# READING MEANS BUSINESS ON CLIMATE CHANGE

## READING'S CLIMATE CHANGE STRATEGY 2013-202

*DRAFT 270613*

*FOR STRATEGIC PLANNING, ENVIRONMENT AND TRANSPORT COMMITTEE 090713*

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## INTRODUCTION

There is overwhelming global consensus that society must rise to the challenge of tackling climate change.

*"The Intergovernmental Panel on Climate Change tells us, unequivocally, that greenhouse gas emissions must be reduced by half by 2050 – if we are to keep the rise in global temperatures to 2 degrees since pre-industrial times".*
(U.N. Secretary Ban Ki-moon, 17th Conference of the Parties, Durban 2011).

In times of economic uncertainty and with the planet facing unprecedented pressures on natural resources, energy reserves and land-use, we must face our responsibilities and play our part in averting the risks of severe climate change. This is crucial to ensuring a sustainable future.

We must act locally in the global interest, but we should also not overlook the significant local benefits of this action. These benefits include improving the efficiency and resilience of our local communities and infrastructure. We must reduce the risks that climate change will present and maximise the opportunities that lie in innovating and developing solutions.

*"Most of the observed increase in global average temperature since the mid-20th century is very likely due to the observed increase in anthropogenic (man made) greenhouse gas concentrations."* (The International Panel on Climate Change - fourth assessment report).

Reading Means Business on Climate Change is Reading's first cross-sector climate change strategy, developed by the Reading Climate Change Partnership (RCCP). As well as providing a vision for Reading and a strategic framework for action, Reading Means Business on Climate Change aims to motivate and encourage others into action and commitment by promoting the very positive progress which has already been made in the first climate change strategy, Stepping Forward for Climate Change.

## READING CLIMATE CHANGE PARTNERSHIP

The Reading Climate Change Partnership (RCCP) was set up in 2009 with the mission to work in partnership across all sectors, including the business, public, and community and voluntary sectors, to deliver urgent and appropriate action to mitigate and adapt to climate change in Reading.

The RCCP reports to the overarching Reading partnership, the 'Local Strategic Partnership' – called Reading 2020.  This partnership which brings together organisations, groups and individuals from all sectors to work in partnership for the benefit of all our residents, visitors and workers.

The development of RCCP was one of the key actions set out in the Council's  2008 - 2013 Climate Change Strategy for Reading, called Stepping Forward for Climate Change, which focused primarily on actions that the Council would take to address climate change.

## READING MEANS BUSINESS ON CLIMATE CHANGE 2013-2020

'Reading Means Business on Climate Change' presents a vision for how Reading will tackle climate change between 2013 and 2020.

The strategy establishes a set of strategic priorities for achieving this vision, for each of eight themes, along with a three year rolling action plan.

Our vision:

> ***We will develop a thriving network of businesses, organisations and individuals who will work together to develop solutions to reduce carbon emissions and prepare for a changing climate.***

Running through each of the themes are the two broad objectives that the strategy seeks to address:

1. ***Develop a low carbon Reading***

   We need to reduce the emissions of climate affecting pollution, known as green house gases, predominantly the carbon dioxide emissions emitted when burning fossil fuels.

   Low carbon living and working will be normal practice in 2050.

   We will work to reduce emissions in the borough by 34% by 2020 against a 2005 baseline[12].

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[1] *34% is the current target for the UK against a 1990 baseline.  National emission reductions between 1990 and 2005 were 15% source: Table 5 of DECC statistical release 2012 UK Greenhouse Gas Emissions Provisional Figures.*

Members of the community of action will commit to reduce their green house gas emissions, aiming to make 7% annual reductions[3].

2. *__Prepare for a changing climate__*

We need to be prepared for the inevitable effects of climate change that are already in the system due to the higher concentration of green house gases from activities past and present.

We will identify the key risks to Reading from the predicted impacts of a changing climate and establish ways to protect against these risks. People will consider their own vulnerability to the effects of climate change and prepare to minimise the risks.

The themes for the strategy have been developed through engagement with key stakeholders as a means of structuring the strategy. However, several of the themes are cross-cutting and run throughout the strategy, particularly 'Education, Communication and Influencing Behaviour' and 'Community', though there are cross-references within all theme chapters.

Reading's Climate Change Network

The Partnership's central vision is one of participation. Thriving in the future involves doing positive things that will make a local and global contribution.

The Reading Means Business on Climate Change website will enable organisations, groups and individuals to sign up to the strategy and commit to act to help meet its objectives and targets, and will present information on potential actions.

To join the network, please visit website or contact the Council[4] to be sent a paper version of the commitment.

RCCP will also host an annual event that will offer participants of the network the opportunity to celebrate contributions to this future vision.

Climate friendly business - a circular economy

A significant proportion (48.5%) of green-house gas emissions are attributable to the business sector and therefore commercial organisations, both large and small, are a

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[2] *Borough emissions will be measured using the National Inventory of Greenhouse Gases – (Carbon Dioxide Emissions with the Influence of Local Authorities) published by DECC, annually.*
[3] *For organisations, measurement of their carbon footprint should be made using the greenhouse gas protocol or similar standard and reductions measured against a baseline.*

[4] Contact details to be added

key focus of this strategy. We hope to engage a range of businesses in the delivery of the strategy through the development of Reading's Climate Change Network.

Business is also the engine of innovation and can provide the solutions that we need to reduce carbon emissions and protect us from the impacts of climate change. The 'circular economy' is at the heart of our strategy.  This concept shows a positive vision for the future economy, where clean energy is used to power production, re-using products and materials, and where possible using natural materials that can safely be returned to nature. The economy then becomes circular with little impact on the environment *(see the chapter on Purchasing, Supply and Consumption' for more on the 'circular economy')*.

How will the Strategy be delivered?

The strategic priorities within the strategy will be delivered through a rolling 3 year action plan, which will be revised annually with an annual progress report.  The action plan will be delivered by both RCCP and the wider network.

The strategy will be reviewed in 2016/17.

Consultation on the draft strategy

RCCP  has consulted extensively on the climate change strategy, developing the content through a series of events, with individual chapters authored by different partnership members.  A draft strategy of 'Reading Means Business on Climate Change' was published for general consultation for a period of six weeks, closing in December 2012.  The strategy and action plans were then revised in the light of the consultation results and edited to produce the final document.

## SETTING THE SCENE - REDUCING GREEN-HOUSE GAS EMISSIONS

UK

For the UK, the Climate Change Act 2008 establishes a long-term framework for tackling climate change. The act aims to encourage the transition to a low-carbon economy in the UK through setting national targets.  This means a reduction of at least 34% in greenhouse gas emissions by 2020 and at least 80% by 2050, against 1990 baseline.

The graph below shows the reduction in carbon dioxide emissions since 1990 and the targets to 2050.

**UK CO2 Emissions and Targets**
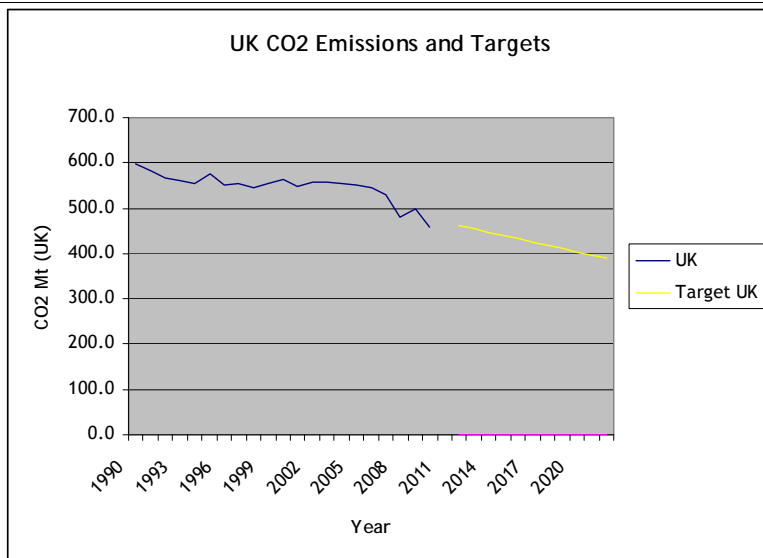


**Reading's Green-house Gas Emissions**

Reading is a busy commercial town, with a significant proportion of its green-house gas emissions (48.5%) attributable to its commercial activities.

**Reading CO2 Emissions**
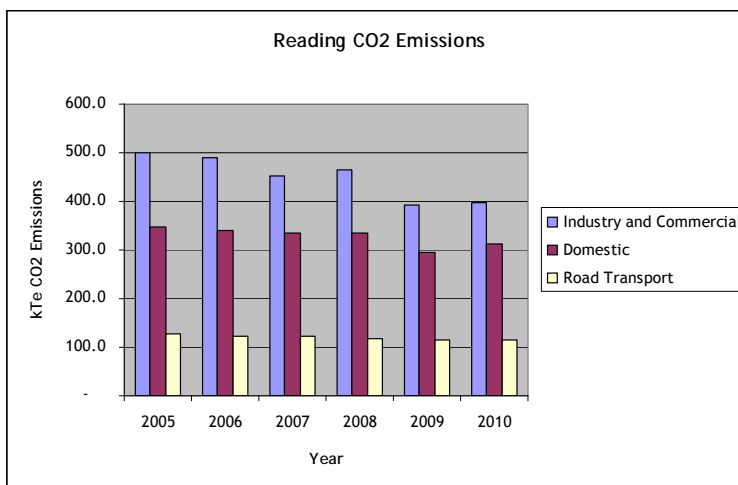


Total emissions in Reading reduced by 15.5% between 2005 and 2010 and by 22% in terms of  per capita emissions (in the context of a rising population over the last 4 years).

Reading has in fact reduced its emissions by a greater percentage since 2005 than the UK as a whole.

Through the delivery of 'Reading Means Business on Climate Change', RCCP aims to reduce Reading's emissions by 34% between 2005 and 2020, against a 2005 baseline, as there is no reliable data for emissions in 1990.

**Reading CO2 Emissions and Targets**
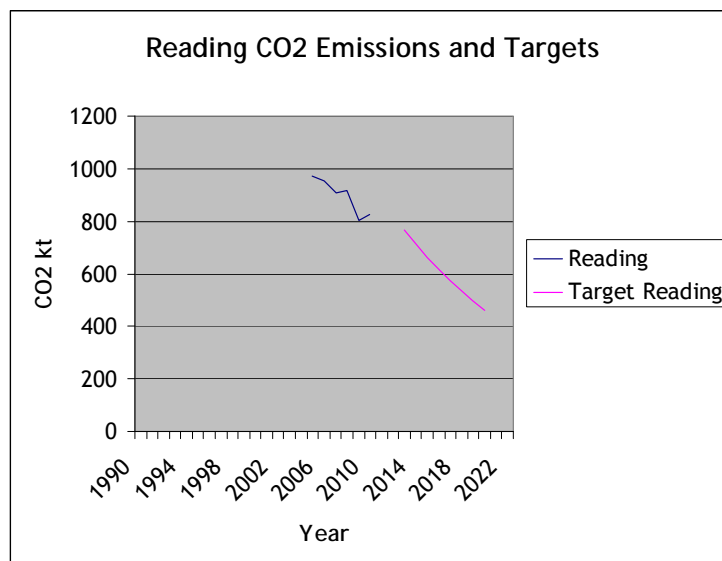


RECENT ACHIEVEMENTS AND SUCCESSES

The Council's first climate change strategy, Stepping Forward for Climate Change (2008-12), was written in consultation with the community and set out targets for the Council to reduce its own $CO_2$ emissions by 50% by 2020, becoming zero carbon by 2050.  It also set out the initial steps towards the wider borough reaching a 80% reduction in emissions by 2050.

Some of the accomplishments during the first strategy:
- Thousands of homes were insulated.
- Hundreds of people were trained in 'green skills'.
- Solar panels were installed on many of the boroughs schools and corporate buildings such as the bus depot and Rivermead leisure centre.
- Development sites have been earmarked for energy schemes.
- There was an increase in sustainable transport choices.
- The Council made good progress with its own emissions.

However, reductions delivered under Stepping Forward for Climate Change were a small proportion of the total progress made by organisations and individuals in the borough during that time.

Some examples of projects that have been delivered in Stepping Forward for Climate Change:

- The Council has made good progress, reducing its own emissions between 2008 and 2012. This includes continued investment in energy efficiency equipment across its own building stock through the SALIX 'invest to save' programme from 2008 to 2012.

- Almost 2000 insulation measures have been installed in Reading's private housing.  This represents around half of the funded insulation jobs carried out in the borough in the period 2008-12.

- The Greener Warmer Safer programme and Winter Watch schemes target homes where the householders are at risk of under heating their homes.  Insulation and a range of other measures are offered as part of the package.

- A wood fuelled heating network has been installed at one Council site and one development area incorporates an energy centre for energy in its plans. Further feasibility reports have been conducted pending suitable development plans and/or funding.

- A 24% reduction in car trips to the centre of Reading has been made since 2006 and an 11% increase in pedestrian journeys.

- The Council and the Reading Climate Change Partnership installed over 2000 solar panels on 40 buildings including 17 schools, aiming to lead 'a step change in renewable energy'.  This tripled the amount of solar electricity generation in the borough.

- Around 300 people signed up to the 'Stepping Forward for Climate Change' pledge to reduce their carbon footprint by an average of 1 tonne per annum per household.

- The Climate Change Partnership has begun to develop approaches to bring in investment for renewable energy and energy efficiency in the borough.

- The Council has adopted planning policies for local energy provision (including renewable energy) and for adaptation to climate change.  Further work is being carried out to identify how new homes can be zero carbon by 2016.

- A local climate impacts profile was conducted to assess the effects of local weather events in the borough, in particular heat events and rainfall.  .

- Kyocera Document Solutions has supported a programme of daily tips on sustainable living, plus events and on-air discussions on local radio station Reading 107, over the period 2008-2011.

- The Climate Change Partnership has been modelling approaches to the Green

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Deal for the borough, with a view to tackling fuel poverty, reducing carbon emissions and creating jobs.

- A training package (Eco-Advantage) enhancing 'green skills' was delivered to over 180 unemployed learners in Reading.

- A solar project for Reading installed solar panels that generate electricity onto 40 buildings including schools, council buildings, community building and local businesses.  The project included a council investment, a community scheme and local community funded schools on the 10:10 solar schools scheme.

## ENERGY

### INTRODUCTION

Modern society relies on the provision of energy to our homes and workplaces; life in the UK climate would simply not function without it. Most of us assume that energy is freely available.  We turn on any appliance (kettle, cooker, computer, for example) when it suits us and for as long as we like.  This energy of course has to be generated, normally in a power station using mainly fossil fuels (such as coal, oil and gas). Combustion of these fuels releases green house gases into the atmosphere.

The heavy dependence on fossil fuel to provide this energy in the UK has been identified as our most significant impact on global climate change. It is therefore crucial that we consider how our energy is produced, supplied and consumed and what we can do to be more efficient and limit our impact on climate change, whilst balancing the needs of the society.

By being efficient with the energy we use, 'greening' the grid and developing new, clean and efficient methods of generation and distribution, we can reduce the impact of our energy consumption on global climate change

This chapter sets out Reading's plan to reduce its emissions from energy.

### VISION BY 2020

In 2020, Reading will use less energy and have cleaner, greener supplies of electricity and heat.  We will have made a step change in the provision of locally generated renewable energy which will have increased to at least 8%.

Local smart grids and power plants (decentralised energy) will offer more responsive, cost effective, low carbon energy to consumers.

Smart meters will be installed across the borough to improve monitoring and control of local energy supply. Communities and businesses will work together to reduce their energy consumption and develop low carbon energy solutions.

| SUMMARY OF STRATEGIC PRIORITIES |
| --- |

- *Reduce electricity consumption within the commercial and public sectors*

- *Introduce smart meters and energy storage solutions in Reading*

- *Increase amount of energy generated locally using renewable technologies*

- *Develop heat supply networks to deliver low carbon heat in Reading*

| HOW WE WILL ACHIEVE THE VISION |
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ELECTRICITY

The Carbon Intensity of Electricity

A range of different fuels are used to generate the electricity provided on the grid. High carbon fossil fuels such as gas and coal are used alongside lower carbon nuclear fuels and renewable energy such as wind and hydro-power.

National policy is set to reduce the amount of carbon dioxide emissions per unit of electricity produced for the national grid (its carbon intensity). Proposed electricity market reforms aim to shift electricity generation from fossil fuels to low carbon sources with a subsequent change of the UK energy mix. Reading will be supplied by energy that is generated both locally and further away (including Europe).

Small scale, locally generated energy tends to be used locally and therefore the more low carbon electricity that is generated locally, the lower the carbon emissions in the borough.

Our Electricity Consumption

In 2010, the borough used approximately 813 GWh (813,000,000 kWh) of electricity, with Reading's households using an average of 4,400kWh. However, the greatest consumption of electricity in Reading is in the commercial sector. This sector includes many different types of energy uses, from lighting in offices and shops to air conditioning, heating and computer equipment.

Reduction in consumption is widely recognised as the first stage in the energy hierarchy; once energy efficiency in buildings is maximised then supplying energy using renewable sources is appropriate. In order to meet the ambitious UK target of 80% reduction in emissions by 2050, however, it will be necessary to implement energy efficiency

measures alongside investments in energy supply, such as renewable energy and more efficient supply across the borough.

*Strategic priority:*

● *Reduce electricity consumption within the commercial and public sectors*

<u>Smart Electricity Grids</u>

In order to efficiently use the power we generate and to cope with increasing amounts of less predictable renewable energy generation, energy storage and 'smart' ways of evening out our consumption are needed. e.g. smart electricity grids.

*Strategic priority:*

● *Introduce smart meters and energy storage solutions in Reading*


HEAT

<u>Our Heat Demand</u>

In Reading, our homes and businesses are mostly heated using gas or electricity. Gas, although a fossil fuel, has a lower carbon footprint than electricity currently and installing efficient modern boilers can make a difference.  In the future, however, we have to move to cleaner, greener energy sources to provide our heat, including electrical sources as the electricity supply becomes decarbonised.

About 1315 GWh (1,315,000,000 kWh) of natural gas is used across the borough to provide heat. Domestic use accounts for over half of the gas used in Reading. The largest use of heat is for heating the space inside buildings. The energy efficiency of a building relies on its insulation level and the efficiency of its heating system.

<u>District Heating – Heating Neighbourhoods</u>

District energy schemes can heat multiple buildings using waste heat from local power plants and/or renewable energy. Reading has earmarked certain areas where development could incorporate district heating networks, where heat is needed continuously such as housing, hotels, hospitals etc.  Detailed planning policy sets out the requirement to consider this approach. Investment in decentralised energy would give Reading the opportunity to meet its local heat demand and continue to reduce carbon dioxide emissions.

<u>Reducing our Energy Consumption</u>

A great deal of the energy used in Reading is wasted.   In many cases it is used to heat

poorly insulated buildings and to fuel and power inefficient, outdated equipment. Given the high carbon intensity of existing grid electricity, the most cost effective way to reduce carbon dioxide emissions, is to improve the energy efficiency of buildings.

Insulation schemes in the UK domestic sector have been funded through obligations imposed on energy utility companies by the government. In Reading a scheme run by the Energy Saving Partnership, Heatseekers, has delivered around 2000 measures since the introduction of the first climate change strategy in 2008. This accounts for around half of the registered grant funded measures recorded in Reading. Each of the measures installed can be estimated to save an average 0.6 tonnes of carbon emissions per annum and save the household an average of £155 in energy bills.

*Strategic priority:*

● *Develop heat supply networks to deliver low carbon heat in Reading.*


RENEWABLE ENERGY

<u>Renewable Energy as a Share of Reading's Energy Supply</u>

Renewable energy is generated using natural resources such as wind, sun, ground heat and biomass. The UK has a target to generate 15% of its energy from renewable sources by 2020. As of 2011, about 3.8% of the UK energy was from renewable sources. In Reading 3% of our energy is currently sourced from renewable sources. Reading has agreed to make a step change in the use of renewable energy generation as part of its commitment to provide clean green energy into the future and to kick start the green economy, and is keen to upscale the deployment of renewable energy generation in line with the national target of 15%. However, geography and prevailing weather conditions play a key role in the number of viable sources of renewable energy within an area.

A report on the current renewable energy generation in Reading and Berkshire was carried out by Thames Valley Energy. These studies indicated around 8.5% of total energy can be generated locally using renewable resources available in Reading, with the balance consisting of a share on the renewable electricity on the national grid. The report identifies around 12MW of electrical generation capacity and 18MW of renewable heat generation capacity that would provide around 8% of local power generation.

With incentive schemes designed to promote investment into renewable energy technologies, business cases are more likely to show returns on investment.

Companies and community organisations may offer to finance renewable energy systems on houses and land and recoup the incentive payments.  These organisations are typically referred to as ESCos (Energy Service Company).  ESCos may also offer investment into energy efficiency services.

*Strategic priority:*

● *Increase amount of energy generated locally using renewable technologies.*

Renewable Electricity Resources in Reading

Reading's natural resources provide the potential for solar, hydro and to a lesser extent wind, generated energy. Waste and wood also offer significant potential for heat and electricity generation through combined heat and power systems.

Solar Panels

Solar panels are much more common since the introduction of financial incentives. Though these incentives have recently reduced, the Council has installed solar panels on 40 buildings in Reading, and overall there are around 500 further households who have installed electricity generating solar panels.

Hydropower

Reading sits at the confluence of the rivers Thames and Kennet, providing  further potential for hydro-power energy generation, in addition to that produced by the Mapledurham turbine, which generates around 0.5GWh per annum.

Wind

Onshore wind is used to generate electricity.  Whilst Reading is not a 'windy' place, it is considered viable and the Green Park turbine produces enough electricity to power 730 homes.   Wind remains a significant opportunity for local renewable energy generation.

Renewable Heat Resources in Reading

Whilst renewable electricity can be easily transmitted over significant distances, this is not the case with heat, which makes renewable heat generation more of a challenge.

Reading's resources include the availability of wood (Berkshire provides an extensive wooded area), ground source heat and the large volumes of waste and sewage, which urban centres create, and which can be used to generate energy via anaerobic digestion.

Biomass

Heat is generated from the combustion of wood and energy crops. It can provide continuous and consistent flow of energy with less variability compared to other sources of renewable heat.  Carbon dioxide emissions are considered neutral as they are captured by the photosynthesis process.  Forest management processes are important to make sure that new wood growth provides further fuel and to capture carbon.  Transport and

forestry operations use fossil fuels and therefore the process cannot be described as entirely carbon neutral. About 1% of the total UK heat demand is sourced from biomass with the potential to provide up to 6% by 2020 (UK Bioenergy Strategy).

To successfully implement biomass it is crucial that fuel is from sustainable sources and preferably from local suppliers. Biomass can create local supply chains and improve the sustainable management for the benefit of both woodland biodiversity and climate change.

However, biomass does affect air quality, as combustion emits particulate emissions (smoke) and nitrogen dioxide (gases). Particulate emissions are not high in Reading and so there are no special control areas for this pollutant. Particulate emissions can be controlled using air pollution control equipment before the discharge flue.

Biomass remains a good option for providing renewable heat in Reading.  Where there is a sufficiently high requirement for heat in a small area, combining district heating systems with biomass could provide an efficient low carbon solution.

Ground and Air Source Heat Pumps

Ground source heat pumps are used to obtain heat from the ground. The system typically uses 1 unit of electricity to deliver 3-4 kW of heat or cooling as required. Reading has been identified as particularly suitable for ground source systems, due to its geology and the mobility of ground water.

Air source heat pumps use the same concept but use the outside air instead. They are generally less efficient than ground source heat pumps as the ground stores more heat than the air.  A study by the Energy Saving Trust (EST) showed system efficiencies of 1.82 and 1.86 for systems with radiators and under-floor heating respectively[5]

Comparing this with a domestic gas heating system, the heat generated by an air source heat pump has a greater carbon intensity and a higher price at the current time.

Anaerobic Digestion

This is the name given to the biological process of digesting organic material such as food waste and/or sewage in a sealed vessel to create natural gas.  This natural gas can then be combusted to provide heat and power.  Reading's sewage treatment works run by Thames Water use this process to treat sewage waste.  The heat and electricity generated are then both used in the on-site process of sewage treatment.

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[5] Dunbabin, P & Wickins, C: Detailed analysis from the first phase of the Energy Saving Trust's heat pump field trial, URN 12D/018, London: DECC, March 2012.

<u>Waste heat</u>

Wherever processes have waste heat there is potential to utilise this locally to reduce the amount of fossil powered heat that is needed.  This could range from harnessing heat from computer servers within larger commercial buildings to large scale industrial processes being used to power district heating systems.

## A BUSINESS PERSPECTIVE

Business accounts for 48% of energy use in the borough and therefore has a significant role to play in reducing energy consumption and selecting decarbonised forms of energy. Rising energy prices also constitute a substantial risk that businesses must manage. Where businesses are owner occupiers – or are able to specify insulation, heating, ventilation and air conditioning systems as part of a new development or refurbishment - there are sound commercial benefits associated with investing in more efficient use of energy and on-site micro-generation. Incentives such as Feed-in tariffs and the Green Deal are available for businesses as well as domestic energy users, and these, combined with the reduction in energy costs, often allow pay-back within normal commercial timescales. Other sources of funding exist that are targeted specifically at businesses, for example the Energy Efficiency Financing programme delivered through The Carbon Trust.  In addition, the Enhanced Capital Allowance Energy Scheme allows SMEs to claim 100% first-year tax relief on investments in energy-saving products and technologies.

The vast majority of businesses are SMEs and most of these are tenants. When a business doesn't own its premises, it has less control over the specification of buildings and the equipment that is installed in them. Reducing the energy consumed by business therefore has to involve commercial landlords and developers. Businesses only have the opportunity to influence leases at initiation and break-points, and even then it can be difficult to convince landlords to invest in measures that won't increase their return on capital Payback periods may be longer than the tenancy period, and leases often require tenants to pay for any changes made to be reversed on termination, so making the business case can be challenging. "Green leases" have been pioneered by the Better Buildings Partnership, a group comprising some of the UK's more enlightened commercial property owners; these provide mutual contractual lease obligations for tenants and owners to minimise environmental impact in areas such as energy, water and waste.

There are, however, steps that can be taken by all businesses to avoid energy being wasted in the course of business, through the use of more energy-efficient business equipment and more efficient patterns of use. There are both financial and reputational benefits to adopting a methodical approach to monitoring and minimising energy use. We can be confident that energy prices will continue to increase, so prudent use of energy and minimisation of energy costs are essential to control operating costs; operational efficiency releases funds that can be re-employed in more productive ways. Although it is

harder to quantify, there is also a reputational benefit to being a "low-carbon business" which can be instrumental in winning contracts from customers with a strong sustainability focus. In some sectors it is a minimum requirement that suppliers are able to demonstrate effective systems and processes for controlling carbon emissions.

Some energy efficiency measures involve significant investment and it can be harder to make a compelling business case. Innovative business models, for example "pay per lux" for LED lighting, are beginning to emerge, enabling the higher capital cost of innovative technology to be converted to an operating expense.  These innovations create opportunities for new product-service systems, creating new market segments and stimulating competition.

Carbon offsetting is one option available to businesses, but it should not be seen as an alternative to reducing operational emissions. In the context of this strategy, only genuine emissions reductions count towards achievement of our shared target.

## LOW CARBON DEVELOPMENT

### INTRODUCTION

The quality of the built environment is of crucial importance in reducing our contribution to climate change through reducing the amount of energy we use in buildings. Insulating and improving the efficiency of our existing buildings and building highly efficient new buildings are critical to reducing our energy consumption and carbon footprint.

This theme addresses how the built environment might be managed and developed to respond to the threat of climate change, whether through the development of more energy efficient buildings, at the same time reducing energy costs and addressing fuel poverty, or through the need for long-term strategic planning.

To adapt to climate change and achieve sustainable development, long-term economic, social and environmental strategies must continue to evolve and guide the revision of spatial development policies for the future.

### VISION FOR 2020

By 2020 Reading will have reduced its energy consumption from buildings through improved design, construction and refurbishment of existing buildings. All new buildings will meet 'zero carbon' standards.

Reading has planning policies in place that reduce energy consumption. As 'zero carbon' standards are established (in 2016) for new build, planning policies will emphasise local retrofit and renewable energy programmes and other ways to reduce emissions from the local area.

Planning policies and standards for buildings will address energy use, energy embodied in construction, and the local effects of climate change. Strategic planning will assess the long-term implications of development trends on reducing carbon emissions and adapting to the effects of climate change.

| SUMMARY OF STRATEGIC PRIORITIES |
| --- |

*● Buildings in Reading to be built to high standards of energy efficiency (i.e. zero carbon standards), incorporating on-site renewable energy where possible[6]*
*● Retrofit energy efficiency measures into Reading buildings*

*● Improve properties to reduce fuel poverty in Reading*

*● Enable the uptake of Green Deal and associated grants in Reading.*

*● Minimise the 'embodied carbon' incorporated into construction projects*

*● Continue to develop planning policies that:*
  *➢ support the reduction of green house gas emissions directly and indirectly from the borough.*
  *➢ reduce the risks of inevitable climate change to the communities of Reading.*

| HOW WE WILL ACHIEVE THE VISION |
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STANDARDS FOR LOW CARBON BUILDINGS

Significantly from 2016 it is the government's intention that all domestic new build properties will be required to meet the emerging 'zero carbon' standards.

Building Regulations, which now include strict standards for insulation and ventilation, apply to most built development and compliance is mandatory.  All buildings built, rented, or sold now require an Energy Performance Certificate (EPC) based on their design, but currently there are no required standards of actual energy consumption. From April 2018 all property for rent or sale will be required to meet EPC standards E rated or better.

Reading currently has planning polices that require developers to exceed the mandatory building control standards for energy efficiency.  In 2013 Building Regulations will change again and will demand compliance with higher standards.  Further planned changes to the Building Regulations including the move to 'zero carbon' homes in 2016 (non-domestic buildings to be 'zero carbon' by 2019) are expected to increase energy efficiency and encourage greater use of local renewable and low carbon energy supply.

The emerging Building Regulations definition of 'zero carbon' for domestic buildings sets a maximum energy input based on floor area, but does not cover energy use for cooking

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[6] SP wording to be agreed at Reading Climate Change Partnership Board on 10th July

and appliances. It does allow for off-site low carbon and renewable energy generation. A 'zero carbon' building could therefore still require significant energy inputs.

Therefore, it will be necessary to ensure that high insulation standards are applied to minimise the dependency on external energy supply for heating e.g 'MINERGIE' or 'Passive House'.[7] It will also be necessary to provide low carbon energy sources, as considered in the 'Energy' chapter.

With 'zero carbon' requirements from 2016, there will be a need for developers to demonstrate that, where they are not able to meet zero carbon on site, they are investing into carbon dioxide emission reductions elsewhere to compensate. A local Community Energy Fund[8] could allow developers contributions to be invested in local projects which would benefit the local green economy and fuel poverty objectives *(see section on 'fuel poverty' below)*.

*Strategic priority:*

● ***Buildings in Reading to be built to high standards of energy efficiency (i.e. zero carbon standards), incorporating on-site renewable energy where possible***


IMPROVING EXISTING PROPERTIES

The majority of existing homes and buildings will still be standing in 2050, so it will be important to undertake a significant programme of retrofit and energy demand reduction across almost the entire housing stock. This refurbishment work will need to consider issues around reducing emissions of greenhouse gases, improving energy security, tackling 'fuel poverty' and creating 'green' jobs.

Householders and businesses may feel confused about different options on offer to install renewables and some guidelines could help them when deciding on the best available option (e.g. buy solar panels, etc), particularly as planning permission or listed building consent may be needed. There is a similar need for guidance about retro-fitting insulation and other energy-efficiency measures. This guidance would best be developed in local partnership. Examples of low carbon buildings, whether new-build or improved existing stock, can be used to demonstrate the benefits of good practice.

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[7] MINERGIE® is a sustainability brand for new and refurbished buildings. It is mutually supported by the Swiss Confederation, the Swiss Cantons along with Trade and Industry and is registered in Switzerland and around the world and defended firmly against unlicensed use.

Passivhaus buildings provide a high level of occupant comfort while using very little energy for heating and cooling. They are built with meticulous attention to detail and rigorous design and construction according to principles developed by the Passivhaus Institute in Germany, and can be certified through an exacting quality assurance process.

[8] A local Community Energy Fund is defined in the Climate Berkshire – zero Carbon Standards study 2012.

[9] Marmot Report Health Impacts of Cold Homes and Fuel Poverty

[10] DECC estimate

Ideally new buildings will be built to last without requiring further retro-fit, but in determining appropriate standards for retro-fit there is a potential conflict between implementing relatively low-cost measures that will bring short-term benefits (warmer homes, reduced emissions, economic returns at current prices) but are likely to require costly retro-fit of additional measures by 2050, and more expensive measures that are unlikely to require further expenditure.

In the context of developing technologies and uncertain costs for energy and carbon, this is a difficult area and the availability of 'off the shelf' solutions is ever evolving. Some means of taking account of the ease and cost of retro-fit to higher standards should be developed.

<u>Fuel poverty</u>

An added benefit to making homes more energy efficient is the consequent reduction in 'fuel poverty'. Where householders struggle to heat their homes, due to low incomes and high bills, they are described as being in fuel poverty and tend to face higher risks to their health such as cardiovascular and respiratory diseases and their mental health. Children's educational attainment can also be impacted and there are more 'excess winter deaths' associated with those in fuel poverty[9].

In Reading in 2011, around 9.8% or 6239 households are regarded as being in fuel poverty[10]. Reading Borough Council surveys housing in Reading against the. At the last 'Decent Homes' survey of privately-rented homes in Reading in 2006, 32% of houses were classed as having a 'category 1 hazards on excessive cold' .

Reading has operated a number of schemes in areas that are particularly at risk of fuel poverty, providing free loft and cavity wall insulation, alongside a range of other measures to help householders to be safer and more secure in their homes.

<u>Green Deal</u>

The Green Deal is the government's flagship scheme to retrofit buildings in order to make them more energy efficient, launched in 2013. The scheme provides householders with the opportunity to use their future energy savings to pay for energy efficiency measures to be installed in their homes. The scheme is designed to create a market in energy efficiency that goes beyond previous approaches which focused on loft and cavity wall insulation.

In the case of tenanted properties, tenants will pay the Green Deal charge on their bill, with the charge shifting to the landlord when the property is vacant and passing on to future tenants when re-let. The landlord is required to enable Green Deal works upon request after 2016 and will be required to carry out works on their property if it fails to meet an Energy Performance Certificate rating of E by 2018.

Reading is a city with a large number of historic houses, many of which have poor energy

efficiency ratings, and there are likely to be many opportunities for householders to improve their homes. Through the recent government funded Green Deal Pioneer Places project, the Council visited over 800 homes, and over 500 householders went on to book assessments for Green Deal.

Where homes are expensive to insulate (e.g. solid wall Victorian houses), or where householders are at risk of being in fuel poverty, there are subsidies available. These are estimated to total around £1.3bn per annum.

<u>Embodied carbon – construction impacts</u>

Considerations of the climate impact of construction go beyond the 'running cost' of the buildings in terms of carbon emission sand should extend to whether refurbishment is better than demolition and rebuild in terms of the 'embodied' energy (the total carbon emissions created throughout the construction process) and other natural resource impacts.  There are benefits and dis-benefits of high and low density of developments. Consideration of lifecycle energy consumption and embodied impacts are needed.  This is considered further in the 'Procurement, Supply and Consumption' and chapter.

*Strategic priorities:*

● *Retrofit energy efficiency measures into Reading buildings*

● *Improve properties to reduce fuel poverty in Reading*

● *Enable the uptake of Green Deal and associated grants in Reading.*

● *Minimise the 'embodied carbon' incorporated into construction projects*


STRATEGIC PLANNING AND DEVELOPMENT CONTROL

The National Planning Policy Framework (NPPF) includes many references to sustainable development and climate change and places the onus on local authorities to develop detailed policies, in the absence of more detailed national and regional guidance.

Success in achieving a low-energy low-carbon future will require current strategies and policies to be reviewed and adapted. Any long-term strategy for development that takes account of climate change  will need to reconcile a number of potentially conflicting policy aims:

- Reducing emissions from transport both within and outside Reading

- Encouraging a thriving economy that supports growth in the 'green economy' and local services

- Provision of 'good' housing (easier to manage for a stable demographic rather than Reading's growing population)

- Low carbon energy supply, water supply, and waste management (there will be limits to local exploitable low carbon energy supplies and water resources)  based on geography and meteorology; the more that is required the higher will be the cost

- Reducing the local impacts of a changing climate through the design of buildings and infrastructure that support the population of Reading

Reading should continue to review its strategic plans to ensure they continue to be compatible with local and national emissions targets, and with other local policy aims.

*Strategic priority:*

● *Continue to develop planning policies that:*
  ➢ *support the reduction of green house gas emissions directly and indirectly from the borough.*
  ➢ *reduce the risks of inevitable climate change on the communities of Reading.*

## A BUSINESS PERSPECTIVE

Few businesses have the luxury of being able to design and build their own premises, but for those that do the benefits of commissioning low carbon buildings are becoming stronger. Reading's planning policies already encourage the design of commercial buildings to at least BREEAM Very Good standard, and this is a material consideration in the determination of planning applications. With energy costs on an upward trend this is likely to pay dividends in the future; commercial buildings constructed on a speculative basis are likely to be more appealing to potential occupiers if they have a good energy performance rating, due to the reduced operating costs this will deliver. Other sustainability standards for commercial buildings include SKA, an environmental assessment tool for sustainable fit-outs.

The emergence of new energy efficiency and renewables products and rating standards, together with government initiatives like the Green Deal, provides commercial opportunities for both entrepreneurs and established businesses, by creating new markets and stimulating demand. Up-skilling to deliver low-carbon solutions for both domestic and commercial customers will be a source of significant revenue for those who already work in construction and associated industries.

# NATURAL ENVIRONMENT

## INTRODUCTION

The natural environment plays a key role in making our urban spaces liveable, both for people and wildlife. Tree planting, for example, can help mitigate both the 'heat island' effect (where an urban area is significantly warmer than its surrounding rural areas due to human activities) and the emissions that impact on both climate change and air quality.

In response to climate change, communities of wild animals and plants will have to relocate from places that are becoming unsuitable for their survival to places where conditions are becoming more favourable. The way that open spaces and parklands are managed can have a significant impact on wildlife corridors and habitats and consequently on wildlife's ability to survive.

This chapter addresses how the natural environment should be managed and developed to respond to the threat of climate change, including the role of the local community, to make Reading a better place for people and for wildlife.

## VISION FOR 2020

Reading will have a thriving and interconnected natural environment, with links and stepping stones, such as parks, back gardens and river corridors.  Wildlife will be able to live in and move through the urban environment, allowing it to adapt to a changing climate.

The community will understand the role that trees and other planting plays in reducing the effects of climate change and new tree planting will be provided as standard in new development sites. The community will be more involved in the management of local green spaces.

## SUMMARY OF STRATEGIC PRIORITIES

● *Protect wildlife from impacts of climate change*

● *Encourage local community groups and businesses to become more involved  in the management of local green spaces*

## HOW WE WILL ACHIEVE THE VISION

### EXISTING POLICIES AND STRATEGIES

There are currently various policies in place that relate to the natural environment, such as the Council's Biodiversity Action Plan 2005-2015 (BAP), Tree Strategy, Open Spaces Strategy, Thames Parks Plan, the Reading Water-space vision and the Lower Kennet Valley Management Plan.

Although Reading's Biodiversity Action Plan does not specifically refer to climate change, it does recommend that, as Reading develops, a structured mosaic of habitats is created through the planned incorporation of appropriately located corridors and buffer zones

The Local Development Framework also addresses green spaces, wildlife and the natural environment in specific sections of the Core Strategy, sections of the Sites and Detailed Policies Document, and sections of the Sustainable Design and Construction Supplementary Planning Document. To ensure that wildlife aspects and green infrastructure are given more weight in development control, a Supplementary Planning Document (SPD) on the Natural Environment could be developed including landscape design, biodiversity enhancements and Sustainable Drainage Systems.

In addition, some of Reading Borough Council's large publicly owned meadows receive funding through Natural England's High Level Stewardship scheme and the Council and Berks, Bucks and Oxon Wildlife Trust are involved in the Berkshire Local Nature Partnership, building on the work already done by the Berkshire Nature Conservation Forum.

A further two key areas for action are to review the Biodiversity Action Plan when it expires in 2015 so that it takes a more holistic approach to the conservation and enhancement of biodiversity and to ensure the Berkshire Local Nature Partnership is appropriately resourced and functions effectively.

### WILDLIFE IN DEVELOPED AREAS OF READING

'Ecological permeability' is the term used to describe the ability of wildlife to re-locate through an area. In urban areas permeability is improved by including features such as trees, green roofs, watercourses, allotments, playing fields, grass verges, and hedges, creating continuous linear features and reducing the distances between areas with suitable habitat.

Wildlife can also be made more resilient to climate change by increasing the amount of available (or linked) habitat to create larger, more stable populations of flora and fauna. Small isolated populations are vulnerable.

'Green infrastructure' is the network of natural environmental components and green and blue spaces that lies within Reading's urban area and which provides multiple social, economic and environmental benefits. In the same way that the transport infrastructure is made up of a network of roads, railways, airports and ports, green infrastructure has its own physical components, including woodlands, parks, rivers, street trees and gardens.

As a community grows, it upgrades its grey infrastructure (roads, sewers, energy distribution etc.) but also needs to upgrade its green infrastructure. A 'green infrastructure' approach differs from conventional approaches to open space planning because it considers multiple functions and benefits, along with land development, growth management and built infrastructure planning. Successful land conservation in the 21st century needs to be more proactive, less reactive and better integrated with efforts to manage growth and development.

Reading Borough Council will continue to work with developers, partnership agencies and the general public, to both increase and improve areas of wildlife habitat and to improve the ecological permeability of the urban area.

Increasing tree coverage in appropriate locations using trees that are drought tolerant where appropriate and capable of thriving in predicted future conditions, should be a particular priority.


KEY WILDLIFE SITES IN AND AROUND READING

'Local Wildlife Sites' (formerly known as Wildlife Heritage Sites) are non-statutory areas identified by the Council because of their local wildlife value. They are designated if they meet certain criteria such as:

- containing habitats and species that are nationally uncommon as well as threatened
- supporting a diverse range of species and habitats and can be very important areas of biological richness
- acting as wildlife corridors or links between other important habitats and are important in aiding wildlife to move around the countryside
- functioning as buffers to more sensitive sites helping to protect core wildlife areas

Reading has approximately 25 Local Wildlife Sites; four of these sites are also designated as Local Nature Reserves.

In addition to these, there are a series of Biodiversity Opportunity Areas across Berkshire. These areas have been identified by the Berkshire Local Nature Partnership as potential areas for biodiversity enhancements. In Reading there are two BOAS:

- The Kennet Valley East BOA - from Newbury to Reading extending to include   large

areas of gravel pits in the east and in Reading includes the Kennet floodplain east of the A33.
- West Reading Woodlands BOA – which includes most of the woodland in Tilehurst

*Strategic priority:*

● ***Protect wildlife from impacts of climate change***


COMMUNITY INVOLVEMENT AND EDUCATION

Local community groups are important in the management of local green spaces, but different groups are often unaware of each other's activities. There is a need to promote more partnership work, in particular between local groups and individuals and organisations with Berkshire wide remit.

Current projects include the Council's Outdoor Classrooms, and the Council's volunteer days and support of voluntary groups in its parks. More education and involvement of the public in land management for wildlife, e.g. guided walks, wildflower trails, and other local activities would be beneficial.

There are also potential opportunities for community involvement in the use of public land for growing food purposes (e.g. Food4Families, Transition Towns Reading, Food Group projects) and in the development of more city farms and community gardens. Such projects would provide a range of benefits, including some for wildlife.

See also chapter on 'Community' for more on community activity and local food production.

*Strategic priority:*

- ***Encourage local community groups and businesses to become more involved in the management of local green spaces***


A BUSINESS PERSPECTIVE


The commercial relevance of the natural environment may not be immediately apparent to the average business, but business impacts can be extensive and wide-ranging. Many products and materials used by businesses cause environmental damage, although this is often experienced in a remote region. For example, the rare earth and other metals contained in the technology products that drive our information economy have to be mined, with potentially disastrous impacts on the natural landscape and ecosystem. This can both displace indigenous people, causing unwanted social impacts, and damage habitats, putting species at risk of extinction. These effects may seem remote and

irrelevant, but consumers are becoming concerned about the ethical choices of brands and increasingly less willing to buy products associated with environmental or social harm further up their supply chain. Campaigns like Friends of the Earth's Make it Better help to bring supply chain impacts to the attention of both consumers and manufacturers. By being mindful of these "hidden" impacts, and taking concrete steps to mitigate them, businesses can demonstrate high ethical standards and build trust which assists with customer retention and creates new business opportunities.

Closer to home, the UK already has effective legislation to prohibit the pollution of land, air or waterways and compliance represents the absolute minimum requirement. For businesses that wish to do "more good" rather than "less bad", protecting the natural environment and promoting biodiversity in and around commercial premises can improve working conditions and staff morale. It also demonstrates good corporate responsibility, which carries a reputational benefit. Landscaping can help with energy efficiency, for example by using vegetation screens to protect against solar gain through south-facing windows and thereby reduce the need for mechanical cooling. Environmental clean-up events are a popular staff volunteering activity and adopting a local green space can be a valuable way of creating a positive relationship with domestic neighbours.

## WATER SUPPLY AND FLOODING

### INTRODUCTION

A changing climate is expected to mean more extreme weather events such as intense rainfall and floods, heatwaves and droughts. These impacts are predicted to increase over time, with winters getting warmer and wetter, while summers become hotter and drier.

Hotter, drier summers will tend to increase demand for water and reduce supply while more variable winter rainfall may increase the frequency of droughts despite the increase in average rainfall. This could have significant impacts on biodiversity and the natural environment.

This chapter sets out measures to adapt to the threats to water supply and to the risks of flooding.

### VISION BY 2020

Supply and demand for water will be managed so as to improve the projected 'supply demand balance', reduce the risks of 'temporary use bans' (hosepipe bans), and reduce the effects on wildlife of poor water quality and of damage to habitat through drought.

The risks of changing patterns of rainfall and extreme weather events will be better understood and people will be well prepared with homes and businesses becoming increasingly resilient.

### SUMMARY OF STRATEGIC PRIORITIES

● *Manage supply of and demand for water to reduce the expected impact of water shortages on consumers and on wildlife*

● *Reduce the carbon footprint of water supply and water heating*

● *Reduce the risk of damage due to flooding*

## HOW WE WILL ACHIEVE THE VISION

WATER RESOURCE MANAGEMENT

The main water source for Reading is surface water from the river Kennet which is treated at the Fobney Island Water Treatment Plant, in the south of the Borough. Smaller amounts of water are extracted at Pangbourne and Playhatch. The River Kennet and its tributaries are largely groundwater fed, so abstraction from surface water and from groundwater near to surface watercourses could impact on water supply.

Thames Water is responsible for Reading's water supply, sewage treatment, and much of its surface water drainage. The organisation produces a Water Resource Management Plan (WRMP) every five years, which sets out how it plans to provide water to meet customers' needs while protecting the environment.

For 2011, the WRMP shows almost 33% surplus water available against the 'average daily demand in a peak week of a dry year', though this surplus drops to just under 9% by 2039. Low winter rainfall can reduce the levels of groundwater and of water in underground aquifers, which can lead to water shortages in the summer. So despite the forecast surplus, Thames Water's agreed levels of service allow restrictions on supply in drought conditions - a sprinkler ban one year in ten on average and a 'temporary use ban' (formerly hosepipe ban) one year in twenty. Demand is expected to rise while supply falls.

The Environment Agency (EA) produces Catchment Abstraction Management Strategies (CAMS) to assess the amount of water available, sets out licensing policies to protect the environment from over-abstraction, and monitors water levels, water quality, and water availability.

The EA is required by the Water Framework Directive to ensure that all rivers reach Good Ecological Status or Potential by 2027. Maintaining good water flow rates improves river ecology by dilution of planned or un-planned discharges and runoff that enter rivers.

Reducing Demand for Water

Reducing demand for water reduces the costs of supply and waste water treatment, makes supply restrictions less frequent, and protects the environment from over-abstraction.

Potential measures to reduce demand include: identifying and reducing leakage (which accounts for over 20% of 'dry year distribution input'); using water meters to charge for water used (estimated to save around 10% per household); installing water efficiency measures such as diffusers, dual flush toilets and low-flow shower heads; rain water harvesting; and grey water re-use.

Grey-water recycling and rainwater harvesting (other than systems like water butts for garden use) can reduce mains water use but tends to increase energy use and carbon footprint due to the energy-intensive processing required. They are often too costly at dwelling level, but more affordable for large commercial buildings, especially those newly built.

Thames Water maintain that all businesses, and new and converted domestic properties, are fitted with meters. In the future, smart water meters, which allow customers to monitor water usage closely, could reduce meter-reading costs, help to identify leakage, facilitate implementation of 'social tariffs', and allow the charge for water to be varied in order to incentivise water saving.

However, because the WRMP currently shows a surplus, Thames Water say that, in the Kennet Valley Water Resource Zone, they cannot immediately prioritise measures to reduce leakage, and propose to start to roll out compulsory metering only from 2020. However they are committed to promoting the wise use of water and offer free water-saving devices to consumers, fit water meters free of charge on request, and are keen to co-operate with other parties to reduce water demand from new developments or refurbishments by providing equipment and advice.

For new housing, Building Regulations set a mandatory standard of 125 litres per person per day (l/h/d) for maximum consumption of potable water (compared with an average of 145 litres of water per person per day, supplied within the Kennet Valley Water Resource Zone, which includes Reading). Including water efficiency standards in planning policy can help to ensure that new housing stock and commercial buildings are build to high standards, in order to help reduce demand.

Reading Borough Council's Sustainable Design and Construction policy calls for:
- new homes to meet Code for Sustainable Homes (CFSH) levels 3 and 4 for which 105 (l/h/d) is mandatory.
- Maximum consumption of 5,500 litres per year per person for office developments.

CFSH level 3 can be achieved at little extra cost per dwelling (estimated at £125). The London Gateway project has shown that a water efficiency standard of 95l/h/d can be achieved without grey-water recycling and rainwater harvesting but this is more expensive per dwelling (estimated at £500 per home).

*Strategic priority:*

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● *Manage supply of and demand for water to reduce the expected impact of water shortages on consumers and on wildlife*


HOT WATER USE AND CARBON EMISSIONS

Carbon dioxide emissions resulting from water use in the home are typically 800 kg per household per year[11], with 89% of this attributable to water heating in the home. Only 11% is attributable to water supply and wastewater treatment and Thames Water has an active programme to address the energy intensity and carbon footprint of its operations to reduce this further.

Reducing the amount of water taken from the supply will therefore have a fairly small effect on carbon emissions unless very large quantities of water are involved. A 10% reduction in a household's consumption would save around 9 kg CO2 – less than 0.3% of the 3,200 kg footprint from energy use in the home for a typical household.

Reducing the use of hot water is therefore a priority. Consumers may be encouraged to change their behaviour in order to save money (particularly if the water is heated with on-peak electricity) at the same time as saving water and reducing carbon emissions.

This can be achieved through taking showers not baths and the use of low-flow showers, shower timers, water-efficient dish- and clothes-washing appliances, and reducing the length of hot water pipe-runs.

*Strategic priority:*

● *Reduce the carbon footprint of water supply and water heating*


FLOODING

Climate change can affect local flood risk in several ways and the impacts will depend on local conditions and vulnerability.

Wetter winters may increase river flooding in both rural and urban areas. More intense rainfall causes more surface run-off, increasing localised flooding and erosion, which may increase pressure on drains, sewers and affect water quality. Storm intensity in the summer could increase, even in drier than average summers. Rising sea and/or river levels may increase local flood risk inland or away from major rivers because of the interactions with drains, sewers and smaller watercourses.

In particular for Reading, there is a risk of flooding from groundwater-bearing chalk and

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[11] Energy Saving Trust Report CO167 - 2009

limestone aquifers across the district.

Reading Borough has been designated a Lead Local Flood Authority and has prepared a Preliminary Flood Risk Assessment (PFRA) and a Surface Water Management Plan, with flood hazard and risk maps required by June 2013, and flood risk management plans by June 2015.

Drainage

While modern developments have foul sewage piped directly to the sewage works and surface water drains direct to watercourses, most older sewers carry both foul sewage and surface water and roof run-off. This can create particular problems of pollution and overloading of sewage works at times of heavy rains.

Reading's Sustainable Design and Construction policy advocates implementation of 'Sustainable Urban Drainage Systems' (SUDS), a range of techniques to reduce the flood risk due to heavy rainfall, in new developments and redevelopments. These techniques include open space or permeable areas to allow rain to soak away, surface water drains, holding ponds, and flood relief areas that prevent sudden discharge of water to watercourses. Some of these techniques may become less effective after prolonged periods of wet weather so it is important that they are well-designed and implemented.

Reading will need to create a SUDS Approving Body (SAB) in accordance with the Flood and Water Management Act, probably by spring 2014. In developments where planning permission is required the SAB will have to approve drainage systems for managing surface water before construction begins to ensure compliance with yet-to-be-published national standards. The right to connect surface run-off to public sewers will be conditional on the drainage system being approved by the SAB.

The SAB must adopt and maintain approved SUDS that serve major planning applications (10+ dwellings and / or over 1000m2). After an initial 3 year period following the commencement of the SAB, this threshold may be reduced.

Although the legislation is not yet in place, Reading Borough Council's transport department require that all new roads serving new development must be drained by a SUDS system either through environmental measures (swales, balancing ponds) or engineering measures (attenuation tanks) to ensure surface water run-off is contained.

Adaptation

Measures to adapt buildings to address risks of flooding fall into two categories: resistance and resilience. Resistance measures prevent or limit the amount of water entering a building by identifying and blocking all possible entry points. Measures such as non-return valves on main drains, demountable door guards etc.

Resilience measures aim to reduce the time and cost of recovering from a flood. Measures such as raising electrical points above flood level, using water-resistant paint on lower walls, etc. Thames Water is carrying out a strategic risk assessment of the resilience of its processes and its capability to maintain its services to customers.

*Strategic priority:*

- *Reduce the risk of damage due to flooding*

## A BUSINESS PERSPECTIVE

The impact of water scarcity varies greatly by business sector and for office-based businesses its commercial relevance can appear slight. Those businesses for which water is an essential raw material are well aware of the impact on their business that can be caused by an interruption of supply, but the indirect effects of water scarcity can impact the production of food crops and natural resources, causing price volatility in commodities that have a knock-on effect.

The water supply is all drinking quality, but many commercial flushing or washing operations do not need drinking water and can be carried out equally well with grey-water or rainwater. Building in (or retrofitting) grey-water recycling or rainwater collection systems to substantial commercial premises can be beneficial, as can adapting processes to use less water or adjusting frequency. Water used in one process could be re-used in another at the same site – or even by a different company; for example, water that has been used to wash food could be re-used to wash down construction equipment in a neighbouring business. As with energy, using less water can reduce costs, and as water becomes increasingly scarce, we can only expect those costs to increase.

The effects of flooding can have a very direct and damaging impact on business continuity. It can prevent staff from reaching their place of work or visiting customers, it can disrupt shipments of products or provision of services and it can directly damage the workplace. Increased flood risk also influences the cost of commercial insurance. Flooding should be an essential consideration in any business risk assessment or continuity plan.

## TRANSPORT

### INTRODUCTION

Every citizen's choice of transport impacts on climate change, road safety, air quality, and noise pollution.

The Climate Change Strategy 2008-2013 estimated that 12% of Reading's carbon footprint is attributable to transport (0.7 tonnes per capita in 2008). While this was well below the national average of 21% and compares favourably with the South East regional average and other urban areas in the region, there remains scope to reduce this further.

More generally, an effective transport system is fundamental to building sustainable and thriving local communities. Reading's excellent links to national road and rail networks as well as Heathrow Airport, have contributed towards the town becoming a major population and employment centre within the South East. The vitality and success of Reading has attracted significant investment from business, retail, sport and cultural sectors, and the town serves a catchment that extends far beyond the borough's administrative boundaries, resulting in a complex set of travel patterns.

However, the ability to continue to attract inward investment, while at the same time reducing carbon emissions in Reading, depends on efficient management of the transport network as demand for travel grows. The challenge is to minimise transport's contribution to green-house gas emissions, through reducing the need to travel, encouraging the use of more sustainable modes of transport and alternative energy sources and reducing congestion.

The 'Transport' theme covers how people move around, including 'active travel' such as walking and cycling, public transport such as buses and trains and private transport such as cars and vans. It also reviews the infrastructure that allows people to travel, and the impacts of travel choices on not only climate change, but also other aspects of the environment.

### VISION FOR 2020

We will have achieved targeted and measurable reductions in green-house gas emissions from transport and created an infrastructure network which supports and encourages low carbon travel, while improving air quality.

Reading will have a healthier and more active population as more people choose to walk and cycle for short journeys whether to the town centre or other local destinations. The transport network will be less congested and safe for cyclists and pedestrians of all ages and abilities. People will use innovative and inclusive information to make smarter choices in the way they travel. Public transport will be efficient, reliable and affordable. Low carbon travel will be the preferred choice for people and goods moving around the town. Reading will have a reputation as a beacon for sustainable travel.

## SUMMARY OF STRATEGIC PRIORITIES

- *Develop a transport infrastructure which supports more low carbon travel options for people in Reading*

- *Reduce energy use and embodied energy in transport infrastructure*

- *Encourage a step change to non-car travel from all sectors of the population through targeted advice, incentives and enforcement*

- *Manage transport infrastructure and services to prepare for climate change*

- *Reduce the air pollution from vehicles*

## HOW THE VISION WILL BE ACHIEVED

The 2011 census 'journey to work' data shows that Reading ranks in the top 50 local authorities for percentage of commuters travelling by bus, rail, bicycle and on foot. Excluding the unemployed or those working from home, 18% of Reading residents walk to work, up from 12% in 2001. Public transport commuting has remained steady at 22%, whilst car commuting has fallen slightly and bicycle commuting has risen slightly. Reading's annual cordon count also reflects the high proportional use of sustainable transport for journeys into the town centre, with car trips falling from 27% in 2006 to 20% in 2011, whilst trips by sustainable modes of transport rose by 7%.

Building further on Reading's excellent track record of successful sustainable transport measures undertaken since 2001, we will continue to invest in accessible information and technologies to improve the efficiency and effectiveness of the transport network and systems in Reading and to help more people understand their travel choices and we will also continue to invest in new transport infrastructure and services to increase the choices available.

A number of plans and strategies are already in place for Reading, perhaps most importantly the Council's third Local Transport Plan (LTP3), which sets out transport policy for the period to 2026. The LTP3 Implementation Plan is updated through a rolling three year programme of measures. Reading Borough Council and its partners have secured approximately £25million from the Department for Transport's Local Sustainable Transport Fund to accelerate LTP policy projects and implement a committed programme to March 2015.

INFRASTRUCTURE AND INNOVATION

Transport infrastructure both impacts on and serves the needs of communities.  The life and business benefits associated with good connectivity to the transport network need to be balanced against the impacts on noise and pollution levels, safety, and of course green-house gas emissions.

An over-riding objective is to increase trips by walking, cycling and public transport and other low carbon modes of travel. One way of achieving this is through developing the transport infrastructure to enable more people to travel by means other than private cars (modal shift).

Funding is now available from the Local Sustainable Transport Fund (LSTF) to deliver an extensive programme aimed at achieving modal shift, including new or improved pedestrian/cycling infrastructure, cycle hire, and new park and ride and rail sites. The programme extends to include parts of West Berkshire and Wokingham to address wider impacts of travel to and from Reading.

Current targets set for the our transport investment programme to March 2015 is to achieve an additional 7,200 daily bus trips; additional 12,050 daily walking trips; and additional 2,300 cycle trips, resulting in an approximate 10% reduction in congestion and 29,000 tonne reduction in $CO_2$. This equates to a 7.5% reduction in car trips, a 4% increase in public transport trips, a 10% increase in cycling trips and a 5% increase in walking trips. It also represents a 3% reduction in carbon emissions per capita and a 25% reduction in Reading's carbon footprint attributed to transport.

Through the LTP3 Implementation Plan and development planning, other measures such as car clubs, car sharing schemes, infrastructure to support electric vehicles, cycle training, etc. are extended and promoted.

The environmental impacts of all new infrastructure is assessed and ways to minimise carbon emissions in construction and in future maintenance are explored. Also included in the LSTF programme are measures to directly reduce energy use through the installation of low energy street lighting and the reduction of unnecessary illuminated street furniture.

Transport infrastructure and the people that depend upon it are at risk from the impacts of climate change, including more extreme weather in terms of heat, cold and flooding. Therefore, developing and maintaining strategies for adaptation and up-to-date, publicly-understood policies for issues such as winter maintenance and flood management are crucial to supporting Reading's neighbourhoods and networks.

*Strategic priority:*

- *Develop a transport infrastructure that supports more low carbon travel options for people in Reading*

- *Reduce energy use and embodied energy in transport infrastructure*


INTERVENTIONS AND INCLUSION

In order to reduce carbon emissions from transport by 80% on 1990 levels by 2050 (the UK target), we require a step change in behavioural attitudes to non-car travel from all sectors of the population (*see also the chapter on 'Education, Communication and Influencing Behaviour').*

We need to break down perceived barriers to walking and cycling. Partnerships are already in place with major organisations such as Sustrans and CTC the national cycling charity, as well as health providers, educational institutions, major employers and local groups. Among other projects, an updated Cycling Strategy is due in 2013 to reflect the increased priority of cycling and local partnership activity.

Accessible information technology can make it easy and more affordable for people to choose and use low carbon travel. The LSTF programme includes improvements that will build on Reading's position as a centre of expertise for transport management and information technology. Personalised travel planning, smartcard ticketing and incentives schemes, and real-time data for transport are intended to support alternative travel choices.

The design of neighbourhoods can encourage people to choose to travel more sustainably and actively. Safety and the perception of safety is a key enabling factor in people choosing to walk or cycle to their destination.  Continued enhancement of cycling and pedestrian facilities is an ongoing priority for Reading, as is ensuring good pedestrian and cycling routes exist to community and town centres.  For new developments, this means that Planning is an important means of influencing the design of such infrastructure. Removing the need to travel removes the transport impacts of that travel.  Enabling people to work and access services on-line is therefore one critical component.

*Strategic priority:*

- *Encourage a step change to non-car travel from all sectors of the population and delivery agencies through targeted advice, incentives and enforcement*

AIR POLLUTION

Another impact of the increase in use of fossil fuelled vehicles is the increase in air pollution. Air pollution has both global and local impacts.  Emissions from vehicles contribute to the global concentration of green-house gases, and are therefore direct contributors to global climate change. In addition emissions of certain pollutants are harmful to human health at a local level, causing respiratory and pulmonary conditions.  They can also cause harmful effects on plants and animals as well as corroding materials and buildings. The main pollutants that affect health in Reading are nitrogen dioxide and particulates from the combustion engine. However, not all measures that may reduce carbon emissions also reduce air pollution e.g. the use of more efficient diesel vehicles.

In addition to pollution from transport use, climate change itself can also directly contribute to the conditions of high concentrations of harmful pollutants, in particular ozone, which tends to occur in certain weather conditions and increases concentrations of nitrogen dioxide.

By diverting trips from private vehicles to more sustainable transport options, particularly walking and cycling, and by enforcing better emission standards, emissions associated with the combustion engine and air quality improves.

*Strategic priority:*

- *Reduce the air pollution from vehicles*

A BUSINESS PERSPECTIVE

Business is responsible for a significant proportion of transport emissions and has enormous potential to reduce transport-related emissions. The strategy's aims of reducing the need to travel, encouraging the use of more sustainable modes and alternative energy sources are very relevant to business. There are three main components to business travel impacts – freight, personal travel in the course of business and personal travel to and from the workplace. Not all of these will apply to every business, so taking them one by one:

**Freight**: Transporting goods contributes significantly to the UK's carbon emissions. There is potential to reduce this in numerous different ways. Some of the more direct options are choosing lower emissions vehicles, optimising delivery routes, re-designing packaging to reduce the weight or volume of cartons and consolidating consignments to maximise utilisation of vehicles. Taking a more holistic approach, based on the principles of the circular economy, it can also be possible to reduce transport impacts by replacing a physical product with a service, or by collaborating with other companies to share distribution networks or set up freight hubs. With fuel costs steadily rising, reducing the use of fuel for freight can also reduce costs, improving both profitability and competitiveness.

**Travel in the course of business**: Most businesses need to visit customers or suppliers, but the frequency of these visits can often be reduced without any negative impact on the relationship. The use of video-conferencing or tele-presence allows high quality meetings to take place without the need to leave the office. If "virtual meetings" are presented as part of a strategic approach to reducing business impacts, the reaction can often be positive. Altering the mode of travel can also help; if several people are attending the meeting car-sharing is a possibility. Where company vehicles are provided, an emissions limit is a good way to ensure that they are as fuel efficient as possible. Often, public transport can be an alternative – and it's possible to do productive work while travelling by train, which is impossible when driving. Policy can be established via a company travel plan that makes it clear how to choose the appropriate mode of transport for different cases. Cycling can also be promoted for more local business travel, and supported by pool bikes or cycle hire schemes.

**Travel to and from work**: Businesses have less direct influence over how employees travel to and from their workplace, but it's still possible to encourage behaviour change. While the local authority can provide the facilities for low-carbon and active travel, the business can help staff make positive choices. Businesses can help by incentivising active travel, subsidising public transport and the purchase of bicycles, and taking part in national, regional and local events that promote active or low-carbon travel. Where travel by car is unavoidable, car sharing clubs and priority parking spaces for car sharers can be considered. Active travel can also have a business benefit in terms of improved fitness for work.

## PURCHASING, SUPPLY AND CONSUMPTION

### INTRODUCTION

Even though 'sustainability' remains a fairly abstract and remote concept for many people, the purchasing, supply and consumption (PSC) of goods plays an integral part in everyday life for all of us. The purchasing, supply and consumption of goods effects climate change in a variety of ways, both directly through the emissions of greenhouse gases from the manufacture and transport of goods, and more indirectly by affecting the resilience of the town to a changing climate by boosting local supply of products and services and the 'green economy' *(see the 'Community' chapter for more on community resilience and the 'Education, Communication and Influencing Behaviour' chapter for more on the 'green economy').*

If we are to meet the challenging targets set out in this strategy, all sectors of Reading's community will need to adopt more sustainable PSC practices and behaviour. This means basing our choice and use of goods and services on maximising benefits to the environment, the economy and society, for both ourselves and the wider community, rather than on a purely private cost-benefit analysis.

As we start to understand the impact that our purchases have on the local and global environment, we will be more inclined to make choices that offer wider benefits, and accordingly, the market will respond by offering products that match these preferences.

Our consumption of products and food and our business activities all produce waste, which impacts on climate change in numerous ways. Zero waste is the process of utilising all of our waste as a resource for other purposes, thus avoiding land-fill and improving resource efficiency.

### VISION FOR 2020

By 2020 people and organisations in Reading will understand the need for action on climate change and adjust their purchasing, supply and consumption choices accordingly, both individually and collectively.

A substantial number of Reading residents and local communities will have made real change to their PSC behaviour, with the results accurately recorded through proven, credible carbon measurement and monitoring techniques.

The majority of large (public and private) organisations based in the Reading area, plus a significant number of local small and medium sized enterprises (SMEs) and other small organisations, will have detailed understanding of sustainable purchasing, supply and consumption  principles; they will have formal practice and procedures embedded into their activities, including proven, accurate recording of performance.

By 2020, Reading will have significantly reduced its waste going to landfill, through producing less waste, creating a market in the recycling and re-use of products, and by generating energy from waste. Surplus material will be viewed as a resource for others to use rather than categorised as waste.

## SUMMARY OF STRATEGIC PRIORITIES

● *Enable people to make sustainable purchasing choices*

● *Support and encourage local purchasing and the development of local supply chains*

● *Promote and encourage new business models focused around services, rather than individual products*

● *Build a consensus on standards and commitment to sustainable procurement in both the public and private sectors*

● *Increase recycling rates*

● *Reduce waste by supporting the re-use and repair of products and materials*

## HOW WE WILL ACHIEVE THE VISION

### WIDER COMMUNITY

Consumers do not always have a good understanding of how their choices can help to combat climate change and there remains a major communication challenge in increasing people's awareness of how to be sustainable consumers.

Whilst there is a variety of different labels and marks, and accreditation, performance and certification schemes already running, few of these give a direct measure of a product's impact on climate change.  Given the wide range of factors that consumers

consider when making purchases, it is questionable whether a system of accreditation specifically for climate change would be effective.

However, technology and process innovations will provide opportunities for consumers to invest with confidence in products offering greater efficiency savings, greater use of renewable resources, and will provide more clarity on product performance and resource use.

The provision of information, education, and skills to support people to make informed and responsible purchasing and consumption choices is crucial e.g. providing real-time feedback on the effect of behaviour on energy consumption via smart meters. *(see also Education, Communication and Influencing Behaviour chapter)*

Community networks could be used to spread messages about purchasing and consumption standards, as well as the benefits of sharing equipment, and supporting local businesses to establish resource-efficient services *(see the Community chapter for more on community activity and community resilience).*

*Strategic priority:*

● *Enable people to make sustainable purchasing choices*

BUSINESS SECTOR

A survey by the Carbon Trust and the Guardian Newspaper (2012) found that 46% for businesses plan to make "tangible investments" in carbon reduction during 2012 (with 58% of public sector agencies and 33% for the voluntary sector). The bigger an organisation's energy and resource consumption. and corresponding carbon footprint, the bigger the potential savings, therefore it is the large corporate organisations who tend to invest in longer term savings. They also tend to be driven by more formalised corporate social responsibility (CSR) policies, market pressures , and cost –benefit planning, so that energy and resource saving and carbon reduction is already a priority for many of them.

However, for the vast majority of small and medium sized enterprises (SMEs), struggling in very difficult economic times, short term financial imperatives prevail and many lack the skills, expertise and resource to be able to take advantage of low carbon opportunities such as building retrofitting, renewable energy installation, etc. Lacking reliable, proven evidence (or simply knowledge) that resource saving and carbon reduction investments will provide short term benefits means many will not be inclined to take action.

This attitude may limit short term capital measures but there is still much that can be done in terms of changing behaviour, with simple energy and resource saving measures involving all staff, which can bring swift, tangible benefits. Getting employees involved

with a well planned, joined up and clearly communicated action plan is key to progress in the wider SME sector.  Businesses need to guide staff to use resources wisely, offer advice on best practice and consider incentives for responsible resource purchasing and use.  Once these practices are embedded into the culture of the business, larger steps are more likely to follow.

Businesses also need to be encouraged to consider new business models that generate revenue in more resource-efficient ways, as well as offering customers wider benefits than simply lowest price, and advising them how to use products wisely and manage end of life impacts, i.e. use less energy and recycle more waste.

Local supply chains

Purchasing and procurement managers can strongly influence the low carbon and sustainability practices of suppliers, and major supply chain leaders can have a significant impact on whole supply chains. Procurement procedures and practices should reflect this.

Continuing overriding emphasis on first cost/price impacts small businesses that are out-priced by larger organisations offering lower costs. Major contractors continue to dominate large scale refurbishment works and will not easily accommodate local SMEs into their supply chains and there is a lack of strong local supply chain networks to effectively compete generally with "big business".

Central Government's local economic growth White Paper identifies green, low carbon economic growth as a sector of national importance and in particular cites the need to stimulate UK-based local supply chains "in developing green markets where there are significant opportunities, but information barriers exist".

One example of progress in this area is 'RE Start Local', an EU funded project operating in the Reading area and across SE region, which aims to increase and improve local procurement and build capacity of local SMEs in renewables and low carbon supplies and services (*see 'Education, Communication and Influencing Behaviour' chapter for more on the 'green economy'*).

Circular economy

While many businesses are gradually accepting the need to reduce their direct energy and resource consumption and carbon emissions (operational carbon),  the additional challenge of limiting the total carbon emissions created throughout the product's life cycle (embodied carbon) is less well understood or considered.

The concept known as the 'circular economy'[12] encourages more efficient use of and greater reuse and recycling of materials through the economy, as opposed to the

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[12] http://www.ellenmacarthurfoundation.org/

conventional approach of 'take/make/waste'.  With this new approach, 'end of life' products become a source of materials for new products – thus the name 'circular economy'. The approach promotes optimum resource use and minimum waste, while creating greater economic competitiveness and a greater localisation of economic activity.

The producer aims to "design out" waste, so that all resources are reused, and man-made materials that are not bio-degradeable are designed from the outset to be reusable in the development new products.

The circular economy also aims to change the relationship between producer and consumer by encouraging the lease, rent or sharing of durable products, rather than the sale of lowest cost, disposable products. Where products are bought, there are incentives in place to encourage end of life return and reuse. *(see the 'Community' chapter for more on a 'shared economy')*

From a business perspective this approach offers the opportunity to create new customer value and appeal, ultimately resulting in local wealth creation and employment as well as conserving resources and reducing carbon emissions.

*Strategic priorities:*

● *Support and encourage local purchasing and the development of local supply chains*

● *Promote and encourage new business models focused around services, rather than individual products*


PUBLIC SECTOR

The Government and the public sector generally have a crucial role to play in leading on the low carbon agenda, both in terms of cutting emissions from the public sector's own estate and operations, as well as creating the incentives and environment to encourage more of the private sector to participate.

The potential for increasing demand for sustainable products and services through public procurement is huge, with public authorities across Europe spending almost €2000 billion, or 16% of GDP, on goods and services annually. There is a wealth of information and advice on sustainable procurement for the public sector available, including NHS "Procurement for Carbon Reduction" and the Department for Environment, Food and Rural Affair's National Sustainable Public Procurement Programme, offering free training opportunities to public sector procurers.

Through the Social Value Act 2012, all public authorities are required to factor in social value as part of the commissioning process, considering how the services they

commission and procure might improve the economic, social and environmental well-being of the area. This involves looking beyond the price of each individual contract to what the collective benefit to a community might be. By introducing requirements for environmental sustainability into tender specifications, the demand from public authorities could significantly increase the market for green products and drive technological innovation, as well as increasing local supply.

Purchasing and procurement managers can strongly influence the low carbon and general sustainability practices of suppliers. Although the general level of innovation and supply of low carbon goods and services is relatively slow, and as yet both public and private procurers find it difficult to identify those suppliers offering true sustainability and value for money, opportunities exist to test innovative ideas e.g. Forward Commitment Procurement, which will open up and stimulate greater focus on sustainable purchasing and supply. Public authorities (and increasingly large private sector) will increasingly group together and enforce higher sustainability standards.

*Strategic priority:*

● *Build a consensus on standards and commitment to sustainable procurement in both the public and private sectors.*


RE-USE AND RECYCLING OF WASTE

The production of waste impacts on climate change in numerous ways: the disposal of materials leads to the use of raw materials for replacement products; the decomposition of waste releases greenhouse gases directly; the transportation of waste and raw materials uses energy.

To achieve zero waste, it is necessary to establish markets based on the inherent value of waste.  As well as continued focus on moving towards zero waste in the municipal (household collection) waste stream, specific focus is also needed on commercial waste streams, including construction and food waste. Obtaining energy from waste that has no other value is also a priority.

The 'waste hierarchy' is to reduce waste if at all possible, then to re-use, recycle and recover energy from waste. Almost all 'product types' could potentially feature products made entirely or partly from recyclable raw materials.

Re-use

Repairing and servicing of products to extend their life reduces the total number of products manufactured and thereby the amount of associated pollution and waste. Products can be re-used by supporting second ownership e.g. second hand shops (including charity shops) and services that repair and re-condition products for re-sale.

Markets can be created for material re-distribution. The re3 partnership (Reading, Wokingham and Bracknell Borough Councils) have joined together in supporting Sue Ryder, the national charity for people with life-changing illness, via the two local Household Waste Recycling Centres for this purpose. Staff identify items with a re-use value and, perhaps following some refurbishment, the items are then re-sold by Sue Ryder in their local shops. Construction sites often dispose of excess products, such as wood, aggregate and building materials in a similar way.

Products that have no further use for their designed function can often be re-engineered for lower grade uses.  Artisans and craftsmen can utilise waste products using skilled processes to create further objects. Reading's 'scrap store' has been set up specifically to help with this.

Recycling

If re-use is not possible then recycling is a good way of re-using the raw materials in products and of diverting waste from landfill sites.  Many businesses choose to recycle their trade waste and this service is provided by the market. Recycling has become a mainstream activity for most people but the Council will continue to seek ways to improve the effectiveness of their collections.

Reading's current recycling rate is 36%; the Council is looking to increase this to 42% by maximising waste prevention, improving our waste collection services and encouraging waste prevention. In addition, implementing an initiative to improve recycling in flats and introduce a recycling incentive scheme using funding from the DCLG (Department, Communities & Local Government) Weekly Collection Support Scheme should be of benefit.

*Strategic priorities:*

● *Reduce waste by supporting the re-use and repair of products and materials*.

● *Increase recycling rates*

A BUSINESS PERSPECTIVE

This is where business plays its most significant role in helping to build a more sustainable future. Its influence here is enormous and the whole of this chapter is therefore relevant to businesses.

Business fuels consumerism by producing goods and services and promoting them to customers. The choices made in how those products and services are made, delivered, used and disposed of are almost entirely within the control of the business and so, it follows, are their environmental impacts. Equally, businesses are also consumers of the

goods and services they use need in order to operate. Both directly and indirectly, businesses influence 100% of the manufacturing impacts that account for 48.5% of carbon emissions.

Most of the work done up until now by the business sector to mitigate carbon emissions has been incremental, however to embrace concepts such as the 'circular economy' and the 'sharing economy' requires more disruptive innovation. For businesses that are prepared to be bold, there is an opportunity to introduce innovative business models, develop new revenue streams and create brand new market sectors. We can already see examples of this, for example the peer-to peer rental business model of Zipcar and the advent of "cloud" computing. As a result of these trends, businesses find they have to react to new and unexpected competitors. Taking a proactive approach to business model disruption offers prime-mover advantage, so that a company can compete from a position of strength.

## EDUCATION, COMMUNICATION AND INFLUENCING BEHAVIOUR

### INTRODUCTION

Climate change affects everyone and everyone is able to play a part in helping to tackle it. By thinking about how we live, work and play, and by making simple changes to our behaviours to reduce energy consumption, we can all be part of the solution.

Meeting Reading's targets for minimising the effects of climate change will depend on significant long-term changes in the behaviours of individuals, communities, businesses and the public sector across the borough.

How we behave is determined by many factors, such as our habits, beliefs about how we should behave in a given context (social norms), and cultural expectations, as well as by incentives. Although changing our behaviour and habits can sometimes feel challenging and complex, changing society's social norms can lead to positive outcomes. This can be demonstrated through the popular growth of initiatives such as fair trade and recycling. These initiatives have developed through the communication of consistent and clear information.

Our priorities can also be influenced by issues that immediately affect us, such as our finances, health and available time. Perhaps even more importantly, these factors contribute to how we see ourselves in society and to the values which we feel are important to us, which in turn can have an impact on our behaviours.

If Reading is to have more renewable energy installations and if its residents are to adopt more energy efficiency measures, Reading's workers will need to up-skill in a variety of technical and specialist areas, particularly in the building trade, to enable the development of a 'green economy' – from plumbers and builders to architects and chartered surveyors.

This chapter aims to set out how education, communication and influencing behaviour can lead to action on climate change, and identifies some key target audiences.

## VISION

People and organisations in Reading will understand the reasons for action on climate change; we will be aware of what we can collectively achieve and the contribution we can make.

People of all ages will be equipped with knowledge and skills that will increase employment accessibility within the local 'green economy'.

## SUMMARY OF STRATEGIC PRIORITIES

- *Further integrate sustainable behaviour promotion and practice throughout schools, colleges and universities, and workplaces*

- *Ensure that communication which is aimed at influencing climate change related behaviour is delivered in a consistent and targeted way.*

- *Engage organisations in the private sector, including residential and commercial landlords, in effective action to reduce carbon emissions*

- *Develop the market for climate change related local business and the skills to ensure that local jobs are created in line with the growing low carbon economy*

## HOW WE WILL ACHIEVE THE VISION

Research shows that understanding and awareness alone do not always motivate us to change our behaviour. Concerns about the environment do not necessarily translate into action. Equally, what people say they do is not always what they do in practice. Common behaviour can sometimes prove difficult to change, and unsustainable behaviours can be regarded as 'normal'. Appeals to change behaviour in one area e.g. energy saving on the grounds of financial benefit, may simply divert resources into another 'unsustainable' but normal activity e.g. flying on holiday. Therefore it is important to understand more fully what influences people to change their behaviour and why some people are willing to make certain behaviour changes, but not others.

However, sustainable living can become the social norm. A coherent range of interventions will be needed over both the long and short term to encourage behaviour change – no single policy or intervention is likely to achieve change on its own The increase in waste recycling shows how, with the right information and at the right scale,

social norms can be altered.

EDUCATION

Knowledge and understanding are fundamental to behaviour change, although not always sufficient in themselves for long-term behaviour change. Structured education and training have a role to play in both improving understanding and raising skills levels in sustainable services and industry.

Certain key life stages, such as childhood and young adulthood, can present ideal opportunities for influencing attitudes and behaviour. Reading's various educational institutions already contribute to educating people about climate change. The University of Reading, New Directions (the council's adult learning provider), Reading College and many of the borough's schools have established green teams, pressure groups, eco-schools groups or the equivalent, where students encourage their peers and staff to change their behaviour.

In addition there are a number of education programmes such as the Institute of Education's 'Changing with the Climate' and Reading International Solidarity Centre's 'Global Advocates' course, which are available for teachers and students. New Directions has also developed an online course 'EcoAdvantage' to enable adult learners to develop sustainable skills.

Despite the wealth of current provision, this strategy recognises the opportunity to develop this further, focusing in particular on the knowledge and understanding of children and young people.

*Strategic priorities:*

*● Further integrate sustainable behaviour promotion and practice throughout schools, colleges and universities*

COMMUNICATION

Even if the broad causes of climate change are understood and accepted, it is not clear that people and organisations always understand how the things they do and the choices they make, either individually or corporately, contribute to the root cause of man-made climate change.

Information alone is unlikely to change people's behaviour and short term information campaigns in particular are rarely sufficient. However when used alongside other measures, good communications can be crucial to influencing people's thinking and supporting behaviour change. Techniques such as positive framing, i.e. emphasising the benefits of a low carbon future and changes in lifestyles, have been known to encourage

positive responses. Our challenge is to develop appropriate, long-term information campaigns across partner organisations and beyond.

As well as the content of the message, we are also affected by *who* communicates information to us, whether it be our workplace, university, school, family or friends, and *how* they communicate it, whether we hear it through the internet, newspaper, radio, television or word of mouth.

It is therefore important that we understand the audience we are seeking to influence so that we know what type of message and what channel of communication will have the most effect. We need to target messages so that every individual can fully understand the ways in which they can contribute to minimising the impacts of climate change. These channels will include formal education opportunities delivered through schools, colleges, further education and work based training (see 'Education' above), as well as informal awareness raising achieved through the media, the work of charities and community centres within the borough.

Where possible, we will use communications networks which are already in place (e.g. newsletters, business networks and voluntary sector networks) to engage with a wide variety of  audiences on climate related issues, and we will need to be sure that we are co-ordinating messages, language, tone and voice to maximise the impact on the target audience.

Our key messages will need to reach the widest possible span of the local community, as well as being targeted at specific groups and audiences.

Our key communication aims with respect to climate change are to:

- Ensure that people who live in, work in and visit Reading are aware of any new initiatives, projects they can join in with or benefit from and contribute to a.
- Demonstrate Reading as serious about climate change and includes the opportunities it presents for external investors and companies looking to move to Reading.
- Encourage individuals, businesses and organisations to consider climate change as part of their everyday activities and operate and behave in ways that support the objectives of the Climate Change Strategy.

*Strategic priority:*

● *Ensure that communication which is aimed at influencing climate change related behaviour is delivered in a consistent and targeted way*.

Developing 'influencing behaviour' programmes

Reading Climate Change Partnership  has established an 'influencing behaviour' sub-group, which has started to draw on the expertise of partner organisations, particularly

University of Reading, in the science of behaviour change and how this can be applied to communications and programmes that seek to influence climate change related behaviour. Our aim is to use and extend the work of this group to ensure that all relevant communications and programmes of action, across all themes of this strategy, are as informed and effective as possible.

In order to measure the effectiveness of our communications, we will need to consider establishing a process and mechanism for measuring changes in the levels of knowledge, understanding, motivation and commitment to changing behaviour across different audiences in Reading.

KEY TARGET AUDIENCES

As mentioned, it will be important to ensure that we understand the audiences we are seeking to influence, in particular how they receive information and what/who is likely to influence their thinking.

Business

Business is one of the key contributors of green-house gas emissions, responsible for 48.5% of Reading's green-house gas emissions and is therefore a key focus for Reading Means Business on Climate Change.

There is some legislation around reporting emissions for larger businesses but little incentive other than cost savings for smaller businesses to change their practices. In a small area like Reading borough, there will be opportunities for businesses to work together and realise both emissions and cost savings by sharing resources, best practice and joint working on procurement *(see the Purchasing, Supply and Consumption chapter for more on the private sector).*

Landlords

Residential as well commercial buildings in the private sector are significant contributors to green house gas emissions, and Reading has both a relatively large private rented sector and a relatively young and transient population. This, alongside the funding available for energy efficiency measures through the Energy Companies Obligation and the Green Deal, makes private sector landlords a key target audience An added benefit to making homes more energy efficient is the consequent reduction in 'fuel poverty' for those who struggle to heat their homes *(see the chapter on 'Low Carbon Development' for more on the Green Deal and 'fuel poverty').*

As well as targeting private sector landlords, communication messages will need to address, engage with more transient groups who may have different perceptions of their long-term investment in the town or their local community to the general population.

*Strategic priority:*

- *Engage organisations in the private sector, including residential and commercial landlords, in effective action to reduce carbon emissions*

GREEN SKILLS

The 'Green Economy' stimulates the creation of jobs that will mitigate and help us adapt to climate change, as well as help us manage our waste. This market has grown significantly during the current recession nationally is set to grow further.

As communities become more aware of the effects of climate change, there will be increased demand for electric vehicles, renewable energy, and insulated homes. The Green Deal will provide opportunities for greater uptake of energy efficiency and renewable energy technologies, and RCCP will have a role in ensuring that this is taken up locally.

The development and implementation of these initiatives and new technologies will require training for the current and future workforce. Whether this is in the maintenance of electric vehicles, design of 'zero carbon' buildings or the ability to install ground source heat pumps, there needs to be access to high quality training at affordable prices. Training opportunities, whether delivered by specialist bodies, manufacturers, local training providers or government sponsored programmes, will need to be effectively signposted.

*Strategic priority:*

● *Develop the market for climate change related local business and the skills to ensure that local jobs are created in line with the growing low carbon economy*

A BUSINESS PERSPECTIVE

Business is able to influence the behaviour of both its staff and its customers, and the power of brands should not be underestimated. To a greater or lesser extent, people see their brand choices as a reflection of their own values and this gives brand owners enormous power to shape behaviour. By reducing the environmental impacts of their products and services, and by communicating those changes to customers, companies can help to "normalise" environmentally sustainable choices. They can also help their customers to use those products or services is a more sustainable way, thereby amplifying the business's own mitigation activities.

This power carries with it responsibility. Claims must be authentic, transparent and

substantiated by hard data, or trust will be broken and the company's reputation damaged. There is 'green claims' guidance on the Department for Environment, Food and Rural Affairs' website which provides a solid basis for communicating environmental attributes and benefits. Independent accreditation is a useful way of proving the validity of claims, too.

Unless your product or service is specifically designed for eco-consumers, it's probably unrealistic to expect your customers to buy it for altruistic reasons. Some of the most effective environmental communications campaigns are where the benefit to the consumer is clearly articulated as well as the environmental gain – for example the Unilever "turn to 30" campaign which quantified the cost saving of washing at lower temperatures.

Reducing your company's carbon emissions relies as much on the behaviour of your staff as it does on the equipment you buy or the processes you set up. Employee engagement can be challenging and behaviour change is notoriously difficult to achieve. There are no magic bullets but you should expect to have to repeat key messages periodically and to be clear about the benefits to the business of the changes you expect staff to make. Competitions can help to harness peer pressure, and incentive programmes can be very effective; they need not be costly and for activities like energy saving they can be funded from the savings achieved.

Convincing staff to adopt more carbon-efficient ways of working is more effective if it aligns with the culture and values of the business. The more consistently the company lives its values, the more likely it is that the desired behaviours will become instinctive. Helping staff to reduce their carbon emissions at home can be a useful way of engaging them to do the same at work. The benefits they experience in terms of reduced energy bills, for example, can help make the business benefits more tangible and increase motivation. They may even become advocates for the cause, and help get their colleagues on-board.

## COMMUNITY

### INTRODUCTION

Communities can play a central role in developing a more sustainable way of life that reduces the impact that our lifestyles have on the global climate. This can be achieved through individuals being more self sufficient, coming together as a community to share resources, and through a strong local business community.

Whilst Reading's action to reduce its impact on climate change will be the sum of all the changes made by each individual, business or other organisations, this can be significantly enhanced through collective community action at a local level. Working with Reading's existing strong community sector, including a number of environmental groups, will benefit local action taken on climate change.

To reduce our ecological impact, prepare for unavoidable climate change and build high quality low-carbon lifestyles, we will need to consider our interpretation of 'success' to include factors relating to our overall quality of life.

Our quality of life (see vision below) is dependent on much more than increasing our material wealth, as currently dominates our GDP and defines how successful we are as a nation. The significance given to economic growth should be balanced with other factors which affect our well-being, such as protecting, enhancing and recognising the contribution of our local environment and our social interactions . To this effect, we should be working towards building sustainable communities.

This chapter sets out how collective action at the community level can help to reduce the effects of climate change and can help people to adapt to a changing climate, whilst improving communities' quality of life by helping everyone to lead their lives in a more sustainable way.

### VISION FOR 2020

By 2020, people will have an understanding of how their local environment contributes towards a better quality of life; they will have the commitment and community capacity to support each other to lead more sustainable lives. Reading's neighbourhoods will be places where success is measured by the uptake of life-styles centred on self-sufficiency, sustainable consumption and sharing of resources.

Quality of life will include not only wealth and employment, but will also consider physical and mental health, education, recreation and leisure time, as well as the effects of the built and natural environment on their well being, and the social belonging they feel.

## SUMMARY OF STRATEGIC PRIORITIES

- *Building community activity relating to sustainable communities*

- *Build community resilience and self sufficiency (collective and individual) to climate change.*

- *Reduce consumption by building a sharing economy*

- *Build an alternative economy focused on quality of life and emphasising sustainable communities*

## HOW THE VISION WILL BE ACHIEVED

BUILDING COMMUNITY ACTIVITY

Reading has a well-developed and growing volunteering base and culture, with at least 725 voluntary and community groups across Reading[13]. Although these groups make up the community and voluntary sector and may be seen as 'one body', they actually deliver a range of services in differing ways to engage a diverse variety of people.

These voluntary and community groups can play a key role in both promoting knowledge and understanding of climate change and in developing more generally sustainable lifestyles across Reading.

Valuing the contribution of these groups and engaging them in climate change related campaigns will help move us towards the vision set out in Reading Means Business on Climate Change. Reaching these groups in a creative and effective way will help us to encourage people to adopt low carbon life styles.

*A sustainable community* is one where everyone is equally able to meet their own needs and improve their quality of life without harming the environment or animals, depleting natural resources or putting any part of society at a disadvantage.

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[13] registered with Reading Voluntary Action

Neighbourhoods

Strong neighbourhoods are an important aspect of a sustainable community. Having influence over and being involved in our local physical environment and building local social networks are important to both our quality of life and low carbon living. A focus on a geographical location is an important method of engagement. People often relate to the area where they live, socialise or work.

Engaging neighbourhoods on climate change issues can be done in a variety of ways. For example, renewable energy projects often attract attention through the opportunity to be part of an 'ethical' and beneficial shared investment or the growing of food can engage people who like being outdoors. Involvement with a city farm or community allotment can help build a connection with the natural environment, which may lead to a change in values, and subsequently action that will help reduce the effects of climate change.

Community organisations and networks

There are a number of organisations and cross community based networks working on building local community action to tackle the impact of and resilience to climate change, and to pursue the wider aim of building sustainable communities. Currently, the most prominent networks include Econet, Greater Reading Environmental Network, Transition Town Reading , Go Local On a Better Environment (GLOBE) groups and Reading Christian Ecology Link. Other significant local organisations include True Food Community Cooperative, and Reading International Solidarity Centre (RISC), both of which trade and generate income which re-invested in their activities.

These groups demonstrate what collective community action can achieve, eg a solar panel bulk buying scheme. Sustaining and building on this activity by increasing their capacity and co-ordination will help to further strengthen their contribution to a sustainable community. This will in turn encourage and empower grass roots groups to take action to help shape sustainable local communities because their input is more explicitly valued and they can see how they contribute to local policy and action.

In addition, these groups can provide a different perspective to that held by larger organisations as they are closer to the communities involved and can act as a 'sounding board'. Therefore increasing their links with RCCP, Climate Berkshire and other influential bodies, will be beneficial to the work of these partnerships

In essence, we can achieve much more together. The knowledge, skills and

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[14] http://www.ellenmacarthurfoundation.org/circular-economy/circular-economy

experience within each of the business, community and public sectors is unique but can be benefit to the other sectors and to delivering the overall aims of this strategy.

*Strategic priority:*

- ***Build community activity relating to sustainable communities.***

BUILDING COMMUNITY RESILIENCE

Local renewable energy production and food growing contribute to our vision of a sustainable community through increasing self-sufficiency, and removing reliance on energy and food brought in from a distance, at a financial and environmental cost. With international supply chains at the mercy of volatile weather, a local supply can be more reliable and increase a community's resilience to climate change *(see the chapter on 'Purchasing, Supply and Consumption' for more on local purchasing and supply chains).*

A good example of low carbon living and an ideal way for an organisation to become more self-sufficient and to fund its work, would be a community and charity sector that operates from energy efficient buildings, generates renewable energy, grows its own food and sells its waste resources, thereby saving money and /or earning an income.

Resilience for all

A sense of a community 'pulling together in tough times' (e.g. unfavourable economic conditions) is also an important aspect of a sustainable and resilient community and is something we wish to build. To this effect, making sure everyone is becoming more resilient and not just the most able or knowledgeable, is an important aspect of a sustainable community.  Everyone should be progressing and sharing in its success. Resources and effort will be needed to make sure everyone in our community is given opportunities to improve their quality of life, and challenge limiting factors like poor financial or residential circumstances as well as social barriers.

Local food production

Creating shared allotments and supporting more people to grow their own food is an important way of becoming more self-sufficient, with additional benefits of reducing the carbon footprint of a product if it enters the local food supply chain.

Currently community leaders in this market include the True Food Co-op and the Farmers' Market.  The Food 4 Families project creates opportunities for communities to grow food and hosts a bi-annual 'Town Meal' promoting the benefits of growing and sharing locally grown food.  Initiatives like this will help raise awareness and confidence amongst residents and organisations to purchase locally through local

networks and trading groups.

The Council has an Allotment Strategy which sets out the provision of space for its residents for growing food.  In addition, they have been supportive of community schemes to create orchards and fruit hedges.  The community sector also provides space for food growing and uses it as a mechanism to empower local people.

These initiatives will also promote greater availability of local food and other resource supplies. More reliable supply chains are needed to develop this market and make locally grown food more accessible and affordable.

Local renewable energy production

An important way to become self-sufficient is for communities to take control of their energy use, and take advantage of the potential to install renewable energy which will benefit them both financially and environmentally for years to come.

Collectively, there are a number of ways the community sector can benefit from renewable energy generation and schemes offering financial incentives. Reading has seen some activity in this area through a community bulk buying scheme and the installation of renewable energy systems within community centres, but more can be done.

There are a number of ambitious schemes nationally that demonstrate what a community group can achieve through installing a community renewable energy system. This may be possible in Reading, where community assets and determination are aligned to achieve such a goal.

*Strategic priority:*

- ***Build community resilience and self sufficiency (collective and individual) to climate change.***


A SHARING ECONOMY

The consumption of goods contributes significantly to the total carbon released internationally.  Carbon emissions and environmental destruction result from the extraction raw materials, as well as from the manufacture of the goods and from their transportation.

Plastic, cardboard and polystyrene all commonly used for packaging and presenting goods, and to keep them in perfect condition. This has raised consumers' expectations of having only new and pristine goods, and has significantly increased the amount of waste from packaging.

The 'circular economy'[14] concept *(see also the chapter on 'Purchasing, Supply and Consumption')* considers the 'end of life' of goods from a business perceptive.  This approach defines all goods at the end of their life not as waste, but as materials for the production of further goods.

Sustainable communities have a related role to play in the reduction of waste by helping to develop an economy based on sharing. This reduces the need for new goods and therefore reduces the impact of manufacturing goods.

A sharing economy is an economy measured by social interactions and exchanges of goods, with a culture of 'access not ownership'.  Trust will be key to these exchanges and time and effort needs to be invested to build this between individuals and organisations.  Changing the negative perceptions that the majority of the population hold about second hand goods will also be a challenge.

There are existing re-use and service exchange schemes (Freegle and Reading LETS). that we can start to build on.  A repair scheme movement (repair cafés) is becoming popular and could be encouraged here.  This not only provides a platform for people to have their broken possessions fixed, but also provides them with the skills to fix them.

Taking this one step further, a market for goods developed from waste materials would help to increase the richness of community skills and engender creativity, as well as reducing the amount of waste going to landfill.

*Strategic priority:*

- ***Reduce consumption by building a 'sharing economy'***


READING AS A 'COMMUNITY' TOWN

Reading is a town with a thriving economy, attracting international business headquarters, due to its excellent transport links and closeness to London.  The consequent supply of jobs pulls 30,000 people into Reading everyday, rendering Reading a 'commuter town'. It has also become a sub-regional shopping centre hosting many 'chain stores' similar to other towns in the country, drawing attention away from Reading's unique character.

These businesses and jobs are vital to the survival of Reading's community.  However, the 'corporate image' Reading has gained as a consequence of its thriving economy perhaps eclipses the thriving community sector.  This gives the impression that Reading life is centred on prosperity alone, which in turn attracts businesses and residents who hold similar values, possibly leading to a lack of social investment, the effects of which may then be seen in both the physical environment and community life.

To build sustainable communities, we need to rebalance Reading's image, moving away from a focus on financial prosperity, towards a focus on community well-being and ultimately promoting a new way of measuring success.  This will help build a Reading that has a more diverse local business community that contributes to a local identity and a thriving local community. This is turn will attract more people to Reading who want to see it thrive and improve.

Reading's *alternative economy* could mirror efforts undertaken by cities who have strong environmental movements and a strong local identity, known for their culture and their richness of life.

New ways of measuring success and progression are being developed, which consider social, environmental and quality or life factors, alongside the more traditional measures of national growth which do not always benefit all sectors of society.

<u>Local business and trading charities</u>

Building a local diverse business community where innovative small business and social enterprises are supported, will help us meet these aims. Local businesses are more likely to support community activity and invest in their local areas.  Keeping 'money local' and encouraging businesses to reinvest in the communities in which they are located is a significant element of building a sustainable community.

There are a variety of charities that have a trading arm to enable them to survive and meet their aims.  The most visible examples of these are charity shops selling second hand goods. The aim is not only to raise funds for the work of the charity but to support a movement that reduces carbon by reusing goods.  One example in Reading is RISC (Reading International Solidarity Centre) which promotes the 'Global Schools' programme and 'Fair Trade' movement.  These call for greater awareness of sustainable communities internationally, as well as other ethical causes including climate change.  The further development of these organisations is key to taking forward our alternative economy.

*Strategic priority:*

- *Build an 'alternative economy' focused on quality of life and emphasising sustainable communities.*

A BUSINESS PERSPECTIVE

Whether or not they choose to play an active part, businesses are part of the community. Simply by providing employment for local people, businesses can support their local economy. They can increase that contribution by hiring locally where possible and by resisting the temptation to offshore jobs. Sourcing products and services from local businesses is also beneficial to the community as a whole, both economically and in terms of reducing transport impacts.

Employers have the opportunity to improve the quality of life of their employees, both in the workplace and outside. Initiatives that support personal development, healthy living and flexible working can reduce sickness absence as well as improving productivity, morale and staff retention. A staff volunteering scheme can be a good way of providing practical support for local climate change and biodiversity projects that also provides opportunities for teambuilding.

The most progressive companies look beyond their direct stakeholders and engage with the wider community, either through their own activities to promote emissions reduction or by funding or providing in-kind support for other initiatives. Even small businesses can do this, and it need not be a massive drain on resources if it is kept relevant and scalable. In a company where environmental and social impacts are valued equally to financial results, being a positive influence on the local community can become second nature.