultural Fund for Rural Development: Europe investing in rural areas

Executive Summary

Severn Wye Energy Agency conducted an energy survey of Brockweir and Hewelsfield Village Shop on the 7th of February 2011. The complete report has been presented together with a range of no, low, and capital cost recommendations.

The organisation has an annual energy spend of over £9,000. Potential year round savings in electricity have been identified. The majority of energy used at the site is for heating, refrigeration and lighting.

The comprehensive list of recommendations identified in the report can be viewed in section 6, although the following measures will deliver the most significant energy and cost savings:

- Implement a written energy policy
- Establish a targeting and monthly monitoring routine
- Improve lighting efficiency and control
- Insulate all hot water pipework
- Improve refrigeration efficiency
- Loan monitoring equipment from SWEA to understand refrigeration energy consumption and cost

Potential year round savings of at least £1,000 have been identified (an 11% reduction), although it is expected that this will be higher. Careful monitoring and subsequent analysis of energy consumption on a monthly basis will enable savings achieved identified. In addition to the measures stated above, raising staff awareness and encouraging changes in behaviour can add significant further savings.

Severn Wye Energy Agency is pleased to be able to offer the energy report to you for consideration.

1 Introduction & General Description

Brockweir and Hewelsfield Village Shop is a non-profit community enterprise. The shop was purpose built and opened in 2004 and is operated on a daily basis by two paid members of staff and around 40 volunteers. On the second floor of the building there is a community space called The Loft in which there are ICT facilities and also a single office space which is rented out on a commercial basis.

The building is of a traditional oak framed construction and is entirely double glazed. The walls are insulated with 10 inches of fibre glass and infrared reflective plasterboard. The floor base consists of insulating concrete.

Space and water heating is provided by an 8.5kW ground source heat pump. The building has under floor heating throughout and this is zoned. The shop also benefits from a roof constructed of 300 solar photovoltaic roof tiles. This solar array has a theoretical peak capacity of 5kW.

The shop and cafe are open from 8am to 6pm Monday to Saturday and from 10am to 4pm on Sundays. The Loft can be used outside of these hours and is used on one or two days a month.

2 Energy Performance of the Business

Electricity is the only type of energy consumed and this is sourced in the first instance by that generated from the solar photovoltaic roof of the building and then the remainder (which is the majority) from the National Grid. The major electricity consumers are heating, the shop and cafe refrigeration units, food preparation (including a bread oven) and lighting.

It is good practice to take meter readings on a monthly basis as this allows the business to immediately identify any irregularities in energy consumption and more easily address areas of energy waste. It is also important that these readings are recorded so that comparisons can be made month on month and year on year. It is recommended that an electronic energy diary is created which could be used to record regular meter readings. SWEA have such a diary that could be used. It collates the data, converts it to kWh, cost and CO2, and also provides a range of graphs that will enable quick and easy comparisons to be made. The diary also provides a summary of each year's energy consumption and directly compares year on year consumption for simple analysis.

There is a consideration within the organisation to switch to a night rate tariff for electricity. However, to be cost effective night time energy consumption needs to amount to over 20% of the annual usage. In this instance it is highly unlikely that

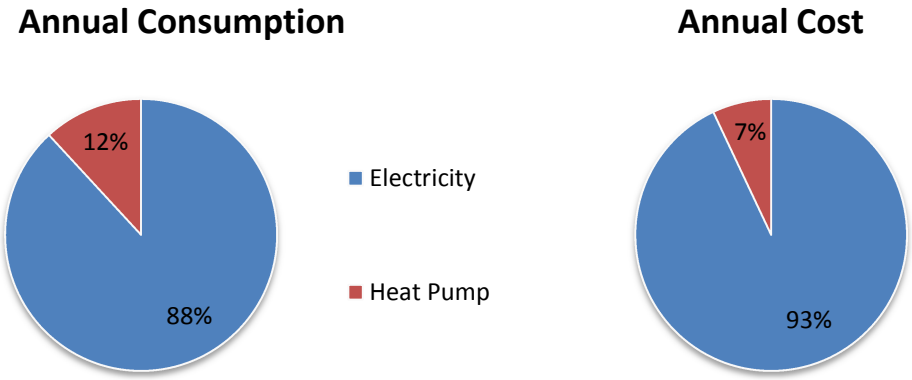
this would be the case for the shop and it is recommended that the organisation stays on a single day rate tariff.

3 Previous Data & Benchmarks

The table below shows the total annual energy consumption of the business.

	Annual Consumption		Annual Cost (ex VAT)	
Utility	**kWh**	**%**	**£**	**%**
Electricity	76,869	88	8,571	93
Heat Pump	10,346	12	647	7
Totals	**87,215**	**100**	**9,218**	**100**

Table 1: Annual consumption and cost



Having analysed the historical bills it was noted that the organisation has been paying the Climate Change Levy (CCL) on each unit of consumed energy and also VAT at full rate, rather than reduced rate. It may be the case that the organisation should not be paying the CCL, as this is a business tax, unless the organisation is "trading". It is recommended that the organisation contacts its electricity supplier to discuss this issue and see if an exemption from further charges is due. If the reduced level of VAT was charged then this could save the organisation over £1,000 per annum; whilst the exemption from the CCL charges would save in the region of £360 per year (based on the previous year's consumption). It is possible that a rebate could be secured for previous overpayment.

The majority of bills provided state a unit price of 9.57p/kWh, however in April 2010 the organisation paid 12.16p/kWh – this is considered relatively high. The average unit rate is around 10p/kWh and so there may well be considerable savings from negotiating lower rates by either utilising an energy broker or doing this personally and checking what each supplier charges. It was stated that the most recent unit rate is the former figure of 9.57p, but given the rise in April 2010 this should be investigated to see whether the organisation has been over charged

and is due a refund from the energy supplier. There are energy brokers that specialise in contract negotiation and resolution of supply errors, with many offering this service free of charge.

Table 2 illustrates energy consumption at the business, converted into carbon dioxide emissions (CO_2). This is for the purpose of understanding what impact business energy use is making environmentally.

Fuel Type	Consumption (kWh)	CO_2 Emissions (kg)
Electricity	76,869	41,552
Heat Pump	10,346	5,593
Total	**87,215**	**47,144**

Table 2: Carbon dioxide emissions

This equates to 47 metric tonnes of CO_2, and given that the average household emits around six tonnes of CO_2 per annum, the business emits the same amount of CO_2 as almost eight homes.

Detailed energy benchmark information is available for retail and office buildings, but it is recommended that actual energy consumption is used as a benchmark and the organisation aims to improve on historic use. The total floor area of the premises has been estimated at 360m^2. However, there are separate benchmarking data sets for offices and retail outlets and as such an estimated proportion of energy use should be attributed to each portion of the site to compare like for like data. To compare the energy consumption against the benchmarking information, take the annual kWh of electricity and divide the figure by the total floor area. As shown in Table 3 below the business performs well against the industry benchmark. However, as illustrated in Section 5 there are areas for significant improvement.

	Electricity (kWh/m^2)
General retail benchmark	165
Office benchmark	105

Table 3: Benchmark comparison data (CIBSE, 2008)

It is recommended that this exercise is carried out each year in order to assess on-going energy performance. The energy diary referred to earlier in the report can do this for you if you can provide the internal floor area. SWEA will create the energy diary using the data that has already been provided and then make this available for you to use going forward in line with Section 4 of this report.

4 Monitoring & Targeting

The organisation has a history of monitoring energy consumption on a regular basis. Regular monitoring of energy consumption allows detailed analyses against previous weeks, months and years and can help identify reasons behind any large increases in consumption. This data should be discussed every 3-6 months at management meetings to enable wider discussions on the company's environmental impacts to take place. This will also enable senior management to set realistic targets for reducing consumption year on year and also to disseminate performance to employees and potentially clients through an annual report. SWEA can provide an energy diary to record monthly consumption data, with results being displayed in graphical form for kWh, cost and CO_2 emissions.

The organisation should consider setting a target for reducing energy consumption which should be reviewed year on year. A proportion of the savings achieved from one year should then be used to invest in further energy saving measures that will continue to help reduce consumption throughout the business for the next year.

It is also recommended that the consumption figures are converted to CO_2, so that people start discussing energy issues in a "common currency". To convert electricity consumption to CO_2, take the total kWh consumption and multiply this by 0.54 (on average 0.54kg of CO_2 is emitted per kWh of electricity generated) to arrive at kg of CO_2.

Targets should be set for reducing emissions on an annual basis, and this should be stated within an energy policy. Gaining a better understanding of the areas of current waste will help to identify realistic targets – this should be achievable from this report. It is recommended that the business consider setting a target for year one at 10%.

5 Survey

5.1 Heating & Hot Water

The whole building is heated by a ground source heat pump (GSHP) via underfloor heating and one radiator (located in the rented office space). The control system is set to deliver heat at around 20°C and there are two room thermostats and a total of six zones. The system is controlled very well and the zoning allows the area of the shop with the refrigeration units to not receive any heating, which is good to see. The system also has weather compensation controls fitted.

Whilst overheating is a common problem within many businesses, the village shop is well managed and overheating is not considered to be an issue. That said, every

degree of overheating increases energy consumption by 8% and so the management team should be mindful of regulating the heating temperature to ensure overheating does not become an issue. In general the building should be heated to around 19ºC. The ideal working environment tends to be around 21ºC, with the remaining temperature increase resulting from any equipment and machinery in the workplace.

Picture 1: Ground source heat pump

It was noted that the atrium area above the café space can suffer from heat gains. The organisation may want to consider installing a de-stratification fan on the ceiling, as this would help circulate the warm air. Punka style fans are best suited to this type of area and cost in the region of £30-50.

There are no recommendations to improve the heating aspect of this system. However, at present the heat pump also provides the business with hot water. Calculations that were kindly provided by the site engineer indicate that hot provision from the heat pump is likely to amount to over 3,000kWh of electricity or almost £300 per annum. At present the heat pump is going into error mode a few times a year, resulting in 3, 6, or 9kW internal heater elements being used to provide heating and hot water rather than the heat pump. As this typically occurs when the heat pump is operating at a higher temperature (to heat hot water for the café) it is expected that this error mode will rarely be engaged if the hot water is provided by other means.

Picture 2: Examples of different hot water storage systems (all pictures from ZIP website)

It is recommended that a hot water storage tank (most likely wall mounted) is installed. During the survey this was discussed and the ideal location appears to be within the first floor toilet, which is situated above the café. There are a variety of storage systems available on the market, but the organisation should ensure that the system is thermally insulated to reduce heat loss from the tank to a minimum. Prices for such a system range from £200 to £600. Advice should also be sought from a local installer/supplier to ensure the location is suitable and to assess any additional installation and labour costs that would be incurred. It is also imperative that the system has good temperature control to

ensure the hot water is stored at 60ºC – this is high enough to eliminate the risk of legionnaire's disease and low enough to reduce heat losses.

5.2 Building Fabric & Insulation

The purpose of insulation is to slow down heat loss, therefore reducing the quantity of heating or cooling needed to keep a space at the desired temperature. The most cost effective improvements to insulation are normally loft insulation, cavity wall insulation, pipe lagging, and draught proofing.

The building was constructed in 2004 and has been thermally insulated to a high standard. The walls have approximately 12 inches of fibre glass insulation, whilst the roof is insulated to a similar standard. However, it was noted that there is the possibility that the insulation was not installed correctly, as there is heat loss within certain areas of the building. SWEA can use a thermal camera to investigate potential cold spots within the building and also to assess the effectiveness of the underfloor heating and ensure it is working properly.

It is unlikely that much can be done with regards to poorly installed insulation, but the work should have been covered by a 10 year guarantee if the organisation wished to have any areas re-insulated.

Although it was stated that the hot water pipework was insulated none of the pipes inspected during the survey had been lagged. Insulating all hot water pipework should be a priority in order to maintain the efficiency of the heating and hot water systems. Insulation should be specified which meets the standards set out in BS 5422 (2001) in order to ensure that the insulation offers the highest energy saving potential possible. Any insulation conforming to this standard also qualifies for the ECA (Enhanced Capital Allowance) scheme, discussed further in Section 8.

The length of un-insulated hot water pipework is not known and so calculations have been provided for one metre of pipework and the organisation can then apply this to the known length within system (note – this does not apply to the underfloor heating pipes). Based on the heating operating 16 hours a day, seven days a week and for 30 weeks over £8 can be saved per metre. Insulation starts from £1 per metre, but assuming the cost is £5 per metre then a return on investment can be expected within seven months.

5.3 Lighting

Lighting presently accounts for around 6% of the annual electricity consumption across the site, costing almost £450 per annum. The lamps currently being used are detailed in Table 4 below, along with the recommended replacement lamps rated power.

Type of lamp	Number of lamps	Rated power (W)	Replacement lamp rated power (W)
T8 5ft fluorescent lamp	16	58	35
Halogen GU10 spotlight	2	50	7
Incandescent spotlight	7	60	7
Compact fluorescent lamp (CFL)	4	13	5
CFL D-ring	25	18	5

Table 4: Types of lighting used

Replacing the T8 lamps currently installed with slimmer and more efficient T5 lamps could cut energy consumption by up to 30%. T5 lamps are produced in different sizes and have pins spaced much closer together so are not directly interchangeable. The use of T5 lamps will also reduce the frequency of lamp changes, and reduce disposal costs. Inexpensive adaptors are available so that T5 lamps can be used in existing light fittings. Several types are available, and it is recommended that only those that comply with British and European standards are used. It is recommended that light fittings designed for T5 lamps are specified for any future building work and when current fluorescent light fittings need replacing. T5 fluorescent lamps have a longer lamp life than T8 lamps, along with a better quality of light.

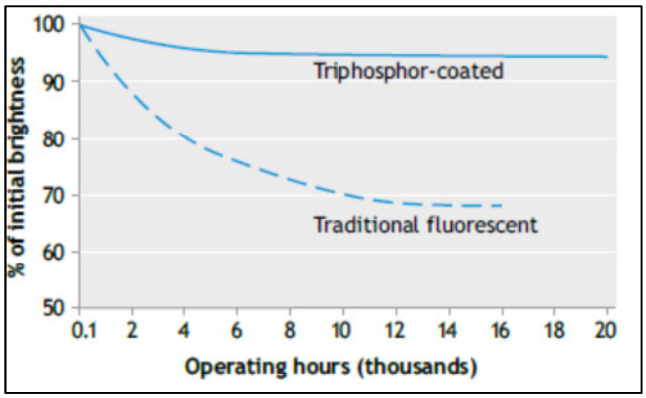


Figure 1: Effect of tri-phosphor coating (Carbon Trust)

When replacing fluorescent lamps it is important to purchase lamps with a triphosphor coating, which prolongs the light output of the lamp far into its operational lifetime (as shown in Figure 1 above). This results in less frequent lamp changes and reduced replacement costs. This should be included in a procurement policy, alongside an energy policy for the organisation.

There are some halogen GU10 spotlights being used. It is recommended that all of these lamps are replaced with LED (light emitting diodes) spotlights, as illustrated in Picture 3 below. Care should be taken to ensure warm white lamps are chosen to match the colour rendering of existing lights. It is also recommended that attention is given to the lumen output of the lamps, as this affects the brightness of light emitted. Some LEDs provide 230 lumens, whereas others provide 350 lumens – the higher lumen lamps are recommended to maximise the range of light output. Savings of up to 90% per annum can be achieved from using 5-7W LEDs.

Dimmable LED replacement lamps are available – meaning they can be run off any standard dimmer switch. GU10 LED spotlights typically cost between £10-20 for

good quality lamps and a specialist LED lighting contractor should be engaged to assess the re-lamping requirements.

Additionally, it is also recommended that the organisation replaces all of the incandescent spotlights, CFLs and CFL D-ring lamps for LED spotlights. 5-7W LEDs should be specified to ensure the light output meets that of the existing lamps.

Picture 3: LED GU10 (left) & LED MR16 (right)

It would be possible to save over £300 per annum by replacing all lighting with energy efficient equivalents. This represents a reduction in lighting energy consumption of 70%.

Additional savings can be achieved through the use of motion sensors in areas used infrequently such as the toilets and storage area. Using either PIR (Passive Infrared) or ultrasonic motion sensors would significantly reduce the energy consumption. PIR sensors typically cost from £15-30, whilst ultrasonic sensors are more expensive (£30-50 per sensor). However, ultrasonic sensors have the benefit of not being a line of sight device and so are especially useful in long buildings or areas that have obstructions.

5.4 Electrical Equipment

As lighting accounts for 6% and the heat pump approximately 10% of the total electricity consumption, the remainder of the consumption is allocated to the following areas:

- Catering and refrigeration
- Ventilation, extraction and pumps
- Office and auxiliary equipment

5.4.1 Catering and refrigeration

The kitchen is well run and used efficiently. The majority of refrigeration units were installed in 2004 and it is recommended that units are replaced with modern A+ or A++ units at the end of their operational life. It would be beneficial to include procurement of energy efficient equipment within a written energy policy. This would ensure that A+ or A++ units are purchased as replacements – higher initial purchasing costs are always outweighed against the operational costs of non-efficient units. It is important to have in place a regular maintenance programme

to ensure equipment is operating efficiently and to have any faulty items repaired or replaced.

There are energy saving devices available for commercial refrigeration units that can save on average 30% of energy costs per unit. The only device on the market that SWEA is aware of is called an eCube (although other products may be available) and the device reduces the number of refrigeration cycles, whilst increasing their length to save energy. This helps improve regulation of the internal temperature to a constant level.

Picture 4: Compressor being relocated externally

All refrigerated display units have night blinds, which is good to see; whilst some also have PVC strip curtains. It is recommended that all units have PVC curtains installed. This measure would reduce heat gains within the units and help maintain the desired internal climates. Plastic blinds allow customers to see what products are available, but have the benefit of acting as a thermal barrier to reduce heat transfers. Suppliers often state energy reductions of up to 40%; however this is likely to be on the optimistic side. A realistic figure would be a 30% reduction in electricity use for each unit. The curtains are often custom made to fit the particular cabinet size and cost around £40-60 per metre width of material. Other energy saving measures to consider:

- Try to keep cabinets fully loaded to the load lines. Large gaps between shelves in an open fronted cabinet can produce a 13% increase in energy use.
- High efficiency components such as compressors, heat exchangers, fans and lighting can reduce energy by up to 20%. Installing an efficient compressor can save around 12-15% of energy consumption per annum, whilst installing LED lighting could reduce this further by 5-10%.

During the survey it was noted that the compressor for one of the display cabinets was being relocated externally. This is good to see as compressors prefer cold input air. The difference between a frosty day at zero degrees and a warm compressor could provide a 5-6% improvement for the compressor efficiency. A 4ºC reduction in air input temperature provides a 1% increase in compression efficiency. It was mentioned that there is a wish to link all refrigeration units to the same compressor. Whilst there could be savings from installing a high efficiency compressor that has been sized appropriately, it would need a backup system in

case the unit needed repair or maintenance. However, the organisation should seek specialist advice on this area before making any changes.

Alternatively, consideration could be given to new display units. Many supermarkets now use integral display units that utilise air curtains to maintain the refrigerated temperature rather than blinds or doors. These units recycle the air and can be very efficient. The cost of such units is unknown, but if the existing units are nearing the end of their operational lifetime then this could be a worthwhile investment.

At present the area housing all refrigerated systems is open plan and could be suffering from heat gains generated by other areas of the business – such as the baking oven and kitchen activities. There was consideration for installing a walk-in refrigeration unit, but this has been scrapped. Partitioning the area and insulating the internal walls surrounding the units would create a more favourable internal environment and reduce the impact of the warm air from catering equipment.

It was noted that whilst there is an Xpelair fan located by the door to the storage area and baking oven, this is not used in conjunction with the oven being used. As such much of the heat generated by the oven is likely to end up being drawn past the refrigeration units to the extract fan operating behind these. A staffing or procedural policy should be developed that stipulates the use of the storage room extract fan, whilst the oven is being used. This should reduce heat gains considerably.

SWEA can loan energy monitors and data logging equipment to the organisation in order to understand the true consumption of energy for all refrigerated systems. With this data SWEA can then assess the viability of a range of measures and provide more detail as to the likely cost and return on investment for a range of measures.

5.4.2 Office and auxiliary equipment

The organisation should have computers set to power save when they are not in use. The power save functionality on computers can be accessed by right clicking on the mouse when on the desktop. Select the properties tab and then the screensaver tab. Once this page appears, there will be a “power” or “power save” button that can be pressed that enables the user to activate this function after a PC has not been in use for a short period of time (for example 10 minutes). Users should also be encouraged to switch off the monitors of their PC when they are not in use.

The same should be implemented with all photocopiers/printers to ensure that the units go into standby when not in use, rather than remaining on all day. Linking these units to the power down plug system will also ensure they are not left switched on out of hours.

The business should make use of power down plugs or one-click panel plugs to turn off all IT equipment when not needed. These are new types of plugs (Figure 2

below), with incorporated energy saving measures. The power down plug is for use with a computer or TV, which automatically switches off devices, such as printers and scanners, linked to your desktop computer (or DVD player linked to the TV) when the computer is switched off. The one-click panel works by monitoring the power needs of the main device plugged in (i.e. computer) and through this monitoring of consumption it will turn off any peripheral items (scanners or printers for example) when not in use.

Figure 2: Example of a power down plug (left) & one-click panel plugs (right)

5.5 Renewable Energy Options

During the construction phase solar photovoltaic (PV) roof tiles were installed amounting to 5kW peak capacity. On average this provides 8-10% of the sites electricity consumption per annum.

Given the presence of solar PV there is little space left on the roof, however if there is any space available then solar thermal should be a consideration in order to provide hot water for the kitchen.

The choice between flat plate and evacuated tube collectors is not clear-cut; the latter can perform better in diffuse radiation, cloudy or wintry conditions, whilst generally being more expensive. However, flat plate collectors usually achieve higher gross output (per unit area) in good summer conditions, coinciding with the demand patterns of this installation. Note that many installers will supply only one panel type or the other.

A domestic system might produce around 1,500–2,000 kWh/year, which is about 50-70% of typical hot water demand. A much larger system would thus be expected to yield in the region of 3,000kWh per annum.

Solar thermal could generate 60% of the kitchens hot water needs, which would equate to around £180 per annum. This might not appear much, but the Renewable Heat Incentive (RHI) will provide support to solar thermal and other renewable heat systems installed from now on. Proposed rates for this technology are up to 18p/kWh, which would yield a much larger additional benefit of around £550/year.

6 Recommendations

6.1 Suggested Action Plan

Physical and behavioural recommendations identified in the survey are detailed in the suggested three part action plan: Part one contains no cost measures; part two lists low cost measures and part three contains capital cost measures. SWEA can usually provide information, guidance, and assistance on financial and fiscal incentives available to implement these measures.

Please take time to check the following action plan. Once the plan has been adjusted to include only those measures that you will consider implementing, please arrange for the action plan to be signed and returned to SWEA. Once an action plan is received, SWEA can provide follow up support in any areas that you may require.

Action plans assist businesses in taking steps to reduce energy consumption and cost, allow SWEA to provide relevant support, and meet the need to demonstrate to local authorities funding the Target 2050 programme predicted cost and CO_2 savings.

6.1.1 Action plan: No cost measures

Action	Implementation date	Cost (£)	Person Responsible
Establish a simple written energy policy including cost considerations, energy management issues, and objectives.		0	
Obtain competitive quotes for electricity supply and investigate green tariffs available when renewal is due.		0	
Check and record meter readings monthly.		0	
Establish an energy monitoring spread sheet to record monthly energy consumption.		0	
Check eligibility for paying CCL and higher VAT rates, as may be able eligible for a rebate.		0	
Consider energy efficiency and calculate whole life costs when procuring new equipment.		0	
Engage power save functions on all IT equipment.		0	
Raise staff awareness of energy efficiency issues to reduce wasteful behaviour.		0	
Ensure all fluorescent lamps purchased are triphosphor coated to increase useable lifespan.		0	
Initiate regular cleaning and maintenance programme for lighting and all fans.		0	
Loan thermal imaging camera from SWEA to identify cold spots in building fabric and assess first floor heating system.		0	
Loan data loggers and energy monitors from SWEA to understand true cost of refrigerated units.		0	
Seek specialist advice on linking all refrigerated systems to one high efficiency compressor.		0	

Signed on behalf of Date

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6.1.2 Action plan: Low cost measures

Action	Implementation date	Cost (£)	Return on Investment	Person Responsible
Install punka style de-stratification fan within atrium to reduce overheating.		Approx. £30-50 installed cost	Unknown	
Insulate all hot water pipework and valves.		Approx. £3-5 per meter; £10 per valve jacket	Within 4-7 months	
Install power down or one-click panel plugs throughout office areas.		Approx. £10-15 (power down); £30-40 (one-click)	Within 2 years	
Replace T8 lamps with T5 lamps and adapters.		£10-15 per adapter & £4+ per lamp	From 1-2 years	
Replace halogen and incandescent spotlights with 7W LED equivalents.		From £15-20 per lamp	Within 1 year	
Replace CFLs and CFL D-ring lamps with LED 5W spotlights.		£10-15 per lamp; up to £5 per fitting	Within 1.5 to 4 years	
Install motion sensor for storage room lighting.		Approx. £15-30 installed cost	Within 2-3 years	
Use refrigeration cube within all closed fridges and freezers to reduce energy consumption of each unit.		Approx. £30	Within 6-12 months	
Relocate all refrigerated compressor units externally to benefit from colder input air. Note, ensure that compressors are located away from direct sunlight.		Unknown labour costs	Unknown	

Signed on behalf of Date

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6.1.3 Action plan: Capital cost measures

Action	Implementation date	Cost (£)	Return on Investment	Person Responsible
Install wall mounted hot water storage tank. This should be energy efficient and thermally insulated to reduce heat loss.		From £200-600	Unknown	
Consider partitioning refrigerated area to reduce heat gains.		Unknown materials and labour cost	Unknown	
Consider replacement of large display units with energy efficient integral display units using air curtains.		Seek specialist advice		
Consider solar thermal panels for hot water, if roof space allows.		From £3,000 to £5,000	Unknown, dependent on RHI payments	

Signed on behalf of Date

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6.2 Costs & Savings of Measures

Recommendation	Estimated total installation cost	Estimated Annual Savings	ROI (Years)	10 year savings (after installation cost)
Insulate all hot water pipework and valves (based on 1 metre of pipework).	£5	£8	0.6	£79
Replace T8 lamps with T5 lamps and adapters.	£56	£35	1.6	£296
Replace halogen and incandescent spotlights with 7W LED equivalents.	£149	£147	1.0	£1,323
Replace CFLs and CFL D-ring lamps with LED 5W spotlights.	£500	£133	3.8	£825
Install motion sensor for storage room lighting.	£30	£13	2.4	£96
Install solar thermal panels.	£5,000	£720	6.9	£2,200
Totals	**£5,740**	**£1,056**	**5.4**	**£4,819**

6.3 Targeting

6.3.1 Knowledge

It is important to understand how much energy is being used and how this relates to the identified main areas of consumption. This can easily be achieved through regular monitoring of meter readings on a monthly basis. The business should consider making use of a spread sheet as analysing data from previous years will greatly help to show performance over time and give an idea of an appropriate annual percentage reduction to aim to achieve.

6.3.2 CO_2

In the first instance it is recommended that the business sets an objective of reducing the annual energy consumption (in kilowatt hours and carbon emissions) by a recommended minimum of 10% per annum for the next two years.

7 Raising Awareness

The survey indicates a number of technical and practical issues that could be addressed to improve the energy situation, but a large impact will be made by the energy practices of all those that work and use the business, so we encourage the involvement of staff in the responsibility of managing energy use in their environment. This will also encourage them to make similar behavioural changes at home, thus doubling the effect.

Formalising practical energy management as part of a written energy policy, such as taking meter readings, drawing up "switch off" lists, analysing life cost of equipment before making capital purchases and setting energy efficiency targets will help energy saving to become part of the businesses normal way of operating.

8 Additional Information

8.1 Complementary Sources

Engaging staff on the benefits of energy efficiency is important. Staff awareness literature is available from the Carbon Trust, and further publications can be found at: www.carbontrust.co.uk

The Carbon Trust offers interest-free loans to businesses. The loan is designed to cover the cost of replacing existing equipment with a more efficient version. More information is available from: www.carbontrust.co.uk/loans

The Carbon Trust has a supplier list of organisations that have successfully delivered at least two loans over the last 12 months. All of these organisations have experience of the loan scheme and so can provide the necessary savings analysis for any relevant project. To download the most recent supplier list please visit the website below:

http://www.carbontrust.co.uk/cut-carbon-reduce-costs/products-services/loans/pages/suppliers.aspx

The Energy Technology List and the Water Technology list contain details of a range of energy and water efficient equipment that is eligible for Enhanced Capital Allowances: Businesses can write off the whole of the capital cost of their investment in these technologies against their taxable profits of the period during which they make the investment. For further information please visit www.eca.gov.uk.

The Target 2050 website has additional resources, information and case studies relevant to SMEs. The website also provides useful links to other organisations that could help your business cut costs in different areas. The information can be found at www.target2050.org.uk/business.

8.2 SWEA Contact Details

Please contact *Owen Callender* or *Mike Brain* at SWEA to discuss the contents of this report, and for assistance with taking forward the recommendations.

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9 Comments and Notes

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