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RESTRICTED – COMMERCIAL

ENERGY MANAGEMENT AND OPPORTUNITIES ASSESSMENT

FOR

Clackmannanshire Council

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Executive Summary

This report presents the results of an Energy Management and Opportunities Assessment for Clackmannanshire Council. This assessment and report are provided by Mabbett and Associates Ltd and have been funded by the Carbon Trust.

The agreed objectives of the assessment were:

- to identify and prioritise up to 5 actions that can be taken by the organisation to improve its energy management effectiveness.
- to identify and prioritise up to 10 actions that can be taken by the organisation at site level to reduce energy costs and save carbon.

Whilst they have made good progress, Clackmannanshire Council has requested specific support to improve their overall energy use.

Clackmannanshire Council has a variety of building types and comprises a total of 180 sites. Currently, Clackmannanshire spends approximately £665,000 per year on energy. To put this figure into perspective, this represents 1% of the council's overall budget.

Priority actions are recommended in three main areas:

- Energy Management systems and procedures;
- Energy saving opportunities that are applicable across all the sites;
- Energy saving opportunities that are specific to the sites assessed.

These priority actions have been selected based on the assessment of current practices within the organisation and at the sites. They address key areas where work is needed to improve the overall balance of the energy management practices, and consequently the impact on the organisations energy saving capability.

Taken together, once implemented, the actions should lead to a reduction of 7% in the overall energy consumption and a 7.5 % reduction in cost, at today's prices. This represents £49,445 per year on an on-going basis. The cost of implementing the package of measures is estimated to be a minimum of £7,275.

Risks and Uncertainties

All costs and savings stated in this report are based on the data available at the time of the visit and can only be taken as indications at this stage. Further work may be required to develop this information in greater depth before any financial or commercial commitment is made. Please see section at the end of the report.

Action Plan

Energy Management Improvements

Priority	Recommendation and key actions	Estimated annual savings			ESTIMATED COST (£)	Payback period (years)	Timescale for implementation and by whom
		(£)	CO_2 (tonnes)	(kWh)			
1	Council Energy Team/Committee						
2	Staff Training Programs						
3	Liaise will procurement staff in each department						
4	Investigate the Energy Efficiency Accreditation Scheme						
5	Investigate the use of an external bureau service						
6	Investigate the rising electricity and gas prices before contract renewals in April 2006						
	Total Savings from Energy Management Improvements	**30,000**	**306**	**1,199,484**	**Unknown**	**--**	

Opportunities that are Generally Applicable to Sites

Priority	Recommendation and key actions	Figures below estimated base on actual sites visited					Timescale for implementation and by whom
		Estimated annual savings			ESTIMATED COST (£)	Payback period (years)	
		(£)	CO_2 (tonnes)	(kWh)			
1=	T12 Fluorescent tube lights	2,000	14.3	32,725	--	--	
2=	Vending Machines	2,975	21.4	48,670	250	Immediate	
3=	Monthly Meter Readings	6,640	57.0	265,683	--	--	
4=	Boiler house Insulation	235	3.7	19,200	1,100	4.7	
5=	Awareness Campaigns – Posters and Stickers	650	4.7	10,640	--	--	
6=	Pre-planned Maintenance - Lighting	--	--	--	--	--	
7=	Lead Condensing Boilers	--	--	--	--	--	
8=	Lighting Controls	--	--	--	--	--	
TOTAL		**12,500**	**101.1**	**376,918**	**1,325**	**--**	

Opportunities that are Site Specific

Priority	Recommendation and key actions	Estimated annual savings			ESTIMATED COST (£)	Payback period (years)	Timescale for implementation and by whom
		(£)	CO_2 (tonnes)	(kWh)			
1=	Kelliebank Depot – Electric Heating	2,300	16.8	37,450	150		
2=	Glenochil Nursery – Electricity Use	2,770	41.0	93,200	--	--	
3=	Glenochil Nursery – Boiler Sequencing	700	10.8	57,075	--	--	
4=	Alva Primary – Re-assess Heating in Old Building	990	15.4	80,970	5,300	5.4	
5=	Kelliebank Depot – Doors Interlock	75	2.7	6,025	400	5.3	
6=	Tulligarth LC – Large Gym Hall Heating	110	1.7	8,775	100	0.9	
7=	Glenochil Nursery – Heating and Ventilation	--	--	--	--	--	
TOTAL		**6,945**	**88.4**	**283,495**	**5,950**	**--**	

1. Introduction

1.1 Assessment Objectives

Clackmannanshire council, through Mr Richie Malcolm, are current evolving their energy management services and structure to improve the energy use throughout the organisation. However, resources and man power are limited due to budget constraints and the size of the organisation. Using the assistance available through the Carbon Trust it is hoped that the council will benefit by:

- having an energy management assessment followed by practical suggestions.
- highlighting specific opportunities to save energy.
- giving further generic recommendations than that previously undertaken.
- providing practical guidance to implement any recommendations.
- offering an outsider's view of current energy management practices within the council.

1.2 Organisation Background

Clackmannanshire Council is the smallest local authority in the country situated in Central Scotland between Fife and Stirlingshire, and mainly based in Alloa. The council current employs approximately 2,500 staff member covering a wide range of services. Examples of these services are education, social services, building services, community projects and environmental health.

Energy management is part of the Development Services Department of the Development and Environmental Services, and administrated by a designated Energy Officer. The department is responsible for around 180 buildings, ranging in sizes, services and occupancies.

2. Current Energy Use

2.1 Organisational Energy Consumption and Spend

The total energy consumption and spend for Clackmannanshire Council is approximately 26,508,286 kWh per year, costing a total of £664,696. All energy values are in terms of delivered energy.

This comprises:

Utility	Energy Consumption		Cost		CO_2 emissions tonnes
	kWh/year	%	£/year	%	
Electricity	6,972,871	26.3	426,012	64.1	2,998
Gas	19,535,415	73.7	238,684	35.9	3,711
Total Energy	**26,508,286**		**664,696**		**6,709**

The total unit costs for electricity and gas are 6.11 and 1.22 p/kWh respectively, including all standing charges. The gas and electricity costs above include the Climate Change Levy. These values are average costs. These values will be used for calculation of any savings.

2.2 Benchmarks

Information on the individual visited sites' energy consumption and spend is provided in Appendix 1. Also appended is the energy consumption split by council department.

Energy performance indicators give a measure of activity based energy use, which can be compared between sites within an organisation and with equivalent benchmarks. Energy consumption benchmarks are published in Good Practice Guides for different buildings and some processes. For a particular site, the performance indices need to be modified to take into account building occupancy, size, activities, location and weather (degree days). The lower value indicates good practice.

Benchmark Information for Sites

Benchmark Comparisons						
Site	Benchmark Lower Value (kWh/m^2)*		Benchmark Upper Value (kWh/m^2)*		Site Performance (kWh/m^2)	
	Electricity	Gas	Electricity	Gas	Electricity	Gas
Alva Primary School	22	113	32	164	32	138
Lornshill Academy/ Tulligath Leisure Centre	29	142	36	187	59	164
Kelliebank Depot	101	133	120	152	105	157
Glenochil Nursery	60	350	60	450	122	380

**Benchmark figures from The Carbon Trust's helpline, GPG343 - Building Energy efficiency in Schools, A guide to a whole school approach and ECG091 - Energy Benchmarks and Saving Measures for Protected Greenhouse Horticulture in the UK.*

As can be seen from the above benchmarking table, the performance of the sites is mixed for each of the sectors.

Alva Primary School's benchmark figures would be considered reasonable even though electricity is at the upper limit. However, the new building is off-setting the overall performance of the school, possibly concealing the level of inefficiency in the old building. Electricity savings would be mainly due to operations of lighting and equipment, although any future refurbishments would be an opportunity to improve this. The gas benchmark, is between published figures, but can be improved with increased control and the effectiveness of the heating system in the old building.

Lornshill/Tulligarth's benchmark figure shows the school to be performing poorly for electricity consumption. Other considerations have to be taken into account. The published benchmark figure is only for a swimming pool and not a leisure centre. It also doesn't take into account the extended opening hours of part of the school, including the leisure centre. Another consideration is the dated lighting system in place; they are old T12 fluorescent tubes. The gas benchmark figure shows that the school is within the published figures, this would be expected as it is within five years since they upgraded the heating.

The Kelliebank depot is reasonable compared with the published benchmark figures. However, there is room for improvement in both areas. The electricity has scope for improvement with the lighting, without upgrading fittings, and increasing the control. The electric heating in the Portakabins will also have an affect on this and can be improved upon. The floor area figure should be checked to see if all areas have been included, i.e., Portakabins and land services building. The gas consumption is near the lower limit (typical) but this should also be improved upon and the extend of the BEMS control should be looked at, as well as door interlocks as mentioned in the recommendations that follow.

These benchmark figures can be investigated: are the heaters being controlled on site, bypassing the BEMS system; are they using a booster button continuously; to what extent are the bay doors allowing the heat out? A further point that should be considered is whether the floor area is accurate.

Glenochil Nursery is very poor when compared with electricity benchmark and reasonable for gas. The gas figure is despite nursery's poor control of the heating and also including the control of the ventilation systems, the fabric air leakages, and age and condition of the boilers. This may be caused by the floor area of the building taken as the whole ground and not the heated area only. The discrepancy of the electricity consumption is unknown. When on site there did not appear to be services in place that could account for all the consumption. It is strongly recommended that this is investigated further, see also recommendations below about this issue.

2.3 Current Energy Management Practices

Clackmannanshire Council is the smallest local authority, a result of national re-structuring a number of years ago. The energy management of the council is the responsibility of a single person within the property department, Richie Malcolm, Energy Officer. Until now lack of resources has restricted the number of initiatives that could be undertaken. However, the council are hoping to embark upon the next stage by looking to implement formal policies relating to energy throughout the council, including a desire to involve other council departments.

Until now the council has given priority to the schools within their control and the larger buildings. The main achievement has been the setting up of a bureau type service for monitoring the consumption of their properties and fine tuning of heating controls. This has been restricted due to the level of resources and man power that is available, relating to energy issues.

Energy Management activities undertaken by the council so far are:

Fuel Switching

Converting off peak electric heating systems to gas fired wet systems. This has included Ludgate Old People's Home, Strathdevon Primary School and Deerpark Primary School. A gas supply has recently been installed at Claremont Primary School with view to conversion over the next two years. Conversion to gas heating has reduced the carbon intensity of the council. The running costs of gas are significantly cheaper.

Fuel Supply Contracts

The latest fuel supply contracts were negotiated in conjunction with Falkirk and Stirling Councils. This set up enjoyed the benefit of combined purchasing power whilst reducing the administration costs for each authority. Significant savings were achieved from previous years. A further opportunity to decrease the carbon intensity of the council was also taken by increasing the proportion of "green electricity" purchased form the supplier.

Formal Energy Policy to be Adopted

A formal policy for Energy use in public buildings has been written, with a view to adopting by November 2004. This will commit the council to raising the profile of energy efficiency, and include staff training, awareness campaigns, technical improvements and further use of renewable energy technologies.

Energy Efficiency Improvements to Existing Buildings

The council has continued to invest in a number of projects to improve the energy efficiency of public buildings. These include improved heating controls, zoning of heating systems, swimming pool covers, lighting controls, draught proofing, replacement window programme, water conservation measures, and insulation programmes.

Scottish Executive Public Sector Energy Efficiency Fund

Clackmannanshire has been allocated £136,000 from the executive fund to improve energy efficiency in its public buildings. On adoption of the energy policy, formal application to the fund will be made, and this will provide additional revolving finance for investment in required energy efficiency improvements for years to come.

2.4 Organisational Issues Affecting Energy Use

The main issues affecting energy consumption at the sites are:

- Replacement lighting and equipment is generally on a like for like basis.
- Staff operating buildings have little awareness or knowledge about the systems in place.
- Local staff are not held responsible for the energy costs.
- Purchasing can differ for different buildings, operated by different departments.
- Changes in working practices for council staff may not be well received.
- The size of the council is relatively small.
- They will have budget constraints out with their control.
- Only one member of staff is responsible for all sites and can be spread thin at times.
- Many sites will have more than one person responsible for day to day operation.
- Priorities will differ in different buildings and departments.

3. Assessment of Energy Management Practices

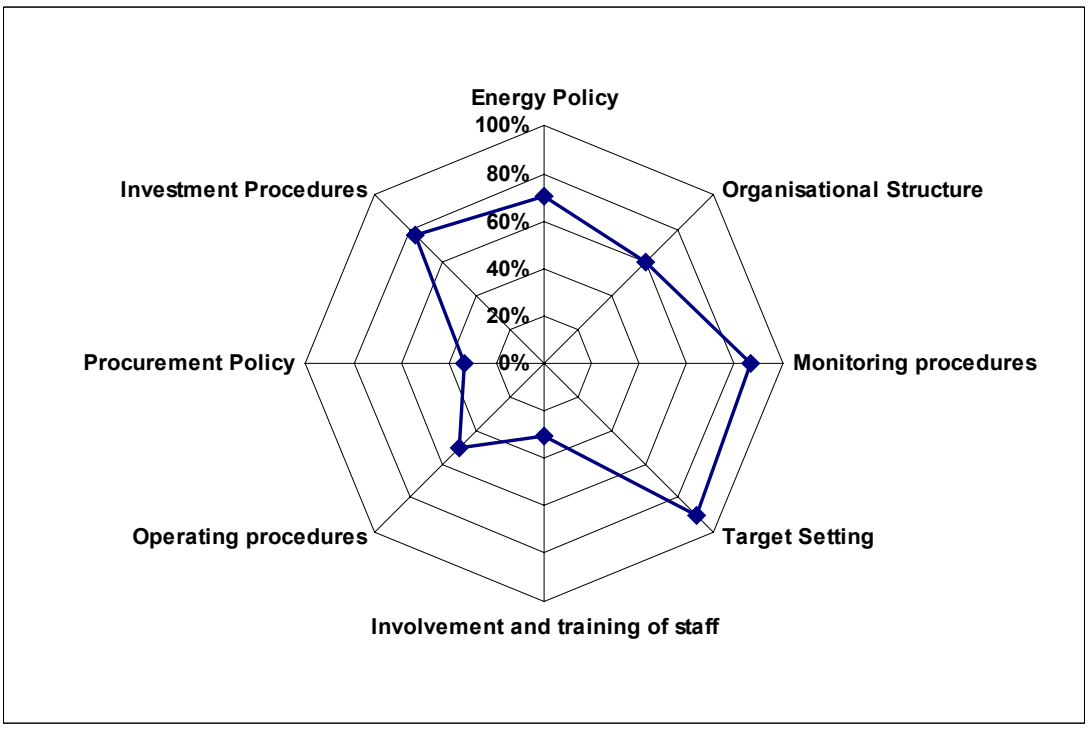
This section provides a descriptive overview analysis of the energy management assessment – where the strengths and weaknesses have been identified in the four major categories. The detailed scoring is provided in Appendix 2.

The table summarises the results of the Energy Management Assessment at Clackmannanshire Council. It gives a picture of the balance of energy management in your organisation, and its associated strengths and weaknesses.

	Score	
	Actual	Maximum
Management Commitment	**16**	**25**
Energy policy	7	10
Organisational structure	9	15
Energy Information Systems	**22**	**25**
Procedures for monitoring and analysing energy use	13	15
Target setting	9	10
Staff Involvement	**10**	**25**
Involvement and training of staff	4	13
Operating procedures for the efficient use of energy	6	12
Procurement and Investment	**14**	**25**
Incorporating energy efficiency into procurement policy	4	12
Investment procedures for energy efficiency	10	13
TOTAL	**62**	**100**

3.1 Overall Evaluation of Performance

Energy management at the council has grown over recent years, with particularly promising development of Information systems and increased management commitment. However, some particular attention needs to be paid to staff involvement and procurement. This can be illustrated as below in the form of a Radar Chart:



3.1.1 Management Commitment

Strengths…

The energy policy is currently in the process of being endorsed by both the Head of services and the Chief Executive. This is a very positive step and should be not only be seen as a commitment to effective energy use within the council, but as a tool that endorses support to future views and programmes relating to energy. An energy policy should work as active document. A brief outline of the contents that should be contained within an Energy Policy and a sample energy policy is given in Appendix 1.

Primary weaknesses…

The energy policy may require further council wide backing in the future and a long term commitment will be required to maintain progress once the initial steps have been completed. Therefore, endorsement of an energy policy may not be enough to actively improve energy management techniques throughout the council. Including an agreed review schedule that actively brings the high level management into direct contact with energy issues would be a further positive step – this has been included in the sample policy in Appendix 1.

A further move may be to initiate joining and meeting the criteria for The Energy Efficiency Accreditation Scheme. This will encourage involvement at higher levels as it is an award that shows continuous improvement and a proactive management trend, similar to other schemes like Investors in People.

3.1.2 Energy Information Systems

Strengths…

This is an area that is strong and has been the main area of focus for the council. It is now in a position were a monitoring system has been in practice for several years and allows for monthly breaks-downs and comparisons with previous years collected data. The council have implemented the monitoring of their sites with the Stark based information system too.

Primary weaknesses…

From previous experiences, the Stark based system is not the easiest to interact with when extracting information for reporting, as the outcomes from it are in a rigid form. This means that if the data is required for analysis in any other way than benchmarking, monthly consumption and simple trends, it needs to be extracted to a different software package manually. This is a common problem with specific software packages and should be remembered when information is required in a different reporting format.

The current system needs to be expanded to include benchmarking of buildings based on, for example, floor area and occupancy so that useful reports are produced which can be acted upon and to enable achievable targets to be set.

3.1.3 Staff Involvement

Strengths…

So far staff involvement has been limited due to the size of the council and the available resources. However, the schools within the area have had some training through the janitorial staff and through participation in the Eco-schools programme. This has not been followed up as often as would have hoped though and is an area that has been highlighted by the Energy Officer.

Primary weaknesses…

Due to energy being the responsibility of one individual, staff involvement is a very large task and is difficult to maintain awareness campaigns. Further support would be required to fully benefit from on-going awareness campaigns. Putting procedures in place in any local government can often be a drawn out process, and may take time unless adequate resources and support are provided from the start. *Note: Staff may be reluctant to evolve their current job roles to include any additional tasks, if it is simply to save the council money.*

3.1.4 Procurement and Investment

Strengths…

It has already been recognised that investment in energy efficiency is required in order to make improvements. Money made available from the discounted electricity contracts has been used for this purpose. The money is allocated to the energy officer for investment in energy technologies. Procurement of electricity has included 'green electricity' which should result in the council reducing its CO_2 emissions.

Primary weaknesses…

The reinvestment of the electricity discount is encouraging but other investment may be required for more sustained projects and longer term goals. Expected price hikes will affect the level of investment available when current supply contracts expire. Areas of investment should be looked at continuously. Perhaps reinvesting a percentage of the achieved targets will increase the drive to meet them.

Policies in areas like lighting and appliances would be beneficial for uniform procurement but would need to be ratified throughout the council estate.

3.2 Energy Management Improvements

The above analysis suggests the following priority actions for improvement of the council's energy management practices.

Priority: 1	**Council Energy Team/Committee**
Type: Organisation and Information System	**Target completion:** Spring 2005
Detail:	To maintain and co-ordinate energy issues throughout the council, there will be a need to include a wide range of "energy champions" from different departments, all with different priorities. These champions can then be called together at regular intervals to discuss future and past energy issues.
Rationale:	Having a regular review of the council's energy costs with the appropriate user groups will increase the awareness throughout the council as this is filtered down. Involving managers and head of departments will give the opportunity for them to interact and have a large input and influence on policies. This should make them more likely to succeed by maintaining their impact. Regularly reviewing council energy issues with colleagues should open communication and highlight any barriers that may not otherwise be anticipated. This will also give opportunity to should what impact any measures have had on the departments and discuss the benefits and disadvantages. Involving colleagues at high level within the council should make organisation change for staff easier. Involving head of departments will ease the direct influence required by the Energy Officer. Instead they can do more of the directing of initiatives, give support and so spread this resource.
Risks:	If the Chief Executive services do not influence heads of departments to get involved this will be voluntary and may not have an impact, as generally, extra duties will not be well received. Staff may not be motivated as they do not see or are responsible for energy costs as a resource and may not see it as a priority. Direction and support will have to be given to heads or they will lose interest. Energy issues will have varying importance to different departments and may lead to political obstructions from different departments who don't want to free up there resource time. If people are not held responsible for the energy they use they are unlikely to improve efficiency.
Next steps:	Prove the case of an energy review team/committee involving heads of departments. Include a structure and formalise the goals and schedules. Get approval from Chief Executive and if possible ask them to be involved.
Relevant publications:	GIR012 "Organisational aspects of energy Management"

Priority: 2	Staff Training Programmes
Type: Involvement and Staff Training	**Target completion:** Spring 2005
Detail:	Most staff will have an effect on energy use. Some more than others.
Rationale:	Key staff in areas would benefit from training in energy efficiency encouraging good practices. This may include: • Heating engineers for o Local control settings o BEMS systems o Improved technologies • Maintenance engineers for o Pre-planned maintenance schedules o Re-lamping o HVAC opportunities o Information systems- reporting processes and effects • Building design staff for o Best Practice design o Improvements in technologies o Increase awareness and opportunities at inception o Holistic design – Life cycle costs • Caretaker staff for o Staff awareness o Information systems – reporting processes and effects • Management for o Staff awareness o Understanding of relevant energy issues for staff Training may take different forms • in-house training • free training seminar – Carbon Trust, ESTA etc. • paid courses - college/university courses • tailored external training It may be an idea to go through each department looking at the current energy using equipment and systems they come into contact with. Using this data, run a series of training workshops on the correct use of these systems. For the engineers, have a series of issues that they need to have an understanding of, i.e., building control settings and variable speed fans for the design engineers. Use existing courses and documents as a guide.
Risks:	Staff may lose interest if not continually encouraged. Resistance to organisation change within a council is often a barrier.
Next steps:	Initiate a schedule of available training programs and ask head of departments to encourage structured training for staff. Initiate where knowledge and time allows for in-house training.
Relevant publications:	GPCS214 “Energy Saved by Raising Employees' Awareness” GPCS324 “Energy Management – staff awareness” GPCS325 “Energy Management – training and motivation” www.thecarbontrust.co.uk/energy

Priority: 3	Liaise with procurement staff in each department
Type: Policy	**Target completion:** February 2005 (before next financial year)
Detail:	Procurement in many departments appears to be on a like for like basis or based on initial capital cost.
Rationale:	If discussion and policies can be evolved to include life cycle costs as well as running costs, the total energy used should gradually decrease with the introduction of more efficient equipment. An example of this is with the T12 fluorescent tubes still being used when a T8 tube is cheaper to buy and operates at a lower running cost. From the Sustainable Government website: "From 1 November 2003, all new contracts by central Government departments must meet minimum energy efficiency standards, as well as value for money, when purchasing certain types of product. Types of product that must meet these criteria include IT equipment, gas boilers, white goods (eg fridges and washing machines), televisions, lighting systems and lightbulbs."
Risks:	Procurement may need to be based on capital cost due to budget constraints. Staff may reluctant to increase the thought process of buying equipment to the operation of if, if they are not in direct contact with it.
Next steps:	Initiate awareness training, including running costs, to staff that are responsible for pu Discuss evolving polices that can be reviewed for the purchase of energy efficient equipment.
Relevant publications:	http://www.sustainable-development.gov.uk/sdig/

Priority: 4	Investigate the Energy Efficiency Accreditation Scheme
Type: Policy	**Target completion:** Summer 2005
Detail:	"The Energy Efficiency Accreditation Scheme is the UK's only independent award recognising achievements in reducing energy use by leading organisations in industry, commerce and the public sector"
Rationale:	This scheme, although involving considerable time and effort, will give a message of a conscientious and a continuously improving organisation. The scheme is an award like Investor in People and can be marketed in the same light. Heads of department and the Chief Executive would likely want to be involved, further providing support and raising interest
Risks:	Is a large task so may divert time and resources from other areas. Accreditation will incur costs.
Next steps:	Make contact with the scheme administrators and, where necessary, get external help.
Relevant publications:	http://www.natenergy.org.uk/eeas/

Priority: 5	Investigate the use of an external bureau service
Type: Organisation and Information Systems	**Target completion:** Spring 2005
Detail:	Much of the Energy Officers time is taken up by inputting the energy data into the monitoring software.
Rationale:	If this time is freed up, this will allow for the energy officer to concentrate effort on implementing other initiatives. It may be more cost affective to use an external agency, instead of hiring a full time staff member. A full-time staff member may not be justified in term of on-going savings that can be made. Whereas, the cost of a bureau service would be fixed rate, cost less and give the same benefits currently available. A monthly report of the full services could be provided to the council.
Risks:	Data entry and availability may be delayed during the negotiation period.
Next steps:	Investigate the costs of a bureau service compared with the cost of a staff member's time to do this task.
Relevant publications:	

Priority: 6	Investigate the rising electricity and gas prices before contract renewals in April 2006
Type: Organisation and Information Systems	**Target completion:** Autumn 2005
Detail:	The trend with electricity and gas prices in the past was a downwards slope. However, electricity and gas prices have been rising recently and are expected increase further, at least, in the short term.
Rationale:	Whilst the council may be making 'head way' with energy savings, the annual cost may actually increase. The impact this will have on the council may be significant as budgets may have to be increased to accommodate future contracts. As an example, since the last contract renewal the electricity price has increased by approximately 6%. Therefore, today the cost of energy to the council would have been £25,500 more. Similarly, gas at 8% would correlate to an additional £19,000 per annum. If the increases continued, by the time April 2006 came, electricity costs may have increased by approximately 10% worth £42,500 and gas at 12% worth £28,500. If 10% targets are met as set out, or £66,500, the overall costs will have increased by £4,500. This would equate to an overall increase in costs by 0.7% from current spend. *Whilst still achieving the 10% energy saving.* Some projects that previously had long or border line paybacks may now become more attractive. These may increase the 10% target of energy savings although may come at a higher cost.
Risks:	Whilst the electricity and gas markets are expected to rise in the near future, the actual rise will be hard to predict.
Next steps:	Scenarios involving several different price rises should be modelled. The affect this will have on the council as a result of different increases should be communicated to the other departments. When evaluating projects include scenarios for price increases to see if they will be more viable in the near future. It may be the case that implementing them early at a lower installation cost will prove even more appealing.
Relevant publications:	http://www.dti.gov.uk/energy/inform/energy_prices/qepupdate.shtml

3.3 Savings and Costs

Savings and costs for implementing the energy management recommendations are estimated due to the wide variations in buildings and operations. The man hours required are unknown as well as the value of these man hours. For an organisation that has no techniques in place, a saving of 20% should be achievable. However, Clackmannanshire council has implemented a reasonable foundation that has already shown improvements. It would therefore, be ambitious to expect anymore than 5-10% saving, excluding the other recommendation given. This would equate to savings around £30,000. However, the energy management recommendations are interlinked with the site and generic recommendations, in other words, all recommendations from all three sections would have to be put in place to be realised.

4. Site Level Energy Saving Opportunities

4.1 Sites Visited

As part of the service provided, a total of 4 sites were visited:

- Lornshill Academy/Tulligarth Leisure Centre – six year comprehensive school with a new leisure centre which has been built in the same grounds, including existing swimming pool.
- Alva Primary – Primary school built in the 1970s with a recent new extension
- Kelliebank Depot – Direct Labour Organisation depot for the council, with offices, portakabins, stores and workshop areas.
- Glenochil Nursery – Plant Nursery and limited "green" recycling centre.

These sites were selected by the organisation as being representative of the range of activities that the organisation as a whole is involved with.

The objective of these visits was the identification of energy saving opportunities:

- Of general application and replication to the whole organisation
- Specific to the sites visited

The key assumptions and detailed calculations supporting the following recommendation are included in Appendix 1.

4.2 General Opportunities

Priority: 1	**T12 Fluorescent tube lights**			
Cost Saving	**CO_2 Savings**	**Energy Savings**	**Cost**	**Payback**
£2,000	14.3 Tonnes/year	32,725 kWh/year	--	--
Detail:	A large number of the fluorescent tubes installed within the council buildings are older T12 lamps. T12 5ft and 6ft tubes are used where T8 tubes are available as a direct replacement. Although some may have the same rated power consumption, T8 lamps are more efficient and consume less energy. The T12, 8ft tubes are 125W rated instead of the 100W versions that are available.			
Rationale:	These are more expensive to operate and cost the same to buy. *It is also worth noting that 8ft fluorescent tubes are going to be discontinued by most manufacturers, and in some cases already have been.*			
Risks:	Old practice of like for like may fall back into place.			
Replication Potential:	This can be easily replicated throughout the council operated building by opening communication with purchasers. Replicated saving for this measure would be difficult and may give an inaccurate figure due to the varying size and operations of the council. This saving is based on the site visit to all four sites but only two sites have these in place – the			

	depot and the academy.
Next Step:	Do not allow anymore T12 lamps to be purchased for any departments where they can be avoided. With 8ft fittings only use 100W tubes. Have a lighting recommendations list drawn up for purchaser.
Relevant Publications:	

Priority: 2	**Vending Machines**			
Cost Saving	**CO_2 Savings**	**Energy Savings**	**Cost**	**Payback**
£2,975	21.4 Tonnes/year	48,670 kWh/year	£250	Immediate
Detail:	Vending Machines at the sites are left on over night when not in use.			
Rationale:	The drinks and sweets are cooled overnight when it is not required. Putting plug-in timers on these will prevent them running when not required. Setting the clock to come on one hour before and one hour prior to the opening or operating hours of the building.			
Risks:	The time that they are required may change without the clock being changed. British summer and winter time would have to be considered. This should not be put on vending machine with perishable goods and manufacturers should be contacted if there is any doubt.			
Replication Potential:	This can easily be replicated by simply plugging in timers to the plug of the vending machines. Savings based on 50 vending machines through 180 buildings.			
Next Step:	Have a count of vending machine that do not contain perishable goods i.e., drinks, chocolate and crisps. Fit a timer clock to the plugs			
Relevant Publications:				

Priority: 3	Monthly Meter Readings			
Cost Saving	**CO_2 Savings**	**Energy Savings**	**Cost**	**Payback**
£6,640	57 .0 Tonnes/year	265,083 kWh/year	Needs to be assessed	Set up time

Detail:	Most of the energy data for the council is relying on monthly invoice data.
Rationale:	The invoice data, mainly gas, will have some degree of estimates. At the same time the monthly invoice data is not for calendar months but for 4 to 5 week period. Expanding the monthly metering readings that are taken will give a more accurate picture of energy consumption, allowing a more detailed analysis of the sites.
Risks:	There may be too much information to process and little time to analyse.
Replication Potential:	Most sites will a full time member of staff would be able to do this. The sites with part time or infrequent use are unlikely to be large consumers anyway. Savings based on an error of 1% per annum on billing. This is an indication as more than just errors could be shown when set up. For instance, an early warning for changes in practices or faulty controls.
Next Step:	Implement meter reading to more sites, targeting the larger users. If possible have someone on site enter the meter reading into a spreadsheet and send electronically.
Relevant Publications:	

Priority: 4	Boiler House Insulation			
Cost Saving	**CO_2 Savings**	**Energy Savings**	**Cost**	**Payback**
£235	3.7 Tonnes/year	19,200 kWh/year	£1,100	4.7 Years

Detail:	The valves and bends in the boiler houses were found un-insulated in all the sites.
Rationale:	Each valve, due to its thermal mass, is the equivalent of 1 metre of un-insulated pipe of the same diameter. Bends in pipes can be equivalent to ½m of bare pipe. For ease of maintenance, valve jackets with Velcro fasteners should be considered. An added benefit of insulation is to reduce boiler room temperatures, as excessive heat can lead to the premature expiration of motors and drives. It would also reduce the risk of thermal shock damage to the valves.
Risks:	May be removed and not fixed back on properly, although Velcro fastenings would reduce this risk considerably.
Replication Potential:	This can be achieved by an insulation program for all the buildings stock. Replicated saving for this measure would be difficult and may give an inaccurate figure due to the varying size and operations of the council's buildings. If there is an insulating standard for new installations, this should be added if not currently incorporated.
Next Step:	Investigate the costs and decide if this should be done in phases
Relevant Publications:	FEB008 - The Economic Thickness of Insulation for Hot Pipes

Priority: 5	Awareness Campaigns – Sticker and Posters			
Cost Saving	**CO_2 Savings**	**Energy Savings**	**Cost**	**Payback**
£650	4.7 Tonnes/year	10,640 kWh/year	Free	Immediate
Detail:	Staff, out with the schools, have had little encouragement to turn off lights and equipment.			
Rationale:	As mentioned to some degree in the previous energy management section, awareness of not leaving lights and equipment on when not required would reduce the electricity consumptions.			
Risks:	Staff may revert back to old ways. Some staff will be reluctant to incorporate changes in practices that may mean changing there habits.			
Replication Potential:	Poster and sticker campaigns throughout all buildings could be phased and an awareness newsletter including a feedback quiz with a small prize would prove beneficial and increase the potential for savings to be maintained. Saving is based on 5% savings from initial campaign, not including schools, and for all services with lighting and equipment use portioned at 8% of total. This figure is an indication and should be calculated in more detail for individual buildings. This would also have to be maintained.			
Next Step:	Phase a poster and sticker campaign throughout all council properties. Prepare a regular newsletter about council energy use and circulate throughout the council on building notice boards, also highlight improvements.			
Relevant Publications:	Order from numerous ranges of stickers and posters from helpline number in Where Next section.			

Priority: 6	**Pre-planned Maintenance - Lighting**			
Cost Saving	CO_2 Savings	Energy Savings	Cost	Payback
£Unknown	-- Tonnes/year	-- kWh/year	--	--

Detail:	In all sites visited, including the new builds, the lights are not cleaned and show signs of dirt build-up. Lamps are changed when they fail.
Rationale:	Regular cleaning will maintain designed lighting levels. If lights are left un-cleaned then the fittings can become permanently tarnished and reduce the lamps ability to provide adequate lighting. Lamps should be changed at the end of their useful life and not when they have already failed (normally when they have reached ~80% of their initial light output). This ensures that the lighting levels are maintained and when lamps expire they do not damage the fittings. It is worth noting that a fluorescent lamp that is flickering but has no light output is still drawing power at around its full rating. The fittings will be less likely to be replaced.
Risks:	Cleaning staff may not want the extra duty of cleaning lights on a regular basis. Staff responsible for lighting may not be open to pre-planned re-lamping in all buildings.
Replication Potential:	Easily replicable. Both measures would need to be included in staff duties elsewhere in the council and would require head of department backing. A direct cost saving would be difficult to calculate.
Next Step:	Discuss this measure with relevant parties about incorporated these measures into regular working practices.
Relevant Publications:	

Priority: 7	**Lead Condensing Boilers**			
Cost Saving	CO_2 Savings	Energy Savings	Cost	Payback
£Unknown	-- Tonnes/year	-- kWh/year	--	--
Detail:	Many sites have a number of old, inefficient boilers connected in Parallel. Rather than, for example, replacing all old boilers at Alva Primary School, it may be better to install one or two condensing boilers as lead boilers at a number of sites.			
Rationale:	The lead boiler/s in any system provides the largest percentage of heat output. Installing a condensing boiler as lead boiler will have a larger percentage impact per £ spent on gas consumption than replacing all boilers in a system. Some boilers are on their last legs and will need replacing in the near future. Although a boiler may look ok, its heat exchange efficiency may be very low as they are only expected to be used for 15-20 years.			
Risks:	-			
Replication Potential:	Any site with multiple, parallel boilers.			
Next Step:	Consider applying for implementation advice from the Carbon Trust to take this measure further.			
Relevant Publications:				

Priority: 8	**Lighting Controls**			
Cost Saving	CO_2 Savings	Energy Savings	Cost	Payback
£Unknown	-- Tonnes/year	-- kWh/year	--	--

Detail:

When installing new or refurbishing lighting schemes the control of the lighting should be considered.

Some areas could benefit from more intelligent lighting controls.

Rationale:

Many areas have a light switch controlling a large number of fittings and/or lighting is left on when not required. This practice can be improved upon by installing more intelligent control.

Areas that are often lit when not required are, for example, stores, cupboards, toilets, building entrances.

Toilets: Gents toilets can have a PIR sensor fitted that will control both the lights and urinal flushing, other toilets can have PIR sensors. Small individual toilets may not justify the cost of a sensor but instead a fop key system on entering to turn them on. Each building should be assessed for the best option.

Cupboards and stores: these are often left on for long periods and can often be over lit too. These could be fitted with fop keys to reduce the time the lights are on.

Building entrances: these lights tend to be on for the duration of opening, often when not required. A photosensor could switch lights on only when it is dark outside. This may be a case of using an existing sensor for outside lighting or fitting a new sensor where costs can be paid back within a reasonable timeframe.

It is also important that enough switches are installed to allow users the opportunity to control banks of lights and close to the area that the lights are installed. Having a central bank of lights some distance away will reduce the likelihood of them being turned off when not required. *Note: In new developments there are maximum distances from switches to fittings that Building Control will allow.*

Motion sensors should also be considered for office corridors, schools, areas with large number of lights and areas of infrequent use.

As a rule of thumb, proper lighting control can reduce electricity demand for lighting by 3-5%.

Risks:

The cost of sensors may not be justified for all areas.
It may not be practical in all instances to have automatic controls.

Replication Potential:

Most building will have some areas that will benefit from improved lighting controls.

Next Step:

Have building operators carry out a simple assessment of areas that are poorly controlled and investigate both the practicality and the cost benefit of installing automatic control or improved switching.

Relevant Publications:	Various lighting guides from The Carbon Trust website/helpline are available. Also see flow diagram in Appendix 1

4.3 Site Specific Opportunities

Priority: 1	Kelliebank Depot – Electric Heating			
Cost Saving	**CO_2 Savings**	**Energy Savings**	**Cost**	**Payback**
£2,300	16.8 Tonnes/year	37,450 kWh/year	£150	Immediate
Detail:	The Portakabins are electrically heated and have poor control. Many of the heaters are controlled by a switch beside them and with the operations of the depot 24 hour; these are likely to be left on overnight. The canteen area would also benefit from a room thermostat. It looked like it was common practice that the smaller offices had the heating left on whilst empty.			
Rationale:	The electric heaters should have a room thermostat and an optimum start thermostat connected to the heaters. For the lockers area this could be done by connecting a time clock and a thermostat at the distribution box. This will result in the minimum of re-wiring and disruption. The thermostat should be put in a representative place. The time clock should be set with actual hours used, i.e., morning, lunch, shift change. There would be little need out with these times. The smaller offices should have the heating linked to the lighting circuit so it is isolated when empty. However this will need the occupants to turn their lights off when leaving, which was not evident in most offices. Staff training discussed earlier is very important.			
Risks:	Thermostat may be interfered with. Thermostat may be positioned wrongly. The smaller office occupants may not turn things off.			
Next Step:	Have the lockers and canteen areas connected to a room thermostat and optimum start thermostat. Have isolating switches for the small offices in the Portakabins to turn off heating when leaving, assuming lights are too.			
Relevant Publications:				

Priority: 2	Glenochil Nursery – Electricity Use			
Cost Saving	**CO_2 Savings**	**Energy Savings**	**Cost**	**Payback**
£2,770	41.0 Tonnes/year	93,200 kWh/year	£--	-- Years
Detail:	The electricity use for the nursery is very high when compared to other Nurseries.			
Rationale:	The electricity use for the site should be investigated. If the nursery was operating at the benchmark for this operation/building type they would consume around 90,060 kWh. This is a difference of 93,200 kWh worth around £2,700 per annum. Looking at the monthly consumption figures, appendix 1, there is a seasonal trend that would normally be associated with electric heating. However, there were no signs of direct electric heating on-site. This may release funds to re-invest in the recycling centre for other projects, if the centre has its own budget.			
Risks:	None			
Next Step:	Investigate the high electricity use. Do some monitoring with a data logger if necessary.			
Relevant Publications:	ECG091 - Energy Benchmarks and Saving Measures for Protected Greenhouse Horticulture in the UK			

Priority: 3	Glenochil Nursery – Boiler Control			
Cost Saving	**CO_2 Savings**	**Energy Savings**	**Cost**	**Payback**
£700	10.8 Tonnes/year	57,075 kWh/year	£--	-- Years
Detail:	The two boilers serving three of the greenhouses, on day of visit, cycle excessively. As one stopped firing, the other fired up. Additionally, the boiler outputs were set very low on the day of the site visit which is not recommended for these boilers. It would appear that the boilers are linked up to the central control system, therefore the reasoning behind the low outputs and excessive firing is unknown. Set boilers to a setting that provides an adequate return temperature and fix boiler sequencing controls.			
Rationale:	Excessive cycling is inefficient as the boilers have to go through a wasteful firing process many more times than necessary. In addition the wear and tear on the boilers and burners will be high as they repeatedly go through the short but stressful pre-fire process. A minimum return temperature of around 55-60°C is required for non-condensing boilers to avoid corroding the flues and boiler heat exchangers. To achieve thermal comfort in the greenhouse and still maintain boiler return temperatures, it may be necessary to use variable temperature circuits, which would also provide an energy saving.			
Risks:	On-site staff may be tampering with manual controls believing they are in control of the greenhouse temperatures.			
Next Step:	Have a heating engineer and controls engineer investigate and correct the excessive cycling and boiler output settings.			
Relevant Publications:				

Priority: 4	Alva Primary – Re-assess heating in old building			
Cost Saving	**CO_2 Savings**	**Energy Savings**	**Cost**	**Payback**
£ 990	15.4 Tonnes/year	80,970 kWh/year	£5,300	5.4 Years
Detail:	The heating in the older building is one zone. This causes problems with under-heating one side of the school. To get heat to this side the other side has to be over-heated. The building is split in two by a burn meaning lengthy pipe runs to the second area.			
Rationale:	The two different parts of the school should be operating on different zones. If new, wall hung boilers were installed in the cleaning store in the main canteen area, the school will have to two separate zones independent from one another. This would be the preferred option as the boiler house is some distance away from the second area and it would be relatively straightforward to tap into the heating circuit from this cupboard (the existing pipe work comes through this area). When considering this option thermal comfort should be the primary concern rather than energy savings. A heating system that does not provide comfort is 0% efficient. Further advice on the new boilers/heating system, could be followed up through the Carbon Trust, see Where Next section below.			
Risks:	The new boiler could have high excess capacity if sized wrong. All the existing boilers will not be required.			
Next Step:	Consider applying for implementation advice from the Carbon Trust to take this measure further.			
Relevant Publications:				

Priority: 5	Kelliebank Depot – Door Interlocks			
Cost Saving	**CO_2 Savings**	**Energy Savings**	**Cost**	**Payback**
£75	2.7 Tonnes/year	6,025 kWh/year	£400	5.3 Years

Detail: The heating for the depot is controlled by a central BEMS system. The heaters are allowed to heat the various garages when the doors are open.

Rationale: If there are door interlocks connected to the heating, the heaters will stop when they are opened. This will prevent the heaters blowing air straight out the door. This will also encourage people to close the doors.

A further measure would be to upgrade the more frequent used doors with higher insulated doors that are faster acting. This reduces heat loss by 90% when closed but will have a long payback based on this alone. The cost to upgrade a door will be approx. £2,500 each.

Risks: The door interlock will have to be integrated so that the BEMS control is not affected.

Staff may damage or by-pass the door interlocks.

Next Step: Have the bay doors interlocked with the heaters.
Investigate the option of upgrading the bay doors from metal shutter to high insulated fast acting.

Relevant Publications:

Priority: 6	Tulligarth Leisure Centre – Large Gym Hall Heating			
Cost Saving	**CO_2 Savings**	**Energy Savings**	**Cost**	**Payback**
£110	1.7 Tonnes/year	8,775 kWh/year	£100	0.9 Years
Detail:	The large gym hall is controlled by a time clock only.			
Rationale:	The gym hall should also be temperature controlled. This will prevent overheating.			
Risks:	The thermostat will have to be protected from being hit by the likes of a ball.			
Next Step:	Install a thermostat/s at a representative place and connect to the heating.			
Relevant Publications:				

Priority: 7	Glenochil Nursery – Heating and Ventilation
Detail:	The passive stack ventilation in the nursery is controlled by a thermostat recording high level temperatures. This was turned to manual and operated on/off. As the ventilation is controlled by the temperature, the ventilation will likely to be on when the heating is on too. This possibility for this happening was shown through the temperature difference at high level and low level being 3.3°C. It would appear that simultaneous heating and passive cooling are unavoidable with current automatic controls. The boilers are currently being considered for renewal and consequently the opportunity should be taken to integrate the systems.
Rationale:	The boilers are currently being considered for renewal and consequently the opportunity should be taken to integrate the systems. Other considerations that should be taken into account for the new boilers as well as improvement to the greenhouses are: • Better sealed greenhouses – reducing the heat load through air leaks • Inclusions of thermal screens – fixed or movable • Temperature integration – uses an average temperature rather than an absolute • Flue gas condensing – increased efficiency • Integrated heating and ventilation controls • Heat recovery • Waste as a fuel If expansion of the heating is desired, instead of very large pipework, smaller pipework could be installed flowing through trench heaters. This would allow lower heat losses directly through the glazing, lower installation costs, as well as more uniform heating in the greenhouses (with more flexible heating runs from smaller pipework).
Risks:	-
Next Step:	Further advice on the new boilers/heating system, could be followed up through the Carbon Trust, see Where Next section below.
Relevant Publications:	

Additional items:

Tulligarth Leisure Centre – Corridor Lighting
The corridors in the leisure centre have a large number of fittings that are not required, with excessive lux levels recorded. Corridors do not need to have high levels of lighting. These lights are for the duration of the centre opening and could be reduced by 8 fittings. An example is the entrance to the changing room – this is 1.5 metres long and has two 18W fittings in place when one may be enough. As long as the fittings are distributed evenly no black spots should be seen. Easiest way to do this would be to isolate some fittings and check lighting levels. Once lighting levels are at recommended levels, remove or isolate the unnecessary lights. The saving from this would be approximately £35 per annum.

Tulligarth Leisure Centre – Squash Court
There is no heating in this court and there was condensation forming on the windows. This can lead to fabric damage and should be considered for some sort of fabric protection heating, to maintain 10°C at a minimum. As this is a reasonable sized room oversizing of any heating may be costly and also discomforting to any players who use it.

Tulligarth Leisure Centre – Large sport hall
The lights in the large sport hall seem to be positioned strangely, as one row of the lights is very near to the wall. This will reduce the distribution of the light to the floor area. It would normally be expected that the light fittings are spread evenly throughout a hall.

Lornshill Academy – Corridor Lighting
The lighting in the corridors are 4ft, T12 fittings. However, these fittings are not running in the same direction as the corridors, as you would expect, but going across the width of the corridors. This creates black spots on the ceiling and floors, uneven distribution along the corridors, and requires more lights to provide the adequate light levels. This should be highlighted as a bad installation, no to be repeated.

High Bay lighting (sport halls)
As an example, the small gym at Tulligarth has 6 x 250W SON lights that are left on for the duration of school hours as these can not be turned on and off regularly as they have a long warm up time. For the future, there would be an opportunity for installing 4x55W compact fluorescent fittings, like the main hall, allowing for on/off switching as well as an occupancy sensor. This would also be better for maintenance as they already have to stock these lights for the main hall and it is unlikely that all four tubes would fail in the fitting at the same time. However, replacing these lights will have a long payback therefore, would not have any immediate savings. An alternative would be set up a lighting policy to prevent any like for like changes and take advantage for improving the light fittings gradually.

Glenochil Nursery – Compost Heat Recovery

Compost generates significant heat as it breaks down and it may be possible to recover this heat to warm the greenhouses. See:

http://www.actahort.org/books/399/399_19.htm

Glenochil Nursery – Waste boiler/incinerator

Another future project, which could be considered when the heating system is updated, could be to install a waste boiler/incinerator. This would allow you to burn pallets, paper, textiles, timber, sawdust and cardboard. The recycling centre could offer people from the surrounding areas to leave their tree cuttings and garden waste like they are just now given the nursery free fuel. An assessment of the current wood waste on site would give an indication of the amount of heat that could be produced. The feasibility of saving money in a reasonable payback should be possible but would require, initially, some investigation.

As there is an intention to make the Nursery and Recycling centre an educational centre, a waste boiler would show children an alternative means of disposing of waste while providing "green" heating.

Kelliebank Depot – Portakabins

Portakabins are not supposed to be permanent buildings. The electricity supply into them should be monitored for a period and have the cost to run them evaluated. The total electricity spend at the site is 402,702 kWh per annum when it would be anticipated that the electricity should be around 388,648 kWh. This is a difference of 73,112 kWh worth approx £4,467. How much of this is attributed to the Portakabins. It may even be the case that the Portakabins may be costing more than expected. A possibility could be to move operations inside or relocate some. Whilst this may require upheaval, it might be possible once the savings that can be made are realised. *If electricity prices increase they may be further justification to have something more permanent put in place.*

Kelliebank Depot – Warm air Heaters

Although most of the warm air heaters appear to be controlled by the BEMS system, the one in Land Services looked to be stand-alone. If this is the case, the more up to date control box from one of the garages should be installed here as its own controller was in very bad condition. All the heaters should be confirmed as being controlled by the BEMS. This could be done at the same time as investigating the gas consumption at the site.

Kelliebank Depot - Lighting

The lighting in the garages is controlled by on/off switches and were on even when no one was working in them. Consideration should be given to, installing fob key-card switches in the garages and incorporate as working practice that these are taken with the workers, ensuring that the lights are turned off when they leave. This system would have to be taken up by the staff. It should also be considered that staff may jam things into the switches leaving lights on. Alternatives may be viable including motion sensors but this may not be practical if objects are in the way. A practical solution would have to be investigated with the depot managers.

Some of the garages have lighting at two levels. The high lighting is not always required with good amount of daylight in the garages. Where two levels of lighting are in place, it would be good practice to have the high level lights put on a sensor. The benefit of this would have to be individually assessed.

Kelliebank Depot – Gas Consumption

As mentioned previously in the benchmark section, the gas benchmark figure above typical when compared to published figures, and the extent of this is somewhat surprising as this is controlled by a central BEMS system. Therefore, this benchmark figure should be investigated: are the heaters being controlled on site, bypassing the BEMS system, are they using a booster button continuously, to what extent are the bay doors allowing the heat out? A further point that should be considered is whether the floor area or consumption figures are correct.

5. Where Next

5.1 Following the survey

The purpose of the Action Plan described in this report is to help your organisation save energy. These savings will obviously only be achieved if the measures detailed in this report are properly implemented. The Carbon Trust offers a range of support to assist you implement your Action Plan. This section details the next steps that should be taken on receipt of the Action Plan, and further support that is available.

Following receipt of the report the person responsible for commissioning the survey should discuss the results with relevant colleagues and managers to agree who will be responsible for overseeing the implementation of the plan and individuals responsible for each action (if this is different). A timetable should be agreed to monitor progress and establish firm dates by which specific actions should be completed. The table in Executive Summary provides a convenient column to identify responsible individuals and the timetable.

This report provides specific advice on how to take forward each of the activities and publications which will provide more detailed information. Listed publications will be sent to you. Additional publications can be obtained from either:

- Calling the Carbon Trust Energy Helpline – 0800 58 57 94 or
- The Programme web-site www.thecarbontrust.co.uk/energy

If you are unclear how to proceed with specific activities the Helpline team will also provide further advice.

5.2 Executive Briefing

As part of our follow-up support we encourage the senior management within the organisation to receive a briefing from our consultant. The briefing provides an ideal opportunity to explain the benefits of implementing the plan and respond to any concerns raised. If you are not scheduled to receive an Executive Briefing as part of follow-up support please contact your client manager or the Helpline to determine if you are eligible for a visit.

5.3 Providing Feedback

Following receipt of the final report we will email you a Feedback Form to complete about your experiences of working with the Carbon Trust and our consultant. The Carbon Trust values all feedback obtained. Part of this form provides you with an area in which you can request areas of further support if applicable. Please complete and return this web form using the link provided.

5.4 Follow up support

At some time after the survey has been completed most clients are contacted by their Client Manager to discuss the progress being made in implementing the Action Plan. For sites that demonstrate they have made progress, and have a commitment to implementing further actions, the Carbon Trust has a range of products to provide further assistance. Follow-up support can take a variety of forms including:

- **Helpline advice** – either from the Helpline or a consultant, this is designed to assist you overcome a specific technical issue that is hindering progress. You may call the Helpline at anytime to receive telephone advice.

- **Implementation advice** – Provides more extensive advice on how to implement a specific recommendation (or recommendations) within the Action Plan. A consultant will visit your site to provide both technical and practical project management advice. The consultants are not able to recommend specific suppliers but will provide guidance on the options available to you and how to make an informed decision about which to appoint.

- **Technical training** – Either delivered directly on your site or through an organised event, we can provide training to individuals or teams about specific aspects of energy efficiency.

- **Staff awareness training** – Delivered either by enabling you to attend a training event run by the Carbon Trust; or through "training a trainer" support provided by a consultant on your site. The Carbon Trust also has a range of self-help guides and electronic toolkits to assist with staff awareness training.

- **Energy management assessment** – For sites that have made good progress in implementing their Action Plan and are now examining ways to embed good practice in energy efficiency into everyday management of their business. A consultant will visit your site and complete a questionnaire to identify areas of strength and weakness in the energy management practices operated by the organisation. Your organisation will be scored in 8 dimensions of energy management and a series of actions recommended strengthening current procedures.

- **Detailed Survey –** To investigate the feasibility and potential savings from a specific energy saving opportunity, such as replacement of equipment with significant energy consumption, the Carbon Trust will fund two-free days plus 50% of the costs of a detailed survey to examine the practicality and benefits of proceeding with significant capital investment.

- **CHP advice** - Specific advice to organisations interested in use of CHP (Combined Heat and Power). Advice ranges from initial feasibility studies, design and project implementation advice for both new developments and refurbishments.

- **Design advice** – For organisations engaged in new build or major refurbishment projects the Carbon Trust will provide design advice to ensure appropriate energy efficiency measures are incorporated into the design and lifetime energy costs reduced. Both fully and part funded advice is available.

- **Next steps advice –** For sites that have implemented most actions in their plan we will send the consultant back to your site to identify areas of potential further improvement. As part of this visit we will obtain information to enable your organisation to be included amongst our examples of best-practice (if this is acceptable to you).

If you are interested in receiving follow up support to assist in implementing your Action Plan please contact the Carbon Trust Energy Helpline at anytime. Before receiving follow-up advice we do however expect the site to demonstrate good commitment to implementing the action(s) for which they will receive the support.

5.5 Impact Assessment

Six to twelve months after completing the survey a client manager will contact you to discuss how successful you have been in implementing the Action Plan and the level of energy savings you have achieved overall in order that we can evaluate the effectiveness of our programme. We would be grateful if you could make time to take this call and provide the information we are seeking.

5.6 ENVIROWISE

This report focuses upon energy efficiency but making optimum use of other resources such as water and raw materials, and waste minimisation, also offers cost savings for your organisation. The Envirowise programme (funded by the Department of Trade & Industry and the Department for Environment, Food and Rural Affairs) provides a helpline service on environmental issues and publications on waste minimisation, clean technology, water and effluent savings, and more. Further information can be obtained from the Envirowise website http://www.envirowise.gov.uk or from the Environment & Energy Helpline 0800 58 57 94 and selecting the Environment option.

Appendix 1 – Supplementary Information (including Sites Energy Consumption and Spend)

EXAMPLE Energy Policy
[A Council]

Statement of Commitment

[A Council], as part of the corporate strategy to the environment, is committed to responsible energy management and will endeavour to practice energy efficiency throughout all buildings, whenever it is cost effective to do so. Consequently, reducing the council's impact at both national and local level.

Policy

[A Council] recognises the substantial benefits to be gained in using energy efficiently and effectively, especially in terms of cost savings and the environmental effects it has.

[A Council] will take proactive measures to ensure that energy consumption and costs will be reduced to a level consistent with maintaining efficiency and acceptable working conditions and operations.

[A Council] will promote and adopt the best practice standards for design and energy efficiency throughout the council owned and operated buildings.

[A Council] will encourage and support the wider community to improve energy efficiency that will provide benefits to both the environment and the local economy.

Objectives

Our long term objectives are:

1. to achieve a 10% reduction in energy consumption over the next three years.
2. to reduce the amount of pollution, particularly CO_2, caused by our energy consumption.
3. to reduce, wherever practical, our dependence on fossil fuels through the use of ambient and renewable energy sources including the purchase of 'green electricity'.
4. where appropriate, energy efficiency measures will be incorporated into new services, buildings and products within the council.
5. to continuously improve staff awareness and involvement through organised training.
6. to buy fuels at the most economic costs.
7. to encourage increased investment for energy efficiency within the council.

8. to continue the monitoring and targeting programme and further develop procedures for controlling energy consumption.

9. to evolve energy management techniques throughout the council and at all levels.

In the short term, our immediate aims are:

1. to establish a programme of energy efficiency awareness training directed at all key end users with emphasis on the benefits of energy efficiency

2. to further develop and maintain an energy reporting system which will include performance changes, improvements and future objectives for each building.

3. to implement a cyclic programme of energy audits providing recommendations involving the management, operation use, maintenance and fabric of council owned and operated properties.

4. to increase the profile of energy use within the council.

5. to assess alternative means of energy and implement were viable.

6. to install a procurement policy for the purchasing of low energy rated equipment.

7. to put more emphasis of end user ownership of energy used through quantifying and reporting back.

8. to increase the level of communication related to the council's energy use to all the council's staff.

The above is stated objectives and targets that should be communicated to the public as well as the council employees. The next sections provide "behind the scenes" policy that sets out who is responsible and how the objectives will be achieved.

Responsibilities

The responsibility of controlling consumption of energy resides with the end users who are accountable to relevant supervisors/managers

The cost of the purchasing energy resides with the Energy Officer, within the [A] department, and is directly accountable to the Head of Services, [A Department].

The responsibility for co-ordinating energy management activities resides with the Energy Officer along with the responsibility for formulating and implementing the energy policy, and is directly accountable to the Head of Services, [A Department].

Structure

The Energy Officer will make monthly reports available for each department on the energy management activities giving a break down of

- the expenditure on consumptions,
- energy management activities undertaken,
- the performance of individual buildings,
- highlight any anomalies for investigation, and
- any physical improvements made that have an effect on consumption.

The Energy Officer will report to the Head of [A Department] and Chief Executive Services on a quarterly basis given a break down of

- energy consumption throughout the council,
- energy management activities undertaken,
- relevant performance tables for each building types,
- any progress made,
- any activities planned prior to the next reporting period, and
- highlight any difficulties encountered.

Action Plan

During the coming year, the following energy management activities will be undertaken but not exclusive:

1. A programme of work with timescales and specific milestone.
2. Focused energy awareness training with the aim of achieving energy savings without significant investment costs.
3. Continue to review fuel choices and tariff selections to ensure the most appropriate energy services are being exploited fully.
4. Set up a reporting schedule and open communication throughout the council on the importance of energy management.
5. Investigate the possibility of an Energy Management Committee made up of representatives from the major energy users/departments with the specific responsibility of directing the energy policy throughout the council.
6. Continue to explore ways for further investment in beneficial Energy Management Techniques.

Review

All energy management activities are subject to review at any stage but will occur, as a minimum, annually. This will involve the Energy Officer, Head of [A Department], and the Chief Executive. An annual audit will be presented at the review stage. The audit will report the progress made and the return on investments for individual activities undertaken in this time period. The audit will be open for comment and all findings published to relevant parties.

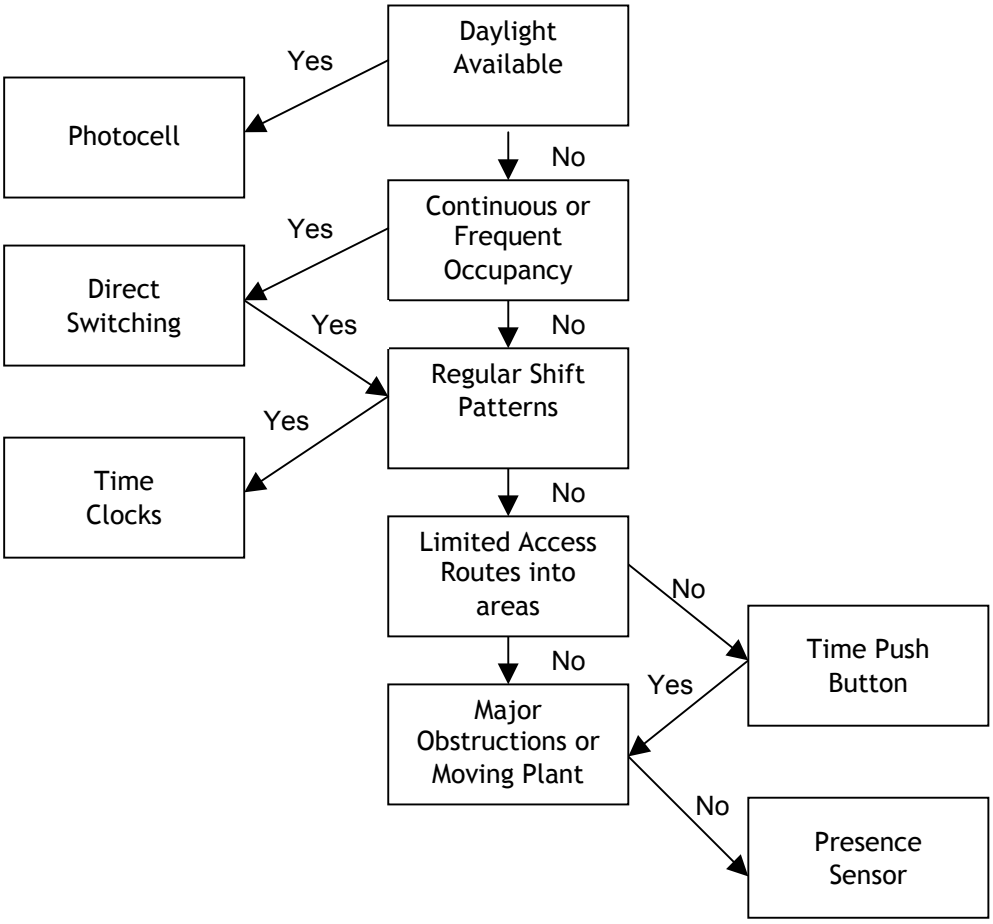
From Sustainable government website

Departments need to develop delivery plans for the following targets. Plans should take into account future changes in estate size, building type and activity and consider how best such changes could be utilised to reduce carbon emissions, increase energy efficiency and support renewable energy production.

E1 - Government Departments to reduce absolute carbon, from fuel and electricity used in buildings on their estate, by 12.5 per cent by 2010-11, relative to 1999-2000.
E2 - Government Departments to increase the energy efficiency of the buildings on their estate, measured in terms of kWh of (1) fuel and (2) electricity use per square metre of buildings floor area, or estate area*, by 15 per cent by 2010-11, relative to 1999-2000. **Due to the diversity of the Government Estate, Departments can report using either the floor area of their buildings, or the total estate area.*
E3 - Government Departments to source at least 10 per cent electricity from renewable sources by 31 March 2008*. This will be measured by kilowatt hours for: • Purchasing of renewable electricity • Self-generation of renewable electricity (excluding CHP)
E4 - Government Departments to source at least 15 per cent of electricity from Good Quality Combined Heat and Power by 2010. (Allowances will be made for those Departments that already purchase 100 per cent renewable energy.)
E5 - By March 2006 Government will develop a long-term strategy, up to 2020, for sourcing renewable energy on the Government Estate.
E6 - Departments to include clauses to ensure opportunities are identified and measures taken for reducing carbon emissions and collecting energy data (by fuel type), as far as practical, in all estate management contracts* initiated from August 2004.

"From 1 November 2003, all new contracts by central Government departments must meet minimum energy efficiency standards, as well as value for money, when purchasing certain types of product. Types of product that must meet these criteria include IT equipment, gas boilers, white goods (eg fridges and washing machines), televisions, lighting systems and lightbulbs."

Lighting control flow diagram



Taken from Lighting Guide 7: Installers guide to the assessment of lighting installations

Glenochil Nursery – Consumption data

	Electricity				Gas				Total	
	kWh Cum	kWh	£ Cum	£	kWh Cum	kWh	£ Cum	£	kWh	£
Apr-03	6,287	6,287	374.73	374.73	47,061	47,061	587.79	587.79	53,348	962.52
May-03	9,984	3,697	615.77	241.04	80,915	33,854	1,010.62	422.83	37,551	663.87
Jun-03	13,110	9,413	817.34	201.57	113,676	32,761	1,419.82	409.2	42,174	610.77
Jul-03	15,954	6,541	1,024.56	207.22	147,530	33,854	1,842.65	422.83	40,395	630.05
Aug-03	18,374	11,833	1,206.81	182.25	181,383	33,853	2,265.48	422.83	45,686	605.08
Sep-03	21,784	9,951	1,423.87	217.06	210,721	29,338	2,631.90	366.42	39,289	583.48
Oct-03	27,132	17,181	2,291.25	867.38	252,235	41,514	3,139.34	507.44	58,695	1,374.82
Nov-03	36,463	19,282	2,881.43	590.18	310,080	57,845	3,852.18	712.84	77,127	1,303.02
Dec-03	46,289	27,007	3,486.26	604.83	376,498	66,418	4,670.66	818.48	93,425	1,423.31
Jan-04	55,417	28,410	4,056.25	569.99	446,658	70,160	5,535.25	864.59	98,570	1,434.58
Feb-04	62,459	34,049	4,545.65	489.40	513,568	66,910	6,359.77	824.52	100,959	1,313.92
Mar-04	71,027	36,978	5,077.50	531.85	586,904	73,336	7,263.50	903.73	110,314	1,435.58
1 year total		**183,264**		**5,448**				**7,060**		**12,508**

Kelliebank Depot – Consumption Data

	Electricity				Gas				Total	
	kWh CUM	kWh	£ CUM	£	kWh CUM	kWh	£ CUM	£	kWh	£
Apr-03	27,445	27,445	1,441.45	1,441.45	44,873	44,873	560.46	560.46	72,318	2,002
May-03	53,135	25,690	2,799.56	1,358.11	71,741	26,868	896.04	335.58	52,558	3,696
Jun-03	75,520	22,385	3,983.98	1,184.42	97,742	26,001	1,220.79	324.75	48,386	5,205
Jul-03	96,433	20,913	5,113.34	1,129.36	124,609	26,867	1,556.37	335.58	47,780	6,670
Aug-03	116,827	20,394	6,208.80	1,095.46	151,477	26,868	1,891.95	335.58	47,262	8,101
Sep-03	138,924	22,097	7,384.11	1,175.31	175,347	23,870	2,187.85	295.90	45,967	9,572
Oct-03	188,035	49,111	9,520.02	2,135.91	230,309	54,962	2,865.15	677.30	104,073	12,385
Nov-03	222,344	34,309	11,450.69	1,930.67	293,961	63,652	3,649.55	784.40	97,961	15,100
Dec-03	265,118	42,774	13,625.19	2,174.50	370,386	76,425	4,591.34	941.79	119,199	18,217
Jan-04	309,339	44,221	15,864.70	2,239.51	452,298	81,912	5,739.79	1,148.45	126,133	21,604
Feb-04	349,696	40,357	17,912.90	2,048.20	526,603	74,305	6,684.42	944.63	114,662	24,597
Mar-04	389,496	39,800	19,928.32	2,015.42	602,308	75,705	7,617.34	932.92	115,505	27,546
Apr-04	31,724	31,724	1,597.94	1,597.94	44,873	44,873	560.46	560.46	76,597	2,158
May-04	63,863	32,139	3,216.52	1,618.58	71,741	26,868	896.04	335.58	59,007	4,113
Jun-04	86,459	22,596	4,367.76	1,151.24	97,742	26,001	1,220.79	324.75	48,597	5,589
Jul-04	108,089	21,630	5,472.08	1,104.32	124,609	26,867	1,556.37	335.58	48,497	7,028
Aug-04	127,467	19,378	6,457.37	985.29	151,477	26,868	1,891.95	335.58	46,246	8,349
Sep-04	152,130	24,663	7,708.89	1,251.52	175,347	23,870	2,187.85	295.90	48,533	9,897
1 year total		**402,702**		**20,253.10**		**602,308**		**7,617.34**		**156,583**

Alva Primary School – Consumption Data

	Electricity						Gas				Totals
	General	Catering 1	Catering 2	Catering 3	Total	Main	Kitchen	New Ext	Total	kWh
Apr-03	8,804	209	246	305	9,564	30,560	1,367	2,176	34,103	43,667
May-03	9,056	338	398	436	10,228	18,412	1,972	2,024	22,408	32,636
Jun-03	7,264	126	400	400	8,190	11,035	763	468	12,266	20,456
Jul-03	5,000	100	469	180	5,749	6,360	636	468	7,464	13,213
Aug-03	4,867	132	232	0	5,231	4,420	859	0	5,279	10,510
Sep-03	10,151	368	402	453	11,374	17,903	2,162	527	20,592	31,966
Oct-03	13,538	510	494	526	15,068	57,017	2,735	3,966	63,718	78,786
Nov-03	7,839	829	630	875	10,173	23,691	1,081	4,680	29,452	39,625
Dec-03	8,500	0	0	0	8,500	38,732	1,367	5,850	45,949	54,449
Jan-04	8,500	0	0	0	8,500	93,874	2,512	5,873	102,259	110,759
Feb-04	8,839	0	0	0	8,839	41,435	1,049	6,178	48,662	57,501
Mar-04	9,188	727	583	821	11,319	79,277	3,148	5,967	88,392	99,711
Total	101,546	3,339	3,854	3,996	112,735	422,716	19,651	38,177	480,544	593,279

Tulligarth Leisure Centre and Lornshill Academy – Consumption Data

Electricity			
	Tulligarth Complex		
	Main	Flood light etc.	Total
Apr-03	4,153	2,423	6,576
May-03	3,811	1,719	5,530
Jun-03	5,833	776	6,609
Jul-03	2,333	586	2,919
Aug-03	4,535	2,257	6,792
Sep-03	4,008	3,206	7,214
Oct-03	4,431	6,158	10,589
Nov-03	4,238	7,530	11,768
Dec-03	4,337	6,799	11,136
Jan-04	5,186	7,340	12,526
Feb-04	5,083	6,952	12,035
Mar-04	4,247	5,362	9,609
	52,195	51,108	103,303

Lornshill Academy			
	Main	Catering	Total
	kWh	kWh	kWh
Apr-03	50,830	3,690	54,520
May-03	54,260	5,930	60,190
Jun-03	43,620	4,720	48,340
Jul-03	35,200	340	35,540
Aug-03	37,710	2,000	39,710
Sep-03	57,660	4,730	62,390
Oct-03	57,870	3,290	61,160
Nov-03	75,200	3,850	79,050
Dec-03	62,230	2,230	64,460
Jan-04	54,680	3,100	57,780
Feb-04	66,840	2,940	69,780
Mar-04	65,460	4,280	69,740
	661,560	41,100	702,660

Gas				
	Lornshill and Tulligarth			
	Main	Technical	Technical B/house	Total
Apr-03	126,278	5,279	38,189	169,746
May-03	86,337	3,975	40,552	130,864
Jun-03	28,397	3,403	70	31,870
Jul-03	29,383	4,102	0	33,485
Aug-03	35,870	3,593	70	39,533
Sep-03	68,402	4,039	23,400	95,841
Oct-03	134,005	8,459	53,200	195,664
Nov-03	182,341	5,915	73,067	261,323
Dec-03	241,775	5,756	87,411	334,942
Jan-04	167,936	4,198	73,757	245,891
Feb-04	211,025	5,342	87,516	303,883
Mar-04	194,234	5,215	75,582	275,031
	1,505,983	59,276	552,814	2,118,073

Total Excluding flood lighting		
Electricity	Gas	All
kWh	kWh	kWh
58,673	169,746	228,419
64,001	130,864	194,865
54,173	31,870	86,043
37,873	33,485	71,358
44,245	39,533	83,778
66,398	95,841	162,239
65,591	195,664	261,255
83,288	261,323	344,611
68,797	334,942	403,739
62,966	245,891	308,857
74,863	303,883	378,746
73,987	275,031	349,018
754,855	2,118,073	2,872,928

Appendix 2 – Energy Management Assessment

This appendix details the findings of the Energy Management Assessment that has formed the basis of the recommendations made in the body of this report.

Management Commitment

This section identifies if there is a clear statement of policy that shows the commitment of management to the efficient use of energy, and whether there are suitable allocations of responsibility for energy and adequate resources are assigned.

Energy Policy

Characteristic	Score		Comment
	Actual	Maximum	
A written Energy Policy	1	2	*Awaiting approval*
Agreed with Senior Management	1	2	*Awaiting CEO and head of services approval*
Promulgated to all employees	0	1	
Been written recently (within 3 years)	1	1	*>3mths*
Contains commitment to the development / deployment of quantitative improvement targets	2	2	*Yes, reduce by 10% across the board within 3 years*
Commitment to annual reporting (public or to all employees)	1	1	*Annual reporting envisaged.*
Date for revision	1	1	*It's a 3 year plan*
Total Score	7	**of 10 maximum**	

Organisational Structure

Characteristic	Score		Comment
	Actual	Maximum	
A manager at board (or equivalent) level with responsibility for energy	4	5	*Head of Services is energy champion and endorsed by CEO*
Appointment of person with designated responsibility for energy	4	5	*Energy Officer in place although has constraints with time and resources.*
Job description and assigned adequate resources for designated person	1	3	*Resources are stretched, no formal job description*
Regular management meetings to review energy use	0	1	*No*
Local energy responsibles appointed	0	1	*Plans for future*
Total Score	9	**of 15 maximum**	

Assessors opinion:
The council are at the final stages of putting a formal energy policy in place. This is receiving backing at a high level. The resources and time available through one individual means they have had to prioritise more and may be stretched in some areas. Continuing to put formal structures in place that will reflect the council operations should prove more effective in the long run. The development of this area will be slow as it is a one man operation.

Energy Information Systems

This section identifies if there are systematic procedures for monitoring and understanding energy consumption, and for setting suitable improvement targets.

Procedures for Monitoring and Analysing Energy Use

Characteristic	Score Actual	Score Maximum	Comment
Regular collection of energy consumption data	3	4	*Yes but can be expanded to other sector other than schools and some larger buildings*
Analysis of consumption against energy drivers (production, temperature, etc.)	4	4	*Degree day performance, comparisons with previous years*
Analysis of consumption patterns (vs. time)	3	3	
Recent site energy survey undertaken	1	2	*Only when problem arise or are noticed through the monitoring program*
Comparison of energy data with utility bills	1	1	*Yes*
CO_2 emissions calculated/analysed	1	1	*Yes, have increased renewable produced electricity from 10% to 30%*
Total Score	13	**of 15 maximum**	

Target Setting

Characteristic	Score Actual	Score Maximum	Comment
Energy saving targets based on analysis	4	5	*Published figures used for energy efficiency and awareness etc. to derive 30% target*
Targets challenging, but achievable*	3	3	*Yes, recent program was successful through school energy program. New target of 30% of total is challenging*
Performance compared with appropriate benchmarks (internal or external)	2	2	*Against published benchmark figure and council own through league tables.*
Total Score	9	**of 10 maximum**	

** if an earlier Opportunity Assessment has been conducted, use this as a guide for "challenging but achievable", otherwise ask client to justify target. If no rationale with low estimate or unachievable, mark down score to 1 only.*

Assessors opinion:
This is an area that the council is strong in but has also been the area that they have focussed most of their attention on.

Staff Involvement

This section identifies if the opportunities afforded through involving staff in energy efficiency are being taken advantage of.

Involvement and Training of Staff

Characteristic	Score Actual	Score Maximum	Comment
Energy specific training for staff key to energy, e.g. maintenance, boiler-house, caretakers, security, etc.	2	4	*SEAL, some training to janitor staff although can be improved on.*
Wider active staff involvement initiatives (e.g. via Total Quality)	0	4	*Planned for future*
Awareness campaigns held regularly	1	3	*Not regular but has been in some areas*
Use of Standards for Managing Energy and/or NVQ training	0	1	
Energy included in staff induction training	0	1	
Total Score	3	**of 13 maximum**	

Operational Procedures for the Efficient use of Energy

Characteristic	Score Actual	Score Maximum	Comment
Active reporting systems for energy waste and suggestions (lights on, doors open, steam leaks etc.)	2	4	*In place, but not used fully. More breakage and faults that are reported.*
Job/Priority sheets for reducing energy waste (e.g. repair compressed air leak)	2	3	*Priority sheets of programs of works for major facilities*
Maintenance schedules which include reducing energy wastage	2	3	*As required and when services included*
Operating instructions which include energy use issues (e.g. close down lists)	0	2	*No*
Total Score	6	**of 12 maximum**	

Assessors opinion:
Due to energy being the responsibility of one individual, staff involvement is a very large task. Further support would be required to fully benefit. Putting procedures in place in any local government can often be drawn out and where this will be a new area of thought for staff, may take longer unless resources and support are given from the start.

Procurement and Investment

This section identifies if the organisation's procurement and investment policies and procedures provide active support for improvements to energy efficiency.

Incorporating Efficiency into Procurement Policy

Characteristic	Score		Comment
	Actual	Maximum	
General policy to include consideration of energy consumption in all procurement.	2	6	*Policy yet to be adopted. Best practice options are to be adopted in the near future*
Energy performance specified in new buildings, IT projects, process plant etc	1	3	*Not at this stage unless specifically asked. Procedures have to be put in place prior to this taking place*
Specific procurement policies for particular efficient products, e.g. lighting, motors etc.	1	3	*No formal policies in place but lighting has been previously tackled*
Total Score	4	**of 12 maximum**	

Investment Procedures for Energy Efficiency

Characteristic	Score		Comment
	Actual	Maximum	
Is there a capital investment procedure to obtain funding for energy efficiency	5	5	*The discount given on electricity reinvested into energy projects*
Is there a payback (or other) investment threshold for energy efficiency*	2	3	*Not on all projects but generally a 4 year payback*
Does the person with responsibility for energy vet all capital requests to assess energy impact	1	3	*Some involvement in larger project but not regularly*
Do maintenance budgets include repairs to save energy	2	2	*Yes. i.e., controls*
Total Score	10	**of 13 maximum**	

**if criteria are too restricting, acting as a major barrier for energy efficiency investment, mark down.*

Assessors opinion:
Similar barriers to operational procurement as with incorporating efficiency. The reinvestment of the electricity discount is encouraging but other investment may be required for more sustained projects. Local government funding is becoming available so may prove to be more of an advantage. Areas of investment should be looked at continuously. Perhaps reinvesting a percentage of the achieved targets will increase the drive to meet them.

Appendix 3 – Information Supporting Recommendations

Brief Outline of Local Government seeking Energy Efficiency Accreditation. – Shortened guide of requirements. See website for full details

SECTION 1: INTRODUCTION
Introduction of organisation structure and energy use

SECTION 2: MANAGEMENT COMMITMENT TO ENERGY EFFICIENCY
There must be a sound, fully implemented policy with appropriate accountability. Assessment is based on the measures identified in Sections 2.1 to 2.8.

Statement: 2.1: There is a clearly stated energy policy, which has been promulgated to all employees.
Statement: 2.2: There is a clear organisational structure, with a member of senior management having overall responsibility for the organisation's energy policy.
Statement: 2.3: There are systematic procedures for monitoring and controlling energy consumption, with a planned approach to the improvement of overall energy performance.
Statement: 2.4: There are quality control mechanisms, to ensure that the correct operating procedures of all plant and equipment reduce both the energy cost and environmental impact.
Statement: 2.5: There are / have been awareness programmes for all staff, including new employees, and training programmes for those with energy responsibilities. Assessments for the NVQ in Managing Energy have been considered/carried out.
Statement: 2.6: Energy efficient technology and best practices are incorporated into services, buildings and products, capital purchases and refurbishment programmes.
Statement: 2.7: Are CO2 emissions calculated and publicly reported
Statement: 2.8: Have the Standards for Managing Energy been used in developing any of the above?

SECTION 3: INVESTMENT IN ENERGY EFFICIENCY MEASURES
There must be evidence of investment. The Client Organisation's commitment in terms of investment through capital projects and/or manpower is assessed. The assessment is based on the measures identified in Sections 3.1 to 3.5.

Statement 3.1: There is provision in financial plans and budgets for energy efficiency investments, including allowance for the Climate Change Levy and Emissions Trading.
Statement: 3.2: Capital investments have been made over the last 3 to 5 years, either in plant or equipment specifically for energy measures.
Statement 3.3: Energy efficiency measures have formed part of investments made for other purposes.
Statement 3.4: Investment in people has been made either internal of external, to improve management practises, for instance implementing an M&T system, organising training or Vocational Qualifications.
Statement 3.5: There are plans for further investment

SECTION 4: ENERGY EFFICIENCY IMPROVEMENTS
There must be a demonstrated reduction in energy usage, which should be related, where possible, to heated/cooled volumes or production. The client organisation's performance is assessed based on the measures identified in Sections 4.1 to 4.6.

Statement 4.1: The organisation has identified and actively uses an appropriate measure of specific energy consumption (SEC) e.g. GJ per m^2 or unit product.
Statement 4.2: What is the trend in reduction in SEC over previous years?
Statement 4.3: Account is taken of changes in business size or activity levels?
Statement 4.4: Is there analysis of consumption patterns in the case of larger organisations or more complex processes, to provide adequate detail?
Statement 4.5: Budgeted energy efficiency measures, or measures yet to show conclusive results, should be assessed objectively. However, proven achievements will merit greater consideration. Are lessons learnt from retrospective analysis of investments?

Statement 4.6: Where appropriate, in order to establish comparative data upon which to assess the performance of an organisation, reference is made by the Assessor to relevant national norms, for example by referring to those developed by:
i) The Department for the Environment, Food and Rural Affairs (DEFRA)
ii) The Chartered Institution of Building Services Engineers

SECTION 5: OVERALL IMPRESSION
Other information relevant to application, see website for full details

Priority 1 - T12 Fluorescent tube lights

Using the lights seen at the school and the depot

School

Classrooms had either 7 or 9 times 75W fittings
Approximately 75 classrooms affected

Total savings per fitting = 17W

Savings from school = 17W x 7 x 75 = 8.925kW
Hours on ~ 1520hrs (8h per day, 5 days, 38 weeks)

Saving = 13,566 kWh/yr

Depot

Has a mix of 85W, 75W and 125W tubes changing to 70W, 58W an 100W

85W = 54 fittings
75W = 131 fittings
125W = 46 fittings

Saving = (54 x 15) + (131 x 17) + (46 x 25) = 4.187kW

Hours on ~ 4576hrs

Savings = 19,159.70 kWh

Total = 32,725.70 kWh worth £1,999.54

Priority 2 - Vending Machines

Vending Machine = 400W
When not in use cycle is 16/24h
Approx 10h per night not required (average figure)

400W x 16/24 x 10h x 365d x 50 = 48,666 kWh/yr

Priority 4 - Boiler house Insulation

Number of valves/bends and un-insulated pipes

Valves taken as 1m pipe, bends = ½m pipes

Values given are the difference between insulated and bare pipe

19 valves at 138 W/m
14 valves at 110.2 W/m

10 bends at 110.2 W/m
6 bends at 300 W/m
4 bends at 153 W/m

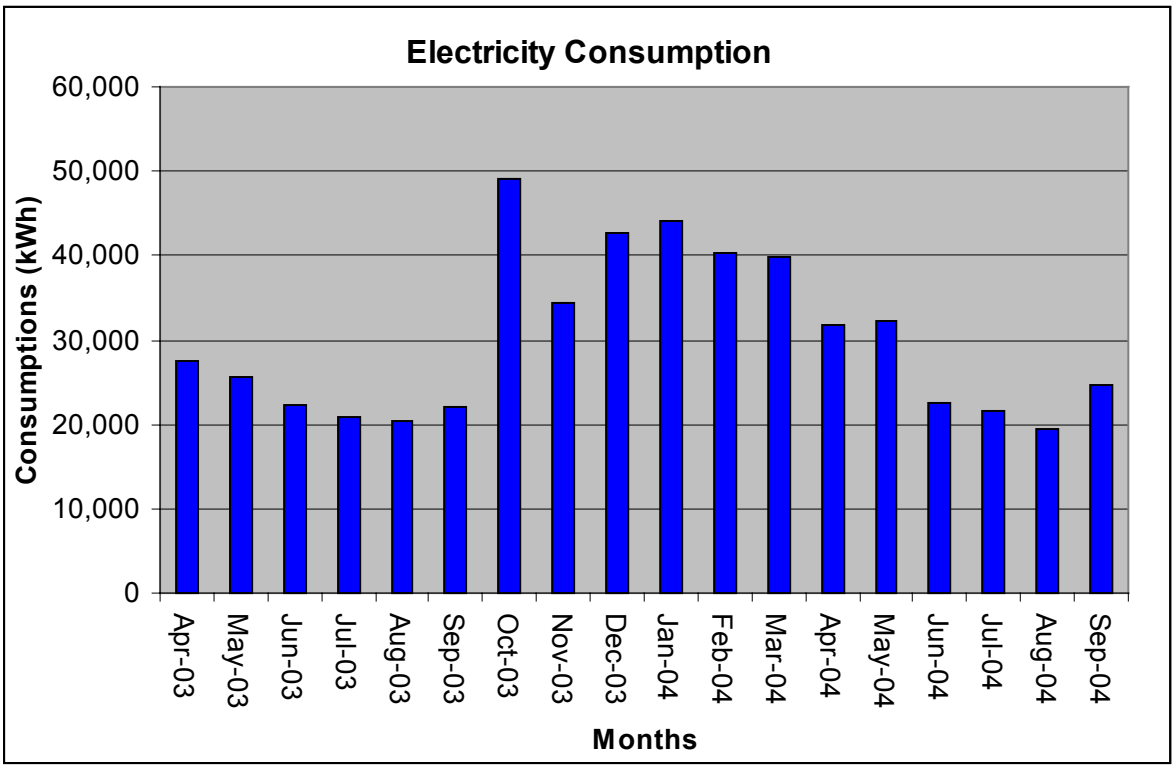
80m of bare pipe at 77.7 W/m
2m of bare pipe at 110.2 W/m

Totals = 2898 + 1542.8 + 1102/2 + 1800/2 + 612/2 + 6216 + 220.4 = 12.6342 kW

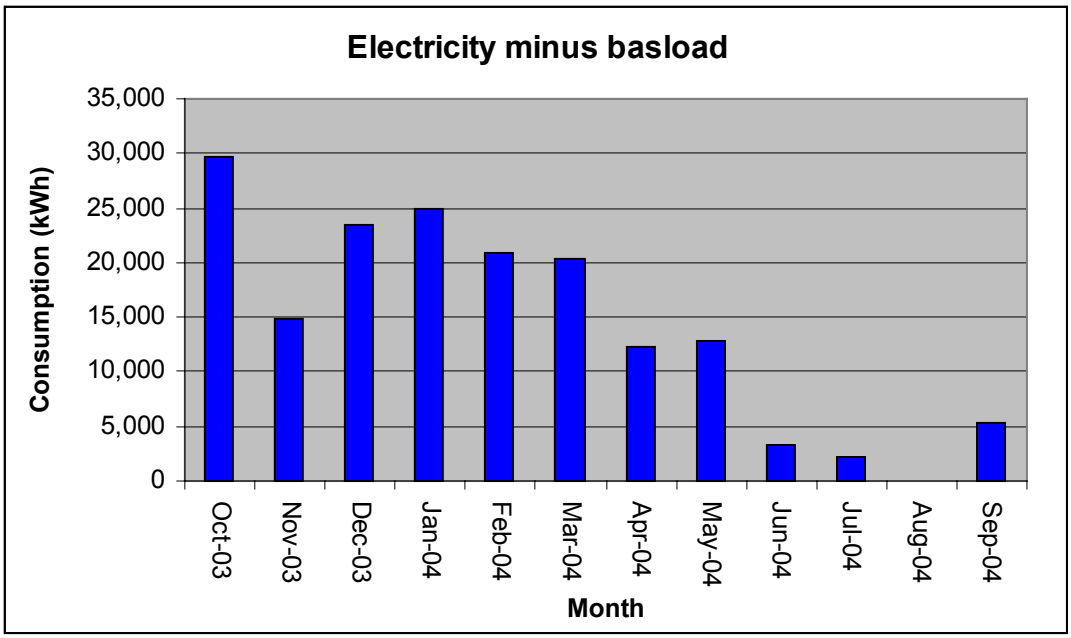
Average taken for 8h per day for 38 weeks

Savings = 19,203.7 kWh = £234.29

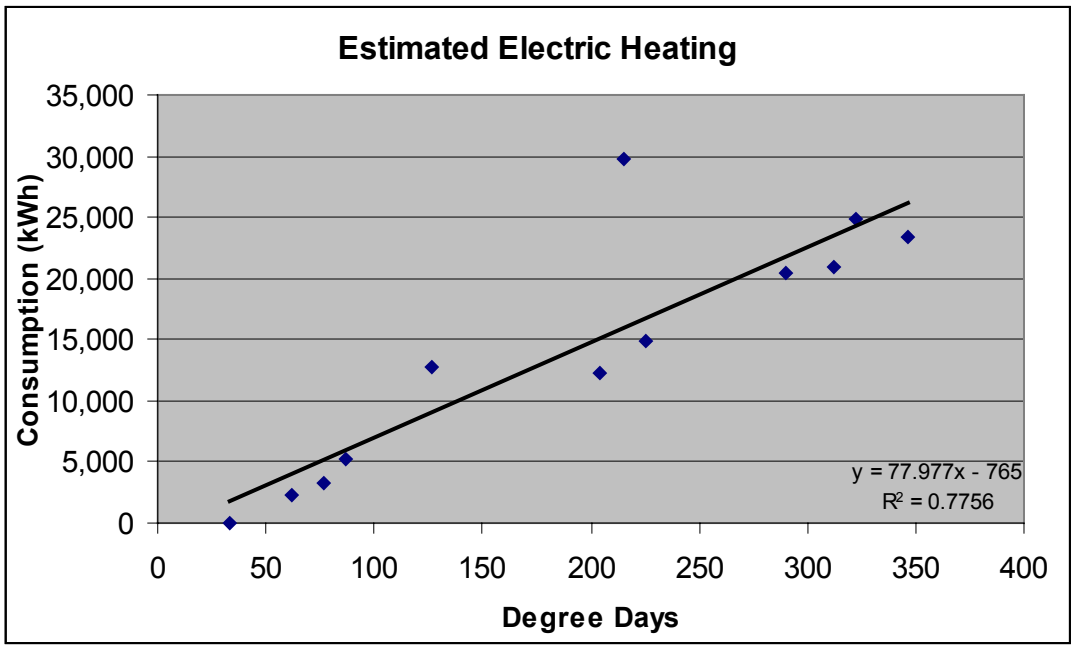
Priority 1 - Kelliebank Depot - Electric Heating



For the graph above, there appears to be a seasonal trend on top of a reasonably consistent baseload. If the consumption above the baseload is assumed to be due to the electric heating. Then, the below graphs show the consumption and the control of this.



With the exception of October, there seems a reasonable pattern associated with the heating season. When compared with the actual degree day figures, below.



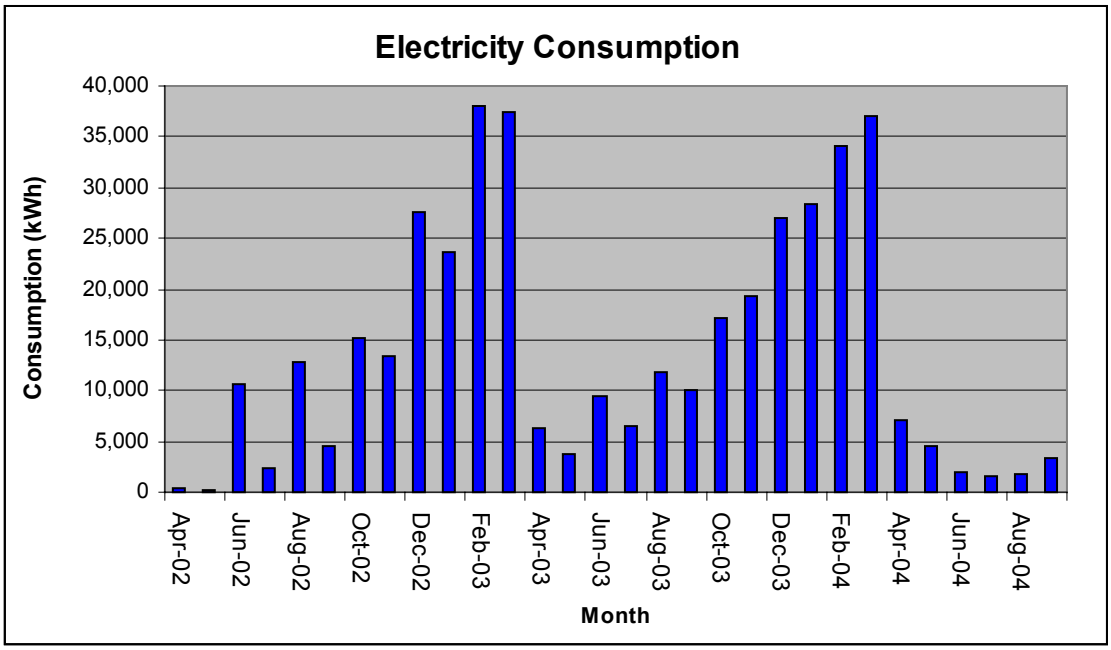
It shows that the system is not very well controlled. This coincides with the observations made during the visit.

R^2 = .77 when should be close to .99
If the difference in R^2 = .22 is the inefficient control of the system. If this is controlled with a room thermostat and outside temperature sensor a R^2 value of .99 would not be unreasonable to achieve.

22% of 170,166 kWh = 37,437kWh (This is a reasonable indicative figure.)

Optimum start thermostat = £50
Room thermostat = £50each

Priority 2 – Glenochil Nursery – Electricity use



It can be seen from the graph above that electricity use has almost the same pattern in the previous year.

Priority 4 - Alva Primary – Re-assess Heating in Old Building

Old building approx 2,600m^2
Using a half way between the upper and lower benchmark figure of 139 KWh/m^2

Give an expected consumption of 361,400 kWh
Total at the moment for this area = 442,367 kWh

Difference = 80,967 kWh = £987.79

Costs approx. £18.5/kW
Requires approx = 260 kW

Cost = £4810 + 10% = £5291

Priority 5 - Kelliebank Depot – Doors Interlock

Door interlocks save approx. 1% = 6,023 kWh = £73.48

Priority 6 - Tulligarth LC – Large Gym Hall Heating

Benchmark for a sport hall = 215kWh/m^2

Area = 340m^2

Gives 73,100 kWh

Thermostat savings approx 12% = 8,772 kWh/yr = £107

Appendix 4 – Summary of Areas covered on Site

This is a checklist of items that could be covered during the site assessments as part of the Energy Management and Opportunities Assessment. The purpose of this form is to advise the report review process as to why certain areas have been covered and why others have not.

Main area	Sub topics	Key area ?	Yes, covered	Not covered	Reason for exclusion (e.g. client already familiar, not relevant at this site, etc.)
Energy Management and Reporting System					
	Policy and Strategy	**YES**	**Yes**		
	Energy Management responsibility	**YES**	**Yes**		
	Use of meters	**YES**	**Yes**		
	Data collection and analysis	**YES**	**Yes**		
	Publicising Energy Performance		**Yes**		
	Workforce engagement	**YES**	**Yes**		
	Use of the Standards for Managing Energy		**Yes**		
	Energy procurement		**Yes**		
	Buildings Energy Management Systems		**Yes**		**Briefly, this is well developed already**

Main area	Sub topics	Key area ?	Yes, covered	Not covered	Reason for exclusion (e.g. client already familiar, not relevant at this site, etc.)
Energy Performance					
	Space Heating	YES	Yes		
	Boiler house/ plant room/ boilers	YES	Yes		
	Controls	YES	Yes		
	HVAC systems and plant	YES	Yes		
	Compressed Air	YES		No	None in use at sites
	Combustion processes	YES		No	Only gas boiler involved in combustion process
	Lighting	YES	Yes		
	Motors and drives	YES		No	No issues
	Building Fabric	YES	Yes		
	Refrigeration/ Cooling Systems	YES	Yes		
	Hot water systems		Yes		
	Steam distribution			No	None in use at sites
	Heat recovery		Yes		
	Process	YES		No	Process – Buildings only
	Pumps and fans		Yes		Little on sites

Main area	Sub topics	Key area ?	Yes, covered	Not covered	Reason for exclusion (e.g. client already familiar, not relevant at this site, etc.)
Energy Supply	*Opportunities for Renewables*			No	No site thought commercially viable although a waste wood boiler is mentioned
	Opportunities for CHP			No	No site is thought practical or commercially viable