

Achieving a Low Carbon Economy

Taking the first steps...

This is the second of two briefing notes that have been prepared by the Plymouth Environment and Sustainability Partnership. In the first note we indicated the advantages that could come to Plymouth if it moved towards a low carbon economy. We also outlined some of the challenges that such a move could bring. In this note we shall highlight some of the specific actions that might be taken to allow Plymouth to achieve a low carbon economy.

Recently published figures from the DTI show that households in Plymouth each emit about 4.5t CO₂ per year. The UK average is 5.6t CO₂ per year. Households are responsible for about a quarter of all CO₂ (carbon dioxide) emissions. This implies that emissions in Plymouth are equivalent to about 8t CO₂ per person per year and that Plymouth is in a relatively strong position to reach the target of about 4t CO₂ per person per year (equivalent to a 60 per cent reduction in the national average CO₂ emissions by 2050) that we are aiming for.

It should be emphasised that the reduction of carbon emissions is not only linked with the direct use of energy by consumers, but also with the indirect use of energy in the manufacture and

supply of goods and water. Reducing waste in the use of energy, water and other resources (reuse and recycling may be necessary) will all help in achieving a low carbon economy.

Plymouth City Council has signed the Devon, Plymouth and Torbay Declaration on Climate Change and Fuel Poverty. A major route to achieving the aims of this Declaration will be by taking the actions needed to reduce carbon emissions.

We strongly support the actions suggested in the South West Low Carbon Housing and Fuel Poverty Strategy and Action Plan which is due to be published soon.



1

How can we ensure growth in the city's economy within environmental limits and a framework for a sustainable future?

By leading the way with a low carbon economy.

Why promote a low carbon economy?

In order to mitigate the effects of climate change we need to change the way we use energy and manage the environment. We need to think about energy supply - the costs, security, risks - and demand in terms of management and innovation. If we get these aspects right, Plymouth can develop new employment opportunities and be a better place to live. In short we'll be healthier and wealthier!

A low carbon economy will be fundamental to the success of any actions to tackle these challenges. Oil, coal and natural gas are all carbon-based fuels that release carbon dioxide (CO₂) when burnt. There are limited supplies of these fuels and, as world demand increases, so does their price. Even if climate change were not a problem, the economic effect of reduced indigenous supplies of carbon-based fuels would still favour a low carbon economy.

In 2005 the Environment and Sustainability Partnership was asked to report on the implications of a low carbon economy for Plymouth. In 'Towards

a Low Carbon Economy' they set out the potential Plymouth has to succeed as a Low Carbon city.

Basing their arguments on the outcome of recent, recognised research and the availability of new information on the factors influencing climate change, they made a number of recommendations for the Local Strategic Partnership and the City Council.

As local authorities and Local Strategic Partnerships are being encouraged to take a lead on tackling climate change through commitments to national policies, Local Area Agreements and 'Climate Action Plans' there has never been a better time to combine action on two key drivers for change - the economy and the environment.

To do so will require co-operation, co-ordination and the application of innovative and creative solutions to Plymouth's development and the economic plans and strategies that support it.

Understanding and leading the change to a low carbon economy will be a major challenge that Plymouth will need to rise to.

2

Can we afford not to?

Reducing carbon emissions

There are a number of lines of attack that may be followed to reduce CO₂ emissions. Technically, some of these are not very difficult, whilst others are much more complex.

The main sources of CO₂ from human activities in the UK are the combustion of coal, oil products and natural gas (i.e. fossil fuels) to provide energy. How we choose to use these resources makes all the difference to their cost effectiveness and sustainability.

SOLUTION: REDUCE WASTE—REDUCE, REUSE, RECYCLE.

Reducing the wasteful use of energy will reduce carbon emissions and reduce the costs to the consumer. It should be noted that wasting any sort of manufactured material e.g. metals, plastics, paper,

also means that carbon emissions are unnecessarily high. Reducing such waste, reusing the materials and recycling them will all contribute towards achieving a low carbon economy.

SOLUTION: REPLACE—INVEST IN RENEWABLES.

Replacing fossil fuels with energy sources that do not emit carbon has its obvious attractions but the commercial development of renewable sources is not always as advanced as we might like. Possibilities are solar thermal energy, solar photovoltaic energy, wind energy, wave energy, tidal energy, geothermal energy, and hydropower.

It should be noted that the materials from which the renewable energy sources are made may well release CO₂ in their manufacture and in the

construction work required to install and maintain them.

SOLUTION: CARBON NEUTRAL OPTIONS.

Growing and harvesting plants (biomass), to convert to oil substitutes or to burn, releases carbon dioxide. However, as the plants initially take up the carbon dioxide from the air as they grow, the process is considered to be almost carbon neutral. This carbon neutrality depends upon low energy outputs by transport and treatment processes.

SOLUTION: NUCLEAR ENERGY

Nuclear energy plants are not carbon emitters, but there is only a limited quantity of their primary fuel stock, Uranium-235, available. The supply will probably last as long as oil supplies, depending upon demand increases.

Therefore, as well as the problems of dealing with the nuclear waste there is a potential shortage of fuel and consequent rise in price, if a large number of nuclear plants are developed world-wide. Again, there will be releases of carbon dioxide, especially from the large amounts of concrete used during construction phases. This near carbon neutrality depends upon low energy output on transport and treatment processes.

SOLUTION: EMERGING TECHNOLOGIES

The move from large scale centralised power generation sources to small scale local or micro generation can produce large increases in the efficiency of the use of fossil fuels. They can be two to four times more efficient. This is because both the heat output and the electrical output can be used productively. There are also smaller transmission losses. Such localised units would be particularly useful for a geographically isolated city like Plymouth.

There are two trial marine energy schemes in operation in the South West that might be successfully used to generate significant quantities of renewable energy and employment opportunities. The first is the use of three types of wave energy extractor systems attached to the so called 'wave hub' off Hayle in Cornwall. The second is a smaller scale trial of a method of extracting

energy from tidal currents off the coast of North Devon.

The potential for solar energy extraction is very large in the South West, because of the high amount of solar energy falling on the region. As well as the use of solar thermal panels, which is already cost effective, the existence of a work force with experience in working with semi-conductors should give the area an edge in attracting photovoltaic panel manufacturers.

SOLUTION: OFFSETTING ACTIONS

Carbon 'offsetting' can be used to reduce total carbon emissions in an economy. The carbon given out by fossil fuel combustion units that are not yet ready to be closed down is balanced by the installation of non-carbon emitting energy sources somewhere else. Because of the time it takes to change to low carbon energy sources everywhere, it is possible to speed up the overall reduction by offsetting the carbon dioxide produced in one area by increasing the rate of reduction in another. The planting of trees to take up carbon as they grow is a possibility here but, at best, it is only a short-term method of offsetting possible carbon emissions.

Many companies, including major airlines, now offer opportunities to offset the emissions created by air travel by investing in alternative energy, community development or biodiversity projects.

SOLUTIONS: INVEST IN RESEARCH AND DEVELOPMENT

One example is the possible extraction of hydrogen from water by electrolysis and then use the hydrogen to produce energy (and water). If a non-carbon emitting source of electricity is used the hydrogen could be used to replace fossil fuels. This has been suggested as a way of helping to store energy from intermittent sources.

Another approach that is being considered is to capture the CO₂ emitted from fossil fuel power plants and store it underground. This is called carbon sequestration and old empty oil and natural gas fields could be used. This could not be more than a partial short-term solution because of the lack of suitable storage systems.

Local action - Local partners

We are all responsible for the actions needed to tackle climate change and to ensure a low carbon economy for the city. We all have a part to play—corporately and individually. There is also the opportunity to take proactive action—before the implications of price rises, fuel shortages and economic sanctions take hold. The development of a low carbon economy is fundamental to these commitments but the question is “do we have the drive to take these changes forward?”

What actions will make a difference?

The Local Strategic Partnership

The main contribution of the LSP should be to provide the leadership needed to drive forward the move towards a low carbon economy. This can be achieved by

- ◆ Providing support for the various agencies, whether commercial or public body, and helping to coordinate joint ventures, such as the Local Area Agreements or the Local Economic Growth Initiative, where appropriate.
- ◆ Acting as a powerful catalyst in helping to strengthen Plymouth’s economy by ensuring

the benefits of reducing fossil fuel usage are widely appreciated and implemented.

- ◆ Ensuring that all strategic developments have in place viable plans that will result in the lowest possible release of carbon dioxide and other greenhouse gases.
- ◆ Introducing its own carbon offsetting scheme to limit the impact of any travel undertaken or any events held.

Plymouth City Council

Another key leader, the city council should:

- ◆ Expand on its recently adopted Energy Policy and adopt its own carbon offsetting programme.
- ◆ Make the move to a low carbon economy a major theme in Plymouth’s Local Area Agreement.
- ◆ Support the development of a Climate Change Action Plan, its publication, promotion and delivery.

As the planning authority for the city, the Council should

- ◆ Ensure that all new developments, and all redevelopments, have at least 10 per cent of their energy needs provided by renewable energy sources in keeping with the recommendations of the Local Development Framework and Regional Spatial Strategy. However, suitable micro-generation or district energy generation schemes that would produce at least an equivalent reduction in

greenhouse gas emissions would be acceptable.

- ◆ This requirement should be in addition to developments (including single dwellings) being designed and built for maximum agreed energy efficiency. The preferred standard would be Level 5 of the new Code for Sustainable Homes, though in some cases emissions at the level of 20kg CO₂ per m² would be acceptable (this is Level 3).
- ◆ A preferred option would be a commitment to increase the 10 per cent requirement to 20 per cent by 2015 and, through regular increments, to 60 per cent by 2050.
- ◆ Complete, monitor and review the Affordable Warmth Strategy, enabling PCC to contribute positively to the reduction of levels of fuel poverty in the City. Work with the Health Trust to identify vulnerable households and inform them of the help available to avoid fuel poverty.

- ◆ Work with schools to promote home energy conservation. Help schools reduce their own waste of energy, water and other resources.
- ◆ Monitor energy, water and other resource use in all Council properties and target wasteful use for elimination. Review the contractual arrangements for PCC's energy supplies and encourage the increased use of renewable energy sources in buildings.
- ◆ Ensure that energy efficiency features in transfer agreements of PCC housing stock through Large Scale Voluntary Transfer.
- ◆ Carry out an audit of transport use and plan to reduce, or offset, carbon emissions on a year-by-year basis. This should include discussions with private transport providers i.e. buses, taxis etc on how they might contribute to reducing carbon emissions.
- ◆ Use procurement agreements to encourage suppliers to reduce their carbon emissions and wherever possible buy locally.

Working regionally and locally they have the opportunity to work with other agencies, such as the Environment Agency, in the pursuit of their own commitments to tackling climate change and

Other public bodies

Working in partnership relies on us being able to encourage other bodies to support jointly agreed policies and strategies whilst incorporating the changes in to their own day-to-day management. This is a real challenge but not an insurmountable one.

The Health Trusts, The University of Plymouth, The College of St Mark and St John and the Government Office for the South West should all have in place policies that would reduce their carbon emissions. Acting as exemplars to others, they should

- ◆ Review their present use of energy, water and other resources and have a five-year plan on how they would reduce waste in each of these areas. This review and action should include buildings, transport and other staff activities.

sustainable energy. In particular, the energy and climate change elements of the following should be taken in to account:

- ◆ The Regional Economic Strategy.
- ◆ The Regional Spatial Strategy.
- ◆ The Environment Agency's strategic approach through 'Creating a Better Place–SW region local contribution 2006/2011 (Improving the environment in the South West Region)'.

And

- ◆ 'The Way Ahead–Delivering Sustainable Communities in the South West'



- ◆ In terms of development, all new developments should have significantly lower carbon footprints than present buildings. Refurbishments should aim to do the same if possible.
- ◆ Including staff at all levels in the planning and feasibility of the actions to reduce waste would be beneficial and would help to embed the concepts in the organisations.
- ◆ Using procurement agreements to encourage suppliers to reduce their carbon emissions and, wherever possible buy locally would also limit the broader impact of emissions.
- ◆ Support a citywide audit of the actions being taken so that a collective approach can be secure; citywide baselines and targets agreed; and best practice upheld at all times.

The business community

The potential financial savings to be made by reducing waste of energy, water and other resources are so great that all businesses, whether large, medium or small will benefit from introducing suitable reduction methods.

- ◆ The Chamber of Commerce, the Federation of Small Businesses, SWRDA, GOSW and the DTI should all ensure that there is a coordinated scheme to ensure that all businesses can receive support on how to achieve these financial savings.
- ◆ All businesses should audit their use of energy, water and other resources in order to identify the most cost effective ways of reducing their carbon emissions.
- ◆ Wherever possible businesses should use local suppliers. This will help the local economy and reduce transport energy costs.
- ◆ The potential job creation opportunities by the widespread use of decentralised energy sources, whether using renewables or micro generation based on fossil fuels, are great. This

potential should be explored and a plan to take advantage of these opportunities should be drawn up.

New commercial buildings should be designed to use sustainable construction techniques and materials. The buildings should minimise use of fossil fuel derived energy.



Local people

There are a myriad of things everyone can do to reduce their 'carbon footprint'. Most of the actions require very little investment but all will have positive payback opportunities! Some of the most popular (and possible) are:

- ◆ All households can review how well insulated their dwellings are. Bringing houses up to the recommended standards can reduce fuel bills considerably. There are also agencies that will help with these surveys and energy suppliers will give subsidies to install suitable insulation.
- ◆ Try turning down the heating by 1 degree—you won't notice it but it cuts emissions!
- ◆ Wherever possible central heating systems should have individual controls on all radiators and heating levels should not be excessively high.
- ◆ All newly purchased electrical goods should have an 'A' energy rating.
- ◆ Everyone should ensure that electrical goods are not left on standby overnight, or when not to in use for long periods of time. Similarly lights should not be left on unnecessarily.
- ◆ Install energy efficient light bulbseven one helps!
- ◆ Walking or cycling instead of driving for short round trips will save carbon, money and improve health.
- ◆ When changing a car, the replacement should give more miles per gallon (miles per litre) than the previous vehicle.
- ◆ Public transport should be used whenever possible.
- ◆ Local suppliers of goods and services should be used whenever feasible. This has a significant impact on reducing food and service miles.
- ◆ Subscribe to an offsetting scheme when you go on holiday.

For more advice and information...

The following may assist you in finding out more about the actions you can take towards achieving a low carbon economy.

- ◆ 'Has it Sunk in Yet?', Sept 2004 can be found at www.plymouth.gov.uk/climate_change.pdf
- ◆ 'Tomorrow's Climate, Today's Challenge', the Government's (DEFRA's) current climate change initiative can be found at www.defra.gov.uk/environment/climatechange/index.htm
- ◆ Details of the UK Climate Impacts Programme can be found at www.ukcip.org.uk
- ◆ Details of the South West Climate Change Impacts Partnership can be found on the Our South West website at www.oursouthwest.com/climate
- ◆ The work of the Tyndall Centre for Climate Change Research can be found at www.tyndall.ac.uk
- ◆ The work of the Hadley Centre for Climate Prediction and Research at the Met' Office can be found at www.metoffice.com
- ◆ The Nottingham Declaration on Climate Change appears in numerous local authority websites. The basic declaration can be found on the Local Government Association's website at www.lga.gov.uk .
- ◆ The Devon Sustainable Energy Network can be found at www.dsen.org.uk
- ◆ The Devon Energy Efficiency Advice Centre at www.devon-energy-advice.co.uk or www.practicalhelp.org.uk
- ◆ The SW Energy and Environmental Management Group at www.oursouthwest.com
- ◆ Plymouth City Council's Home Energy Advice Team at www.plymouth.gov.uk/homepage/housing
- ◆ The Carbon Trust at www.carbontrust.co.uk
- ◆ Or Sustainability South West's 'One Planet Economy' campaign at www.sustainabilitysouthwest.org.uk



About the Environment and Sustainability Partnership

The Environment and Sustainability Partnership remains committed to tackling climate change in Plymouth and is promoting two new briefings in support of the Council's commitment to a sustainable future. The 2004 report 'Has it sunk in yet?' confirmed Plymouth's vested interests in tackling climate change—from increased insurance risks to changes in biodiversity and the fact that we can do something about localised greenhouse gas emissions.

The Environment and Sustainability Partnership was established in November 2000 as an advisory body for Plymouth 2020, Plymouth's Local Strategic Partnership. Core members of the Partnership were drawn from Plymouth's Local Agenda 21 Editorial Board—providing strong and continuous links with local sustainable development and issues such as climate change. The Partnership has since grown to encompass a broad range of interests and linkages with Plymouth's leading environmental groups and research institutions—including the University, the Centre for Sustainable Futures, the Marine Biological Association and Plymouth Marine Laboratories.

The cross cutting issue of sustainability—the balance between social, economic and environmental quality impacts—underpins the work of the entire Environment and Sustainability Partnership. Members have a vast network of up to date knowledge and expertise to draw upon.

The Environment and Sustainability Partnership working with:



The Partnership has been tackling climate change issues since 2003. Interest in the issue was focused on P2020's stated aims for a 'carbon neutral city'. It was felt that such an ambitious challenge required careful thought and even more careful application through the P2020 Partnership and their links with those organisations tasked with protecting and improving the local environment and economy.

The Environment and Sustainability Partnership continues to take advantage of links to local and regional specialists—including the South West Climate Change Impacts Partnership (SWCCIP), Devon Sustainable Energy Network (DSEN), the Environment Agency and REGEN SW.

'Climate Change—the Impacts and Implications for Plymouth' was published by the Environment and Sustainability Partnership in September 2004 and complements Target 13 (Climate Change) in Plymouth's City Strategy—a commitment we would urge the LSP to maintain and develop throughout the development of the newly required Sustainable Community Strategy and Local Area Agreements.

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