Tewkesbury Borough Climate Change Strategy

Consultation Draft – September 2004

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2. Introduction

Climate change is set to be the most pressing global environmental issue of the 21st century. Since the onset of the Industrial Revolution emissions of 'greenhouse gases' from human activities have steadily increased. The concentration of carbon dioxide (CO_2), the most abundant greenhouse gas, in our atmosphere is now nearly double pre Industrial Revolution levels.

The vast majority of scientific evidence now suggests that the increasing quantities of greenhouse gases in our atmosphere are causing our planet to warm, with a consequent change in local temperatures and weather patterns.

Climate change is a global problem and therefore needs to be addressed at a global level through mechanisms such as the 1997 Kyoto treaty. However many of the actions necessary to combat climate change need to be taken at a local level, for example action on housing which is responsible for a third of UK greenhouse gas emissions. Here emissions of CO_2 can be hugely cut through householder's adoption of energy saving products and simple lifestyle adaptations.

CO_2 remains in our atmosphere for many years before it is absorbed by natural processes and therefore even if we are successful in scaling back emissions of the gas we will still see significant changes in our climate in the coming years. The latest climate models suggest we will see hotter summers, wetter winters and an increase in extreme weather events such as flooding. These changes mean adaptations will be needed at a local level to minimise disruption to people and businesses.

This strategy aims to set out Tewkesbury Borough Council's response to the challenge presented by climate change both as a community leader and also as a major local emitter of greenhouse gases. The Council recognises that it can not meet this challenge in isolation and aims to work in partnership with other organisations and individuals to implement the actions in this strategy.

The key actions presented in this strategy are to:

- Identify the likely effects of climate change on the borough
- Assess emissions of greenhouse gases from both Council activities (corporate emissions) and those of the wider community (community emissions)
- Set emission reduction targets and actions to achieve these

Effects of Climate Change in the Tewkesbury Borough

The Intergovernmental Panel on Climate Change has estimated that global temperatures have increased by 0.6℃ since 1900. Th is warming has not been uniform, and many areas of the world have seen greater increases in temperature. The effects of this warming have been pronounced, with the retreat of mountain glaciers and an increase in hot, dry summers – in the UK the 1990s was the warmest decade on record.

The future effects of climate change are being explored via increasingly sophisticated computer models. A study carried out on behalf of the South West Climate Change Impacts group estimated that the South West would see the following changes by 2050:

- Annual warming of 2 ℃ to 3 ℃
- Greater warming in summer and autumn
- Wetter winter (+15%)
- Drier summers (-15%)
- Sea level rise of around 30 cm
- Extreme weather events more frequent
- Significantly less snowfall

These changes bring a number of threats and opportunities for the Tewkesbury Borough. However the most pressing issue is perhaps the potential for an increased risk of severe flooding particularly around the river Severn. Tewkesbury town is particularly vulnerable to this flooding due to its location and flat topography. This increased risk will have a significant effect on flood protection policy, planning of new developments and the Council's emergency planning procedures.

Developing the Climate Change Strategy

Tewkesbury Borough Council has previously been involved in many aspects of climate change work through their work on issues such as home energy efficiency, planning and emergency management. In late 2003 the Council decided to produce a climate strategy to enable a co-ordinated long term approach to the problems and opportunities that climate change will bring. In doing so the Council will join an increasing number of other local authorities who have developed similar strategies.

The Council is aware that it can not tackle climate change alone and therefore aimed to develop the strategy via a participatory process. Two workshops were held to inform the development of this strategy. The first was an internal group with representatives from a broad range of Council services. This workshop looked mainly at how energy is used within the Council and what could be done to reduce emissions.

The second workshop involved over 20 representatives from community and public organisations with the aim of looking at barriers and opportunities amongst the wider community to reducing greenhouse gas emissions and adapting to a changing climate.

The Severn Wye Energy Agency are supporting the Council in the development of this strategy by providing support on the development process, emissions modelling, building surveys and the production of this document. SWEA is one of a network of agencies across Europe, set up to stimulate the development of sustainable energy through local and regional action for energy efficiency and the use of renewable energy resources. It is an independent company and registered charity.

This consultation draft document will now be circulated widely around organisations operating in the Tewskesbury Borough and individual residents, and the comments received incorporated into the final strategy.

3. Emissions of Carbon Dioxide from the Tewkesbury Borough

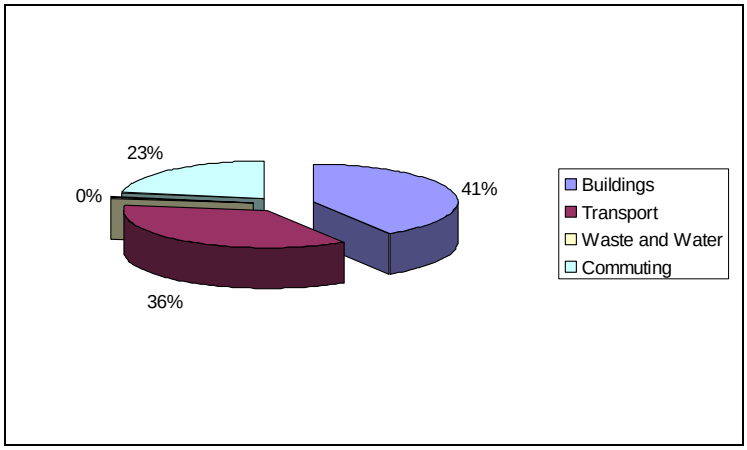
To implement and monitor actions to reduce CO_2 emissions it is important to have an idea of the level of current emissions, both from the Council as an organisation and the borough as a whole. The Severn Wye Energy Agency has therefore completed two emission models for the Council and the community it serves.

- **The corporate model** estimates emissions from the Tewkesbury Borough Council's business activities. It uses a model supplied by the Carbon Trust, containing data provided by the Council. A number of other local authorities are using the Carbon Trust model, which will aid comparison between the Council and similar local authorities.

- **The community model** estimates emissions produced by all residents of the Tewkesbury borough. It uses a spreadsheet produced by the Severn Wye Energy Agency, containing data on local housing, energy use and employment.

Corporate Emissions
During the financial year 2003-04 the Tewkesbury Borough Council and its employees produced emissions of 2, 573 tonnes of CO_2, which equates to 33.7 kg per head of population served. The sources of these emissions are shown in the pie chart below.

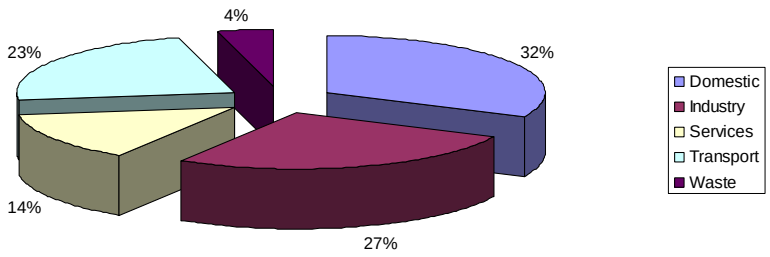
More detailed information on emissions of CO_2 through Council activities is shown in chapter 5 of this strategy.



Community Emissions
For the year 1999 - 2000 residents of the Tewkesbury borough were responsible for average emissions of 8.9 tonnes of CO_2 per head of population, slightly lower than the UK average of 9.5 tonnes. These emissions are shown split into sectors in the charts below. More detailed information on community CO_2 emissions is shown in chapters 6 and 8 of this strategy.

Actions on waste are not explicitly covered in this strategy, however the Council's plans for this area can be found in its waste management strategy.

Tewkesbury BC



It should be noted that both models are estimates rather than measurements, as the quality of the data available for both models is limited in places. Community data is likely to improve in the future as electricity and gas suppliers will be required to release local information on the amount of fuel supplied.

The quality of the corporate data is dependant on that collected by Council internal systems, and one aim of this strategy will be to improve collection of this data to enable a more accurate baseline to be drawn.

4. Carbon Dioxide Reduction Targets

In the drive towards reductions in the level of CO_2 emissions it is important to have achievable targets to work towards.

There are two major national targets for reducing UK CO_2 emissions:

- ***UK's Climate Change Programme*** - The UK government has set a target of a 20% cut in CO_2 emissions from 1990 levels by 2010
- ***The Government's Energy White Paper*** – In this paper the Government adopted the target suggested by the Royal Commission on Environmental Pollution of reducing CO_2 emission by 60% from 1990 levels by 2050

The UK is currently on track to meet the 2010 target, however much of the reduction to date has been through the large scale adoption of gas for electricity generation, which emits much less CO_2 than generation via coal fired plants. Now that this 'dash for gas' is complete UK emissions are falling more slowly, and during 2002-03 actually increased.

This strategy aims to set targets that mirror these UK objectives, which are:

Short Term

- A 10 % reduction in community CO_2 emissions from the 1999-2000 baseline by 2010 *(reasoning – mirrors the average 1% a year reduction for the UK's 2010 target)*
- A 14% reduction in the Council's corporate CO_2 emissions by 2010 *(reasoning – the analysis in the Corporate suggests this is a challenging but achievable figure)*

Long Term

- A long term aspiration of reducing both corporate and community CO_2 emissions by 50% from current levels by 2050 *(reasoning – mirrors the UK 2050 target)*

Action Plans

The action plans within this document set out how the Council and its partners will work to meet the above targets. The actions have been assigned *timescales*, *suggested responsibilities*, *resources* and *monitoring.* The timescales listed used are:

- Short – For completion 2005-6
- Medium – For completion 2007-8
- Long – For completion 2009-10
- Ongoing – Action staking place throughout the time period

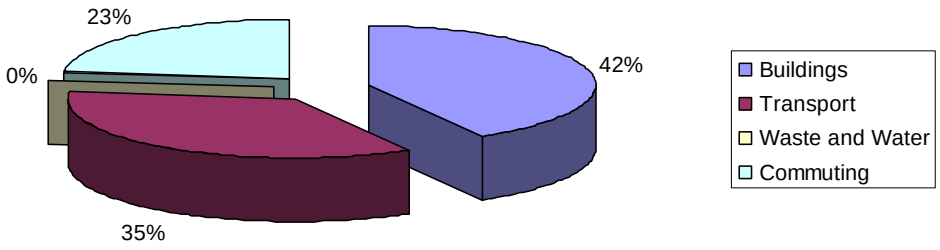
Abbreviations have been used in the action plans, particularly where organisations are mentioned. For explanation of these please see the glossary at the end of this document.

5. Reducing Emissions From the Council's Business Activities

To reduce emissions from the wider community it is essential that Tewkesbury Borough Council itself makes stringent efforts to manage its own emissions of CO_2. Through its many activities the Council is a significant local source of greenhouse gases, and also acts as an example for its employees and wider community.

By working to reduce CO_2 emissions the Council can also save itself money. Currently the Council pays nearly £60, 000 in gas and electricity bills; it is estimated that simple control and awareness measures could cut this by 10%. Similar savings could be achieved on transport costs.

Total emissions from the Council's business activities during 2003-04 were 2, 550 tonnes, the equivalent emissions generated by roughly 260 homes. The split between sources of emissions is shown below.

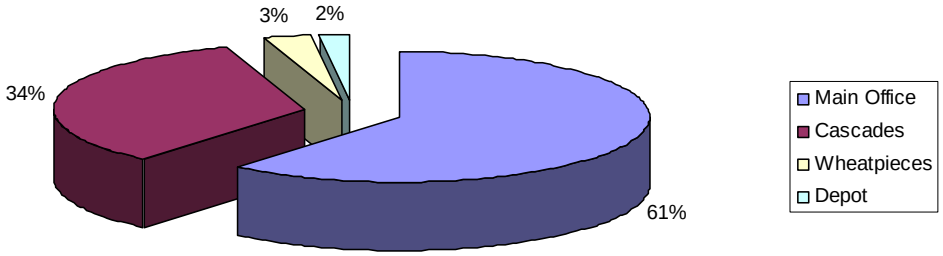


Council Buildings
Tewksbury Borough Council is responsible for the energy activities throughout four buildings. These are:

- The main Council Offices on Gloucester Road
- Cascades Leisure Centre
- Wheatpieces Community Centre
- The Depot to the rear of the main offices

The total emissions from the four buildings are 1,033 tonnes of CO_2 per annum. Electricity use accounts for only 30% of the overall energy consumption, but nearly 50% of CO_2 emissions due to its high 'carbon content'. From this information it is clear that reductions that can be made in electrical consumption will have the biggest positive impact in terms of both cost and CO_2 emissions.

The pie chart overleaf shows the total building CO_2 emissions split between the four sites.



General energy surveys of each of the four buildings were conducted to find areas of opportunity to make improvements. The following information briefly describes the findings of each of the surveys.

Main Council Office

Electricity consumption at the main office was found to be significantly higher than expected. Approximately 20% of the total electrical consumption occurred overnight when the office is empty. A small load would be expected for external lighting, security and the Information Technology suite however it appeared that a significant number of appliances are being left running unnecessarily. The main opportunities for reducing CO_2 emissions are improving the level of automatic control in areas such as lighting and appliances and also increasing the current level of energy efficiency awareness amongst employees.

Gas consumption on site was very well controlled by way of a Building Energy Management System which is used to provide heat to the building based on external air temperatures. Improving levels of insulation throughout the building will contribute to the reduction of required gas consumption.

Cascades

There are many instances of good practice evident at the leisure centre, for example water saving devices installed on showers and time control on electrical equipment like vending machines that do not need to be switched on over night.

Energy awareness at the leisure centre is generally high although problems with the buildings construction mean that there is a high level of heat loss. There is a leaking roof at present that has resulted in the insulation in the roof becoming saturated and ineffective. The poor state of repair of the building has led to problems with regulating the air temperature around the pools. This has caused the space heating to consume more fuel that might otherwise be required to heat the building to necessary levels.

Wheatpieces Community Centre
The community centre is the most recent of all the buildings, constructed in 2000. It has a wet central heating system managed remotely by a Building Energy Management System, is fully double glazed and well insulated.

There are opportunities for savings to be made through improved lighting control and better control of the heating system. At the time of the visit (mid July 04) both boilers were operating although there is no demand for gas as hot water is provided electrically. Improved control of the heating system will help to prevent energy from being unnecessarily used

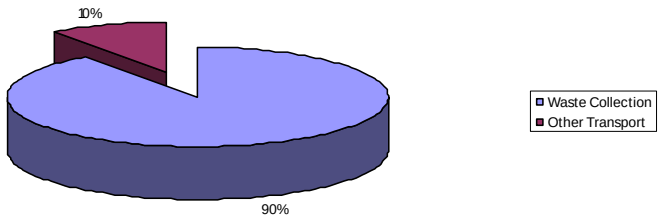
The Council Depot
The buildings in the council depot are in a poor state of repair although the energy efficiency awareness of managerial staff is high. The leased building is in urgent need of attention as there is no insulation in place throughout this building and all heating is currently provided electrically even though the building next door has gas fired warm air heaters.

There are still low cost savings that can be achieved before capital investment is required to improve a buildings heating system or thermal insulation. Measures that can be considered are improving the installed lighting systems, the control of the lighting and also control of the hot water supply.
The Council is currently looking at building a new leisure centre to replace Cascades. This would present a significant opportunity to reduce emissions and fuel costs to the new building, which could be achieved by building CO_2 emissions into the specification of the new building.

The Council currently purchases no 'green' energy produced from renewable sources. A target of purchasing 10% of total energy from renewable sources should be set and achieved by 2010.

Based on the building surveys it is estimated that the Council could cut CO_2 emissions by 20% by 2010 (and energy costs by a similar percentage), with 10% coming from relatively cheap awareness and control measures.

Transport
Emissions from the Council's business related transport activity excluding public transport totalled 894 tonnes during 2003-04. The chart below shows that the majority of these emissions related from the collection of waste from homes and businesses around the borough. The rest of the transport emissions related to fleet vehicles and staff and councillors using their cars on Council business.



The scale of the emissions from waste collection is very much indicative of the scale of the task – the borough is a large geographical area and the waste vehicles travel long distances. The introduction of the Council's kerbside recycling initiative will also have served to push up emissions as it results in more vehicle movements.

The waste vehicles used were the best economically available on emissions when purchased. However the waste collection presents the largest opportunity for the Council to reduce emissions from transport, which can be done by building carbon emissions into the tender for future waste contracts. Reduction from using cleaner vehicles could roughly balance the increased demand for vehicle movements through expanded recycling schemes.

The Council has converted several other fleet vehicles to run on LPG which is both cheaper and less polluting than petrol vehicles. Further improvements can be secured by building CO_2 emissions into the specification when purchasing future vehicles. Emission reductions from staff and councillors using their own vehicles could be cut by promoting public transport options, better route planning and encouraging staff to purchase clean fuel vehicles. The Council therefore aims to reduce emissions here by 20% by 2010.

Commuting
The Council undertook a commuting survey during early 2004, receiving 72 responses from their 420 employees. The survey revealed that the average length of commute is 10.4 miles each way, with the vast majority of staff completing their commute by private car. Total annual CO_2 emissions from commuting are estimated at 582 tonnes.

Many of the issues linked to commuting are covered in the transport section of this strategy, however as a large local employer the Council can aim to reduce emissions from commuting via promoting public transport, walking and cycling, clean fuel vehicles and introducing systems to allow more flexible working patterns including working from home.

The Council aims to achieve a 20% reduction in commuting emissions by 2010, with roughly half of this coming from expected improvements in vehicle efficiency.

Action Plan - Reducing Emissions From the Council's Business Activities

Barriers/Issues	Action	Timescale	Suggested Responsibility	Resources	Monitoring
Co-ordination and Monitoring	Set up a Council energy and carbon management group to co-ordinate internal initiatives	Short	TBC	TBC	TBC
	Implement a monitoring and targeting programme for internal energy use, transport and commuting	Short	TBC	TBC	TBC
	Implement a staff awareness programme covering energy use and transport	Short/ Ongoing	TBC	TBC	TBC
Building Energy Efficiency	Investigate procurement of renewable electricity for Council buildings (10% target)	Short/Medium	TBC	TBC	TBC
	Implement a rolling lighting replacement programme and improved lighting controls. Install time control on hot water services and equipment.	Short	TBC	TBC	TBC

Barriers/Issues	Action	Timescale	Suggested Responsibility	Resources	Monitoring
Building Energy Efficiency	Repair roofs defects as identified in building surveys	Short/Medium	TBC	TBC	TBC
	Improve insulation levels in all buildings	Short/Medium	TBC	TBC	TBC
	Upgrade heating systems as part of planned maintenance programme	Medium/ Long	TBC	TBC	TBC
Transport and Commuting	Provide staff with route planning software and encourage multi-purpose journeys	Short	TBC	TBC/ Transport Groups	TBC
	Provide information on clean fuel vehicles to all casual, essential and lump sum car users	Short/ Medium	TBC	TBC	TBC

Barriers/Issues	Action	Timescale	Suggested Responsibility	Resources	Monitoring
Transport and Commuting	Investigate establishing a low or zero interest loan fund for staff wishing to purchase clean fuel vehicles, or convert their existing vehicle	Medium	TBC	TBC	TBC
	Improve cycle facilities at the Councils main buildings	Medium	TBC	TBC	TBC
	Invest in technology to allow more flexible working patterns and encourage home working	Medium/ Long	TBC	TBC	TBC
Procurement	Build a CO_2 appraisal into specifications for Council procurement, including: o Vehicles o New buildings o Office equipment	Medium/ Long	TBC	TBC	TBC
	Investigate 'carbon offset' as a way to offset some or all of the Council's CO_2 emissions	Medium	TBC/ EEAC	TBC/ EEAC	CC Group

6. Improving Energy Efficiency in Residential and Commercial Properties

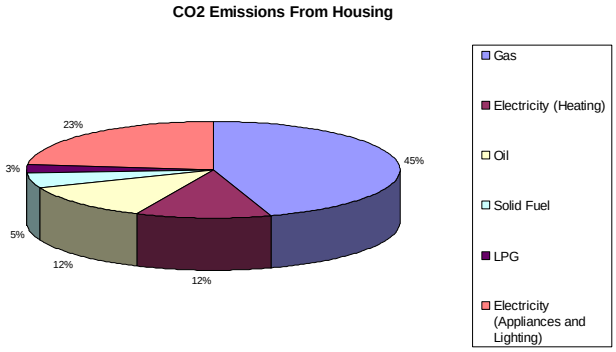
The use of energy in homes and businesses accounts for the majority (73%) of CO_2 emissions from the Tewkesbury borough. Reducing these emissions requires a two pronged approach:

- energy efficiency should be encouraged to reduce the demand for energy by the end user
- we should attempt to reduce the 'carbon content' of energy by encouraging low carbon energy sources such as renewable energy

This chapter explores the first action area – improving energy efficiency.

Energy Efficiency in Homes

The average home in the Tewkesbury borough produced emissions of 6.5 tonnes of CO_2 during the year 1999-2000. This figure sits broadly in line with the national average figure, but is higher than the average new build figure and 'best practise' figures for refurbishment of existing homes.



The majority of emissions (77%) from housing are accounted for by space and water heating, with the remainder coming from lighting, cooking and appliances. Nearly 75% of the homes in the borough use gas as their main heating fuel, which has the lowest 'carbon content' of the fuels listed below. Oil and electricity are in comparison much higher carbon fuels.

The energy efficiency of a relatively modern (post 1930s) gas or oil heated home can be dramatically improved by the following 'menu' of relatively inexpensive improvements:

Measure	**Average Annual Carbon Saving (kg)**
Loft insulation topped up to 250 mm depth	320
High Efficiency Boiler	800
Cavity wall insulation	850
Energy efficient lighting	70

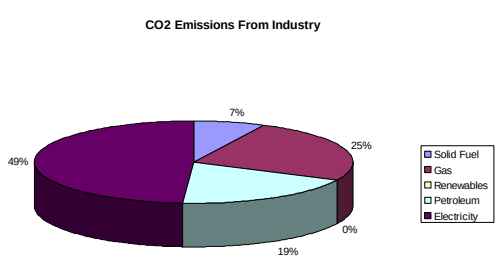
Improving energy efficiency in older homes is a more difficult and expensive process as many older properties have solid walls and no loft space, ruling out loft and cavity wall

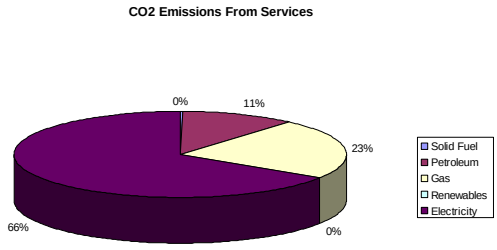
insulation. In the Tewkesbury borough 50% of homes were built before 1919 and fall into this ‘hard to treat’ category.

Emissions from appliances and lighting are responsible for 23% of CO_2 emissions from homes in the borough. Energy consumption in this sector is rising significantly despite the increasing efficiency of appliances such as fridges and washing machines. This is due to the increasing number and sophistications of appliances in our homes such as dishwashers, DVD players and satellite TV receivers.

Energy Efficiency in Businesses

The use of energy in businesses accounts for 41% of the Tewkesbury borough’s CO_2 emissions. Emissions from the various fuels used is shown in the charts below – the industrial chart shows emissions from companies in the borough who use large amounts of energy, whilst the services chart shows lighter energy users such as offices.





The use of energy in businesses used to be fixed closely to economic output (GDP), however the decline of heavy industry in the UK coupled with increasing energy efficiency now means that this link has largely been broken.

The majority of emissions from businesses come from the use of electricity in premises. Electricity is used for heating, lighting, appliances, and in industrial applications for process heat and to drive machinery. A particular growth area for electricity demand is the increasing number and complexity of pieces of office equipment such as PCs, photocopiers and fax machines.

The business case for energy efficiency is in the majority of cases positive - investment in energy efficiency leads to lower fuel bills. However in many cases there is a lack of awareness of the possible savings and little effective energy management. This is a particular problem for small businesses (the majority of businesses in the borough) who may not have the knowledge or the time to properly manage energy issues within their company.

The majority of businesses rent the premises, and in many cases this is detrimental to efforts to improve energy efficiency. Landlords are often reluctant to invest in energy efficiency improvements as they do not receive the running cost savings themselves.

Tenants often lack the knowledge or inclination to put pressure on their landlords to make improvements.

A particular example here is electrical heating in business premises – this is cheap to install and service for the landlords but has high CO_2 emissions and is expensive to run for the tenants. Rented properties also experience similar problems in the domestic sector.

Staff working for businesses often lack ‘ownership’ of energy issues, as they do not see the financial benefits themselves of actions such as turning lights off and shutting down computers. Staff awareness programmes can assist here.

Action Plan - Improving Energy Efficiency in Residential and Commercial Properties

Barriers/Issues	Action	Timescale	Suggested Responsibility	Resources	Monitoring
Data and Monitoring	Obtain data on energy use in the borough from utility companies	Short/ Medium	SWEA	LASP/ Utility Company	SWEA
	Carry out annual energy efficiency survey of households	Short/ Ongoing	TBC/ EEAC	TBC/ EEAC	CC Group
	Produce annual CO_2 emission estimates for the borough	Short/ Ongoing	SWEA	SWEA	CC Group
New Build Homes	Establish a developers forum to find ways of increasing energy efficiency of new properties	Short	TBC/ HECA Group	TBC/ HECA Group	TBC/ HECA Group
	Research the possibility of section 106 agreements to improve energy efficiency in new housing developments	Medium	TBC	TBC	CC Group

Barriers/Issues	Action	Timescale	Suggested Responsibility	Resources	Monitoring
Existing Housing	Expand and implement schemes offering an easy process towards discounted and grant funded insulation and high efficiency heating measures (e.g. Warm and Well scheme)	Short/ Ongoing	TBC/ HECA Group	TBC/ External grant providers	CC Group
	Introduce scheme to encourage insulation and heating measures for 'hard to treat' properties	Short/ Medium	TBC/ HECA Group/ SWEA	TBC/ External grant providers	CC Group
	Investigate establishing a low or zero interest loan fund for homeowners and landlords wanting to purchase energy efficiency measures	Medium	TBC/ HECA Group	TBC	CC Group
	Work with estate agents to improve awareness of energy running costs, linking in with the new seller's pack	Medium	HECA Group/ EEAC	TBC/ EEAC	HECA Group
	Establish borough or county energy forums for social housing providers and private sector landlords	Short/ Medium	TBC/ SWEA/ HECA Group	TBC/ SWEA/ HECA Group	TBC/ SWEA/ HECA Group
Businesses	Create working partnerships with local business groups, e.g. Chambers of Commerce, Trade Associations	Short/ Medium	TBC	TBC	CC Group

Barriers/Issues	Action	Timescale	Suggested Responsibility	Resources	Monitoring
Businesses	Implement awareness campaigns targeted at specific business sectors (e.g. small businesses). Stress the 'good business management aspect'.	Medium	TBC/ EEAC	TBC/ EEAC	CC Group
	Organise local training events in partnership with business groups	Medium	TBC/ Business Link	TBC/ Business Link	CC Group
	Encourage medium/ large companies to use the Action Energy programme	Short/ Medium	TBC/ EEAC	TBC/ EEAC	CC Group
	Lobby the Government to increase financial incentives for businesses to conserve energy (e.g. tax relief, energy levies)	Long	TBC	TBC	CC Group

7. Renewable Energy

In addition to reducing emissions of CO_2 through energy efficiency we can also seek to reduce the 'carbon content' of the energy we consume through the use of low carbon energy sources such as renewable energy. Renewable energy sources are defined as 'those which are continuously and sustainably available in our environment' (New and Renewable Energy – Prospects for the 21st Century' DTI).

There are many different renewable energy technologies, however at the current point in time the main types that may suitable for use in Tewkesbury borough are:

- Solar Photovoltaic (PV, electricity production)
- Solar Thermal (water heating)
- Wind Energy
- Biomass energy (wood fuel from sustainable sources, energy from organic waste, bio-fuels for transport)
- Small Scale Hydro power

Renewable energy can be used on two distinct scales. At a domestic level renewable energy sources can be used to provide heat or power for a single property. Technologies here include solar hot water heating, biomass and wind generators. When electricity generating technologies are used they can be 'grid connected' and sell any electricity not used by the household into the National Grid.

Larger scale renewable energy technologies can be used to produce electricity for the National Grid. These technologies include medium to large scale wind generators, biomass and hydro power.

We do not have any information on domestic scale renewable energy use in households in the borough. There is large scale renewable electricity generation on one site in the borough – this is a landfill gas system on the Wingmoor Farm landfill site. This burns methane gas produce by decaying organic waste and has a capacity of 4.27 MW, enough to provide electricity for approximately 5, 000 homes. Although this is a renewable technology the production of landfill gas from the site will only continue for a finite time.

The Revision 2010 Process and the Gloucestershire Renewable Energy Action Plan

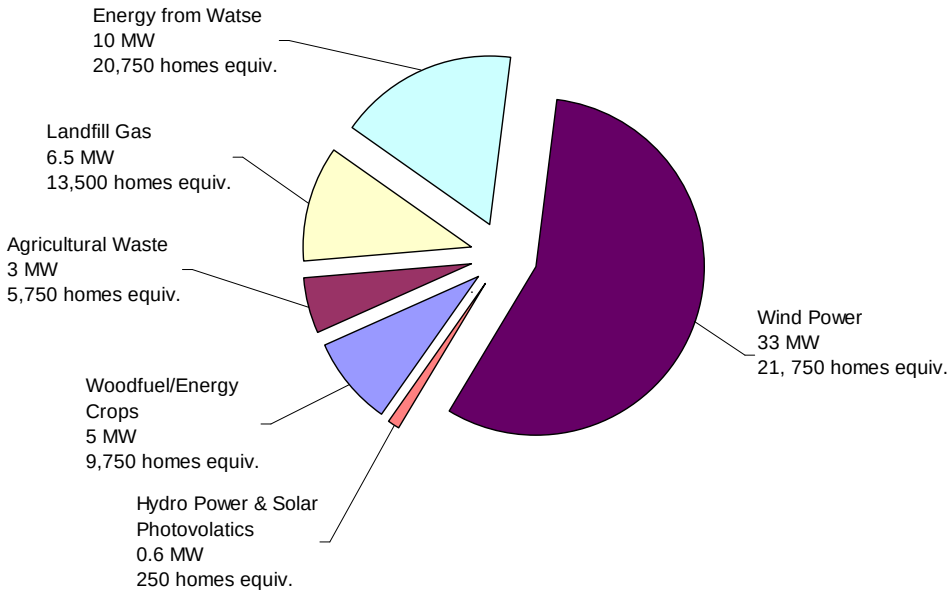
At the time of writing Gloucestershire is in the process of developing a renewable energy action plan based on a target of generating 40-58 MW of renewable electricity by 2010. Tewkesbury Borough Council is playing a leading role within this process alongside the county council, the five other district local authorities and a range of other organisations. This process feeds into the South West region's target of generating 545 MW of renewable electricity generation established through the Revision 2010 consultation process.

The action plan in this section therefore reflects the Tewkesbury borough's contribution to the Gloucestershire action plan, and should be read alongside it.

As part of the Revision 2010 process an assessment of the renewable energy resource in each county in the south west was produced. This assessment included issues such

as urban areas, inter-visibility limits, buffer zones around dwellings and roads, and excludes areas designated as AONBs and National Parks. The pie chart below displays the results of the accessible economic resource assessment for Gloucestershire for the different technologies.

Renewable Energy in Gloucestershire - Accessible Economic Resource (after landscape character assessment) by 2010



The Tewkesbury borough has the potential to generate significant amounts of renewable energy from a range of different sources. The potential resource for the future is very large; the main constraints in the short term are finding appropriate locations, current economic viability of the different technologies and the technical availability of different technologies.

In addition to environmental benefits renewable energy can also contribute significantly to the local economy and the South West Economic Strategy lists renewable energy as a major opportunity for economic development in the region.

Action Plan - Renewable Energy

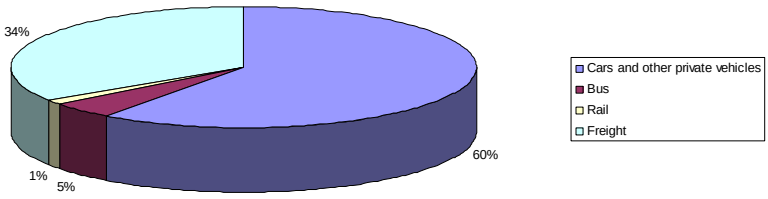
Barriers/Issues	Action	Timescale	Suggested Responsibility	Resources	Monitoring
Financial Issues	Work with developers to bring in private sector finance. Identify opportunities to access UK or EC grant funding for exemplar projects.	Medium	TBC/ SWEA/ Regen SW	In-kind	RE Forum
	Advice and assistance with grant applications for small and community schemes	Medium	CRI	CRI	CRI
		Short/ Medium	TBC/ HECA Group SWEA	Clear Skies/ PV scheme	HECA Group
	Investigate possibility of section 106 agreements with developers to include renewable generation in new developments	Medium	TBC/ CRI	TBC/ CRI	CC Group
Community Involvement	"Concordat" between developers and local community to agree on what makes an acceptable development. Develop examples of community ownership through exemplar projects.	Medium	SWEA/ Gloucestershire RE Forum/ Regen SW	Minimal	RE forum
	Maintain community advice services on renewable energy	Ongoing	CRI	CRI programme local/regional funding, TBC	RE Forum/ CRI

Barriers/Issues	Action	Timescale	Suggested Responsibility	Resources	Monitoring
Community Involvement	Integrate consideration of renewable energy opportunities into the Market and Coastal Towns Initiative process	Short	CA/ CRI/ TBC, MCTI partnerships	Minimal	CRI
Landscape issues	Ensure that all new Local Development Frameworks include policies supporting the installation of renewable energy capacity. All district councils in partnership with county council to adopt SPGs addressing RE locational guidance criteria etc.	Short	TBC	TBC	TBC/ RE Forum
	Develop list of exemplars of sensitive integration of appropriate renewable energy technologies into heritage sites/ buildings/ AONBs which will feed into development of relevant planning policies.	Short	CRI/ TBC	CRI/ TBC/ AONBs/ Heritage sites	RE forum
Establishing new renewables projects	Establish and promote 3-4 exemplar renewable energy projects in the borough by 2010	Long	TBC/ SWEA/ CRI	DTI (Clear Skies etc) Private sector/ local funds	RE Forum
	Carry out a review of potential for integration of renewable energy into all strategic development sites	2004-2005	TBC, with CRI support	TBC	TBC

Barriers/Issues	Action	Timescale	Suggested Responsibility	Resources	Monitoring
Establishing new renewables projects	Establish exemplars of community involvement in renewable energy	2004-ongoing	CRI/ community groups/ RE industry	Clear Skies, private sector/ TBC	CRI
	Investigate landfill gas and anaerobic digestion schemes for waste sites	Long	TBC/ GCC	TBC, GCC	CC Group
	Identify case studies of action taken by other authorities (e.g. London Borough of Merton) to help bring forward capital projects.	Short	TBC/ SWEA	TBC	RE Forum

8. Transport

Transport accounts for nearly a quarter (23%) of CO_2 emissions from the Tewkesbury borough. The split between different types of transport is shown below:



Cars and other private vehicles account for nearly two thirds of emissions, with road freight emitting the overwhelming majority of the remainder. Public transport accounts for only 6% of the total. Air travel has not been included in these figures, as it is beyond the remit of a local climate change strategy.

Transport is perhaps the most difficult sector to tackle in terms of reducing emissions, as our demand for transport in the UK appears insatiable. Road traffic increased by 142% between 1970 and 2002, whilst over the same period the number of air trips by UK residents more than quadrupled. Travel by rail has also significantly increased and only bus transport has seen a decline in passenger miles. These increases have more than doubled emissions of CO_2 from the transport sector since 1970.

These trends can be explained by the increased affluence of our society and structural changes in how we live. People live increasingly further away from their place of work whilst local shops have given way to large out of town supermarkets and retail centres. The real cost of motoring (i.e. adjusted for inflation) has fallen over the past 30 years leading to increasing number of households owning one or more cars.

Reducing emissions from transport needs to be approached at three levels. Firstly we need to reduce people's need to travel, for example through planning mixed use developments and using improved communication technology. Secondly people need to be encouraged to shift where possible to less polluting forms of travel, for example trains and buses for long journeys (public transport has roughly a third of the CO_2 emission as an average car), and walking and cycling for short journeys. Thirdly we should attempt to make our vehicles as efficient to reduce emissions from road journeys.

It is important to note that there are many other important issues other than climate change surrounding transport. Congestion and poor air quality are both significant problems in urban areas and around busy roads. Lack of access to transport is also a significant problem in many rural areas where public transport in inadequate and many people either lack the income or the ability (elderly and disabled persons) to drive a car. Our increased dependence on motorised transport also makes a significant contribution towards growing obesity amongst the UK population.

Action Plan - Transport

Barriers/Issues	Action	Timescale	Suggested Responsibility	Resources	Monitoring
Planning Transportation	Produce a green transport plan for the borough	Short/ Medium	TBC	TBC	CC Group
	Encourage large employers to develop travel plans, using the Council as an example	Medium	TBC	TBC	CC Group
	Implement the Local Transport Plan and feed into review for 2006-11 strategy	Medium/ Long	TBC/ GCC	TBC/ GCC	TBC/ GCC
Reduce the need for transportation	Encourage employers to implement flexible working arrangements, including working from home options	Medium	TBC	TBC	TBC/ GCC
	Work with the county council and schools to implement better school travel arrangements including 'walking buses'	Medium	TBC/ GCC	TBC/ GCC	TBC/ GCC

Barriers/Issues	Action	Timescale	Suggested Responsibility	Resources	Monitoring
Reduce the need for transportation	Encourage locally sourced food to reduce food miles. Include 'box' schemes and work with large employers to allow producers to sell in workplaces	Medium	TLSP	TLSP	TLSP
	Encouraged mixed developments and development near existing urban centres through the local plan to allow homes, workplaces and services to be located more closely together	Long	TBC	TBC	CC Group
Produce a shift in transport modes and reduce vehicle congestion	Improve cycle facilities, including better cycle lanes and more secure parking spaces in towns and transport interchanges	Medium	TBC/ GCC	TBC/ GCC	CC Group
	Promote and develop the use of community transport facilities such as community minibuses	Short/ Medium	TBC	TBC	CC Group
	Improve the quality of bus services in the borough and neighbouring areas through agreements with bus providers and other local authorities	Medium/ Long	TBC/ GCC	TBC/ GCC	CC Group
	Implement innovative traffic calming initiatives such as 'home zones' through the new Local Development Framework	Long	TBC	TBC	CC Group

Barriers/Issues	Action	Timescale	Suggested Responsibility	Resources	Monitoring
Produce a shift in transport modes and reduce vehicle congestion	Expand the use of rail freight. Investigate the possible use of rail freight for deliveries to Wingmoor Farm waste disposal site	Long	TBC/ GCC	TBC/ GCC	TBC/ GCC
Reducing emissions from our vehicle fleets	Promote clean fuel vehicles and 'Powershift' grants to residents	Short	TBC/ SWEA	TBC/ SWEA	CC Group
	Work with fleet managers to provide advice on running efficient fleets and promote clean fuel vehicles	Medium	EST	EST	CC Group
	Set up a local transport biofuels project	Medium	TBC/ SWEA	TBC SWEA	CC Group

9. Adapting to a Changing Climate

It is now inevitable that we will see further changes in our climate through human induced global warming, despite our best efforts to minimise these through emissions reduction. CO_2 levels in our atmosphere are likely to continue rising throughout the first half of this century until we can reduce global emissions enough so that a balance is restored between emissions and adsorption of CO_2 through natural processes.

Models of our future climate continue to improve through a better under standing of how our climate works and the introduction of increasingly powerful computers. The South West Climate Change Impacts Group has predicted the region will face the following changes by 2050.

- Annual warming of 2 ℃ to 3 ℃
- Greater warming in summer and autumn
- Wetter winter (+15%)
- Drier summers (-15%)
- Sea level rise of around 30 cm
- Extreme weather events more frequent

These changes will bring opportunities as well as threats for the Tewkesbury borough. Some of these are shown in the table below:

Threats	Opportunities
Public health may deteriorate through: • Increase in pests/ insects (e.g. mosquitoes) • Increase in dust and pollen • Effect of heat on vulnerable people • Reduced cloud cover in summer may increase the risk of sunburn and skin cancer	Public health may improve through: • Reduction in fuel poverty and chronic cold related illness • Fewer cold related deaths over the winter months
An increased demand for air conditioning in homes, business premises and vehicles would raise CO_2 emissions	A reduced need for heating in the winter would reduce CO_2 emissions
Farmers may find it difficult to continue growing current crops	Farmers may be able to grow crops currently unsuitable for our climate
Biodiversity may be at risk and many species may be driven out of the area	Local businesses may be able to prosper from a changing climate e.g. selling more outdoor products, street cafés
Water supplies could be threatened by drier summers	Domestic tourism could be enhanced by a warmer climate, an extended summer season and popular foreign destinations becoming too warm for UK tastes

The main threat posed to the Tewkesbury borough through climate change is likely to be an increased risk of flooding. The borough is particularly vulnerable to flooding due to the nature of local rivers such as the Severn and the relatively flat landscape of the Severn Vale. Severe disruption was brought to many parts of the borough by the 2001 floods, and this type of event is likely to become more common in the future.

Other flood risks are likely to include an increase in flash floods due to an increased chance of localised heavy rain and increased leaching of pollution from contaminated land.

Action Plan - Adapting to a Changing Climate

Barriers/Issues	Action	Timescale	Suggested Responsibility	Resources	Monitoring
Understanding the changing climate	Work with the UK Climate Impacts Programme, Gloucestershire University and the Environment Agency to distribute modelling results within the Council, to businesses, health organisations and other bodies	Short/ Ongoing	RE Group/ HECA Group/ SWEA	SWEA	CC Group
Flooding	Reduce building of floodplains through the Local Development Framework and by working closely with developers	Short/ Ongoing	TBC	TBC	CC Group
	Encourage the use of Sustainable Urban Drainage solutions in new and existing developments. Encourage households to collect and use rainwater	Medium	TBC	TBC	CC Group
	Work closely with the Environment Agency and other relevant local authorities to strengthen flood defences, improve flood warning systems and produce river management strategies	Ongoing	TBC, EA	TBC, EA	CC Group
	Incorporate climate change modelling results into review of Emergency Planning procedures	Medium	TBC	TBC	CC Group

Barriers/Issues	Action	Timescale	Suggested Responsibility	Resources	Monitoring
Biodiversity and Health Impacts	Work with other local authorities and the Gloucestershire Wildlife Trust to develop and implement the county biodiversity action plan	Short/ Medium	TBC/ GWT	TBC/ GWT	CC Group
	Work with local health bodies to flag up the potential risks from climate change and develop these into future health strategies	Medium/ Long	Primary Care Trust/ TBC	Primary Care Trust/ TBC	CC Group
Opportunities and Threats	Work with developers to improve awareness of the need for greater natural cooling systems for new building	Medium	TBC/ SWEA	TBC/ SWEA	CC Group
	Incorporate climate change predictions into borough and county level economic development strategies	Medium	Gloucestershire First/ TBC	Gloucestershire First/ TBC	CC Group
	Work with farmers and farmer's groups to improve awareness of climate change and the risks/ opportunities for their crops	Long	TBC/ National Farmer's Union	TBC/ National Farmer's Union	CC Group

10. Cross Cutting Issues and Taking Action Forward

Many issues relating to climate change cut across the boundaries of the previous sections on energy efficiency, renewables and adaptation.

Perhaps the most important cross cutting issues are awareness, advice, education and 'ownership' of the problem. A recent BBC poll on climate change revealed the following results:

- Only 23% of people thought they knew much about climate change
- Only half the people polled thought that individuals could have much effect on fighting climate change
- 85% of people would change the way they live to lessen the effects of climate change

These results suggest that we have someway to go to raise awareness on the causes and effects of climate change; however there appears to be a willingness amongst the general public to change their lifestyles to help solve the problem.

To fully implement the aims and objectives of this strategy we will need to put in place guidance and reporting systems. To this effect we intend to establish a steering group to oversee and implement the actions set out in this strategy. We hope to make this group a multi-agency body linked in with the work of the Tewkesbury Local Strategic Partnership. The group will produce an annual report detailing progress against actions in this strategy.

We will also form an internal Council group to guide improvements in energy, transport, waste and water management within the Council.

Action Plan - Cross Cutting Issues and Taking Action Forward

Barriers/Issues	Action	Timescale	Suggested Responsibility	Resources	Monitoring
Raising Awareness and Improving 'Ownership'	Work with the local media to improve public awareness of the threat of climate change	Short/ Ongoing	TBC/ Environment Groups/ EEAC	Local Media	CC Group
	Ensure up to date information is available through sources such as the Council website	Short	TBC	TBC	CC Group
	Work with local employers to implement staff awareness campaigns and improve understanding on the environmental impact of energy use in homes and offices	Medium	TBC/ EEAC	TBC/ EEAC	CC Group
Education and Advice	Work with the county council, local schools and colleges to develop education initiatives on energy and climate change	Medium	GCC	GCC	CC Group
	Continue to support the Energy Efficiency Advice Centre and develop advice resources for transport and renewable energy	Short/ Medium	TBC/ EEAC	TBC/ SWEA/ Energy Saving Trust	CC Group

Barriers/Issues	Action	Timescale	Suggested Responsibility	Resources	Monitoring
Taking Actions Forward	Set up a Council energy and carbon management group to co-ordinate internal initiatives	Short	TBC	TBC	TBC
	Ensure the climate change issues are fully incorporated into the Tewkesbury Community Strategy and the Council's other main strategic documents	Short/ Ongoing	TBC	TBC	CC Group
	Work with the Local Strategic Partnership to set up a Climate Change Strategy Implementation group linked to the LSP	Short	TBC/ TLSP	TBC/ TLSP	TBC

11. Strategic links

The climate change strategy does not exist in isolation, and it is important to note common aims with other strategies used in the borough. The following strategies have link with climate change objectives:

Strategy	**Link with Climate Change Strategy**
Tewkesbury Community Strategy	The Community Strategy is the boroughs leading strategic document, setting out a vision for the boroughs future
Tewkesbury Local Plan	The local plan sets out plans for land use development in the borough. Local plans will soon be replaced by Local Development Frameworks
Tewkesbury Borough Council Corporate Plan	The corporate plan is the Councils main internal strategy, setting out the Councils business plan for coming years
Tewkesbury Home Energy Conservation Act Strategy	The energy efficiency action plan this document effective updates the HECA Strategy
Gloucestershire and South Gloucestershire Affordable Warmth Strategies	Both strategies are concerned with improving domestic energy efficiency
Tewkesbury Housing Strategy	The housing strategy includes Council policies on energy efficiency and domestic scale renewable energy for all tenures
Gloucestershire Economic Development Strategy	This strategy aims to encourage and improve the development of the county's economy
Local Transport Plan	The Local Transport Plan (LTP) sets out the transport strategies the County Council will seek to implement from 2001 to 2006. It seeks to improve road safety, reduce pollution, reduce congested roads and improve the environment.
Gloucestershire Renewable Energy Action Plan	This strategy aims to develop generation of heat and power from renewable energy in the county. It is currently 'work in progress' and expected to be launched towards to end of 2004.
Air Quality Strategy	The air quality strategy aims to reduce local air pollution within the borough from sources such as vehicles, other fossil fuel combustion and radon.

12. Glossary of Terems Used

A

Action Energy – A government-funded programme that helps businesses and public sector organisations save money through energy saving in their buildings. Focuses on the business case for energy efficiency.

Affordable Warmth – The ability to heat your home without incurring excessive fuel bills or developing a debt as a result.

Affordable Warmth Strategy / Action for Affordable Warmth – Agencies in Gloucestershire and South Gloucestershire have produced a joint strategy that aims to ensure all homes have access to affordable warmth by 2016. Implementation of the strategy is overseen by a steering group with representation from local authorities and the health and voluntary sectors.

B

Building Regulations – These set minimum standards for construction of new buildings and the renovation of existing ones. Energy efficiency is covered by 'Part L' and includes standards for items such as insulation, windows and heating systems. The regulations have been gradually tightened over the years, and a new Part L is expected to be introduced in 2005.

C

Carbon Trust - A governmental organisation that promotes and funds development of low carbon technology. Funded through an energy use tax use on UK businesses.

Cavity Wall Insulation - The process of injecting insulation into the gap between a property's inner and outer walls. It greatly reduces heat loss through the walls. As a general rule pre-1930s homes have solid walls with no cavity.

CFL (Compact Fluorescent Lamp) - These can replace standard bayonet and screw fit bulbs, and use only 20% of the electricity of standard bulbs.

CHP (Combined Heat and Power) - Technology that generates both space heating and electricity on site, ranging in scale from units that supply whole towns (district heating) to individual households (micro CHP). This technology is normally more efficient than producing electricity and space heating separately.

Community Renewables Initiative (CRI) - A Countryside Agency funded programme that aims to encourage renewable energy developments in community facilities, e.g. village halls, offices, etc. In Gloucestershire the CRI is managed by the Severn Wye Energy Agency and started in mid-2002.

Condensing Boiler - A type of boiler that uses an extra large heat exchanger to achieve very high efficiencies (90%+). The condensing name comes from the fact heat is recovered successfully from the flue gases such that they are cooled to a temperature where the water vapour starts to condense out. Boilers with an 'A' energy efficiency rating will be condensing models

D

DEFRA (Department of Environment, Food, and Rural Affairs) - The central government department with responsibility for HECA.

DTI (Department of Trade and Industry) - The DTI is involved with many of the commercial aspects of sustainable energy, and funds grant schemes such as the solar PV programme

E

EEAC (Energy Efficiency Advice Centre) –The Gloucestershire EEAC is managed by the Severn Wye Energy Agency and receives funding from EST and several a mix of funding and in-kind support from the Gloucestershire local authorities through an annually reviewed Service Level Agreement. The network of 52 EEACs provide energy advice to the public and promote energy efficiency all around the UK.

Energy Efficiency Recommended – a labelling scheme for energy efficient products sold in the UK. Administered by the Energy Saving Trust.

Energy White Paper – Launched in 2003 'Our Energy Future' sets out the Government's long term plans for energy in the UK. In aims to implement the Royal Commission's carbon reduction target of a 60% reduction in CO_2 emissions from 1990 levels by 2050.

EST (Energy Saving Trust) - A Government body set up after the 1992 Rio 'Earth Summit' that attempts to reduce energy use in the UK. The EST is involved in several schemes to aid Local Authorities in their HECA work, and also fund the EEAC network.

F

Fuel Poverty - A household is said to be fuel poor if it spends more than 10% of its income on fuel.

Fuel Poverty Strategy – A UK strategy produced under the requirements of the Warm Homes Act (2001). The strategy aims to eliminate fuel poverty amongst vulnerable groups by 2010.

G

GJ (Gigajoule) - A unit of energy, 100, 000, 000 joules.

Gloucestershire HECA Group – Quarterly meeting of officers with responsibility for energy efficiency from the seven Councils in Gloucestershire and South Gloucestershire. Is a technical sub-committee of the Chief Environmental Health Officers Group.

H

Heat Pump – A heat pump is a device that transfers heat energy from one area to another. A fridge is a good example, here heat is transferred from the interior of the fridge to the condenser coils at the back. Heat pumps can be used to heat buildings. A long loop of tubing is either laid underground (ground source) or in a body of water (water source). The heat pump removes heat from liquid pumped around the tubing and uses it to heat either radiators or under floor heating. Heat pumps can be particularly effective in rural properties where cheap mains gas is not available.

HECA (Home Energy Conservation Act) - A 1995 private members bill that was made law. It forms the basis of local authority energy efficiency activities and requires them to report annually on activities and progress around improving energy efficiency. A target of 30% improvement in energy efficiency by 2010 was set in 1996 in support of the Act. No specific resources were provided to Local Authorities to assist in the tasks of improving or monitoring improvement.

Home Energy Check (HEC) Form – HECs ask simple question about a person's home. When people fill these in and return them to the EEAC they are sent a report detailing energy saving improvements they could make to their home. They are a simple advice tool and through partnerships with the EEAC can also help Council's collect data on the energy efficiency of local homes.

HRA (Home Repair Assistance) - A form of grant offered by local authorities. Many Councils use HRA budgets to provide vulnerable households with energy efficiency measures.

Hard to Treat Homes – Homes which cannot easily be improved using standard low cost energy efficiency measures. Common features are: Older properties, solid wall construction, non-standard roof spaces, lack of connection to and /or distance from mains gas network, under-occupied homes.

I

Innovation Programme - An EST programme providing funding for innovative schemes to reduce CO_2 emissions. Organisations including local authorities are encouraged to submit bids in a regular competition. Commenced 2001.

K

kW (Kilowatt) - A unit of power, one kilowatt refers to a thousand joules being either consumed or produced every second.

kWh (Kilowatt Hour) - A unit of energy commonly used on fuel bills. One kWh would power a device that consumes a kilowatt of power for an hour, or a 100 watt lightbulb for 10 hours, etc.

L

LASP (Local Authority Support Programme) - An EST funded programme that provides dedicated staff time to support local authorities in their energy efficiency work. Based in the local EEAC. Gloucestershire gained a LASP in September 2002 and the first phase is funded until 2004.

Local Strategic Partnership (LSP) – The Tewkesbury Borough Local Strategic Partnership aims to bring together a wide range of agencies within the borough to address issues and deliver co-ordinated services for residents. The LSP will deliver the Community Strategy for the borough.

P

Photo Voltaic Cells (PV) - PV technology produces electricity from sunlight, commonly seen in the form of solar panels on roofs.

S

Solar Power – Energy from the sun can be used to produce hot water by **PV** (**photo voltaic)** panels, or used to heat hot water for buildings. Solar hot water heaters are currently more cost effective than PV, and can provide most of a home's hot water demand during the summer months.

SWEA (Severn Wye Energy Agency) - An independent charity based in Mitcheldean that manages a portfolio of energy efficiency and renewable energy projects. SWEA work very closely with the Gloucestershire authorities, and manages the EEAC, the LASP, and the Warm and Well scheme.

W

Warm and Well – The Gloucestershire Warm and Well scheme aims to improve energy efficiency in the home and reduce the levels of associated health problems in Gloucestershire, through:

- raising awareness of the issues and appropriate action
- providing specific and appropriate advice to each householder that comes into the scheme
- enabling physical actions to be implemented through referral to grants and discounts

The scheme is supported by the six local authorities in Gloucestershire and South Gloucestershire. It now has several offshoots including the 'Solar Warm and Well' scheme for discounted/ grant funded solar hot water systems

Fact Boxes for Possible Inclusion

2. Introduction

Fact Box - How Climate Change Works
Climate change is often presented as the 'greenhouse effect' for this is a good picture of how greenhouse gases such as CO_2 work. The gases act like the panes of glass in a greenhouse letting in energy from the sun, but trapping re-radiated heat from the Earth's surface.

Greenhouse gases have always existed in a natural balance within the Earth's atmosphere, and without this natural effect the planet would be very cold. Carbon dioxide is emitted by sources such as animals breathing and geological processes. After remaining in the atmosphere for a period of time (about 100 years) CO_2 is absorbed by sinks such as plants and the oceans. Humans have acted to change this natural balance by increasing the amount of CO_2 emitted through burning fossil fuels. This means more CO_2 is being released into the atmosphere that is being absorbed, increasing the amount of the gas in the atmosphere.

Climate change is the preferred term as although we are seeing an increase in average global temperatures local effects on temperature and weather patterns will be more variable.

5. Emissions From the Council's Business Activities

Fact Box – Working From Home
Improving technology is allowing companies to implement more flexible working arrangements for their employees. In particular broadband Internet access combined with remote networking technology is making it far easier for employees to work at home whilst accessing files and using email as they do in the office. Although there are still some security issues with some jobs this technology can improve productivity and reduce the need to commute whilst giving employees a better work/ life balance.

6. Improving Energy Efficiency in Residential and Commercial Properties

Fact Box – The Home Energy Conservation Act (1995)
Under the Home Energy Conservation Act (HECA) local authorities with a housing responsibility were required to produce a report setting out measures which the authority considered to be practical, cost effective, and likely to result in a significant improvement in the energy efficiency of residential accommodation throughout the district. 'Significant' was later clarified as a 30% improvement over a 10 to 15 year timescale from 1997. HECA has acted as the main stimulus for local authorities to improve domestic energy efficiency

Fact Box – High Efficiency Heating
The average gas boiler in UK homes is around 60% efficient, i.e. 40% of the heat from the burning gas is lost. High efficiency 'condensing boilers' achieve efficiencies of 90% and greater; however despite being an established technology only a minority of new boilers sold are of this type. An upcoming technology is micro combined heat and power which replaces a homes boiler with a unit that produces both heat and electricity. These

units promise to have lower carbon emissions than using a boiler with mains electricity, and look particularly suited to older properties that have a large heating demand.

Fact Box – The Building Regulations
The Building Regulations set out legal standards for the construction of new properties and the refurbishment of existing ones; part L of the regulations sets standards for energy efficiency. The standards contained in part L were revised upwards in 2002, and look set to be tightened again in 2005. The 2005 revisions should make high efficiency boilers mandatory when existing units are being replaced.

Fact Box – Action Energy
Action Energy is a government-funded programme that helps businesses and public sector organisations save money through energy saving in their buildings. It focuses on the business (cost saving) reasons for saving energy. Organisations with energy bills of over £50, 000 can have free site visits and reports through the scheme.

Fact Box – The Climate Change Levy
The Climate Change Levy is paid by business users of gas, electricity, coal and LPG. It takes the form of a flat rate tax on each kWh consumed. Businesses can lower the amount of levy they pay by purchasing electricity generated from renewable sources and/ or signing up for a legally binding energy reduction target. The climate change levy is used to fund a number of energy efficiency initiatives.

8. Transport

Fact Box – Demanding Vehicles
Vehicle manufactures have made huge improvements in engine efficiency and exhaust quality over the past 30 years. However vehicle fuel efficiency hasn't seen the full benefit of this due to the increased size and complexity of our cars. The average family hatchback has nearly doubled in weight since the 1970s due to a growth in size, improved safety features and a greater amount of equipment. Combined with more power sapping equipment such as air conditioning and power steering this has greatly increased the power needed to move the average car around.

This trend has not been confined to cars. A modern high speed train emits considerably more CO_2 per passenger than one built in the 1970s due to higher speeds and weight increases from safety regulations.

Fact Box – Alternative Fuels
Petrol and diesel aren't the only fuels we can use to power vehicles. Propane and natural gases (LPG and CNG) are both increasingly available and can often reduce both CO_2 and local air pollutants. Bio-diesel is produced from agricultural crops and has very low CO_2 emissions, as this is re-absorbed when the crops grow. Bio-diesel can be used on its own or, more commonly, blended with conventional diesel fuel.

Fact Box – Hybrid Vehicles
Hybrid petrol-electric cars are on the market now and can reduce emissions by making the best use of conventional internal combustion engines. Hybrids allow vehicles to run with small, highly efficient engines with more power available from an electric motor when needed, for example under acceleration. The petrol engine is shut down when not

needed, for example when at traffic lights, and restarted instantly when the driver accelerates. Electrical power is recaptured when the vehicle brakes.

Fact Box – PowerShift
The Government's PowerShift programme aims to encourage the take up of alternative fuels. Grants are provided to people converting their vehicle to clean fuels such as LPG and to people purchasing new vehicles such as petrol-electric hybrids