

Towards a Low Carbon Economy

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In 2005 the Environment and Sustainability Partnership were asked to report on the implications of a low carbon economy for Plymouth. They were asked ***“How can we ensure growth in the city’s economy within environmental limits and a framework for a sustainable future... can we afford not to?”***

Adapting to Climate Change - the challenge ahead...

The majority of climate scientists and insurance companies now believe that climate change is happening and that human actions are driving this change. 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 (costs, security and risks) and demand (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’d all 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.

The Government is aiming to ensure that these emissions are 60 per cent below 1990 levels by 2050. This implies that the present UK emissions of 10 to 11 tonnes of CO₂ per person, per year would need to be reduced to 4 tonnes.

This aim can be used as the initial guide figure for a low carbon economy. 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.

This is the first of two briefing papers on the topic of a low carbon economy. In the past year a lot of new information on the factors influencing climate change and energy use have become available.

There has also been a change in the political emphasis on tackling climate change and sustainable energy.

Local authorities and Local Strategic Partnerships are now being encouraged to take a lead on tackling climate change through commitment to national policies, local policies and Local Area Agreements and ‘Climate Change Action Plans’. Sustainability South West is also taking up the challenge and encouraging leadership for a One Planet Economy as part of a wider low carbon economy initiative.

Creating the opportunities for a low carbon economy will require co-ordination and the application of innovative solutions to Plymouth’s development. Understanding and leading the change to a low carbon economy is a major challenge for the immediate future. Is it a challenge that Plymouth can rise to?



Progress since 2004...

The translation of commitment into action through Local Area Agreements places a much greater emphasis on the joint roles of the P2020 Partnership and the City Council in leading action on climate change through a low carbon economy. Some, but not enough, progress has been made since 2004. Existing commitments have:

- ◆ Supported the publication of 'Has it Sunk In Yet?' – an advisory report on the potential impact of climate change on Plymouth that suggested a draft Climate Action Plan based on increasing amounts of advice and support from the Government, national and regional partnerships.
- ◆ Secured membership of the South West Climate Change Impacts Partnership and involvement in regional initiatives on renewable energy targets, climate change impacts and the inclusion of climate change impacts in the revision of the Regional Spatial and Economic Strategies and the Regional Sustainable Development Framework.
- ◆ Supported the implications of climate change and renewable energy targets on Plymouth's Local Development Framework.
- ◆ Campaigned for greater commitment from the LSP and City Council and secured that commitment from the City Council through the Nottingham Declaration on Climate Change and the Plymouth, Torbay and Devon Declaration on Climate Change.
- ◆ Supported the development of the Devon Sustainable Energy Network.
- ◆ Published an Affordable Warmth Strategy tackling fuel poverty and actions on household energy conservation and climate friendly development across the city.
- ◆ Developed detailed research on the potential of a low carbon economy in line with the Government's White Paper on energy, including assessments of CO₂ emissions and energy use, using up to date DTI data and eco-footprinting techniques.



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In summary, what might we expect from a low carbon economy in Plymouth? Lower air pollution; local energy production systems and associated local employment; reduced waste of materials, goods and water; more local sourcing of goods and services; high density/mixed use developments and regeneration of urban spaces; a strong sense of local identity and networks of urban green spaces.

Is this a challenge Plymouth can rise to?

The actions we might consider in support of a low carbon economy are set out in the second briefing in this series but, by way of background, it is important to consider how both Government targets and local aspirations for growth might benefit from such an approach.

Is it possible to maintain high and sustainable levels of growth within a low carbon economy?



Meeting Growth Scenarios

A 2005 Report by the Tyndall Centre for Climate Change Research (one of the UK's leading advisory bodies) suggested that the Government's 60 per cent reduction in carbon dioxide emissions by 2050 could be reached if some challenging questions were asked about a low carbon economy. Key factors in the climate change debate include our current and future demands for energy, the supplies we rely on, the costs and the needs of transport. Five scenarios were suggested for further consideration together with a series of options for future action. We are now asking...

QUESTION : Which of the following scenarios might suit Plymouth's needs and aspirations as set out in the Economic Strategy 2006 - 2021?

	Characteristics of growth scenario
Red	<ul style="list-style-type: none"> ◆ High economic growth but low energy demand. ◆ Levels of economic growth slightly greater than today resulting in a 2050 economy nearly five times larger than that of today. ◆ UK remains primarily a service economy – with the commercial sector contributing approximately three quarters of GDP. ◆ Gradual expansion of manufacturing, particularly in the non-energy intensive and chemical industries. ◆ Conspicuously slow growth in the public administration sector – its importance within the economy has declined as a consequence. ◆ Significant energy demand reduction and moderate low carbon supply measures have been achieved by a mix of market mechanisms operating within a joined up and sophisticated regulatory environment.
Blue	<ul style="list-style-type: none"> ◆ Modest economic growth and modest energy demand. ◆ Contribution to national wealth of the commercial sector is almost matched by the expansion of the public sector. ◆ Non energy intensive industries have undergone moderate growth (now almost 15 per cent of the economy).
Turquoise	<ul style="list-style-type: none"> ◆ Medium economic growth and medium energy demand. ◆ Economy growing at a rate similar to that of today. ◆ By 2050 the economy is three and a half times bigger, with an accompanying growth in energy consumption of only 17 per cent. ◆ Three sectors economically dominant – commercial, construction and public. ◆ Productive sectors collectively contribute to the residual 8per cent of GDP primarily from the non energy intensive and chemical industries.
Purple	<ul style="list-style-type: none"> ◆ High economic growth. ◆ High demand supply. ◆ By 2050 the economy is over six times that of today and energy consumption is twice the current level. ◆ The economy remains dominated by the commercial sector but with significant contributions from the non intensive energy industries; both of which have undergone substantial expansion from their position at the start of the 21st Century.
Pink	<ul style="list-style-type: none"> ◆ High economic growth. ◆ High demand supply. ◆ By 2050 the economy is over six times that of today and energy consumption is twice the current level. ◆ The economy remains dominated by the commercial sector but with significant contributions from the non intensive energy industries; both of which have undergone substantial expansion from their position at the start of the 21st Century

The assumptions made for each scenario					
Growth in UK GDP per year	3.3%	1.6%	2.6%	3.9%	3.9%
The dominant economic sectors	Commercial	Commercial Public admin non intensive industry	2.6%	3.9%	3.9%
Energy Consumption (Mtoe)	90	130	200	330	330
Number of households (in millions)	27.5	25	30	27.5	27.5
Energy used per household	Large reduction	Very large reduction	Small reduction	Similar to current levels	Similar to current levels
Supply mix available	Cool Renewables H ² Biofuels	Cool Nuclear CHP Biofuels	Gas Biofuels Nuclear, H ² Renewables	Nuclear Renewables H ² Biofuels	Nuclear Renewables Biofuels
Decarbonisation policies	Innovative and technology driven	Collectivist approaches to demand side policy	Similar to today with focus on supply	Strongly market focused government	Strongly market focused government
Transport	Low growth in aviation Reduction in car use Very large increase in public transport	Medium growth in aviation Low growth in car use Large increase in public transport	Large growth in aviation No growth in car use Small increase in public transport	Very large growth in aviation Large growth in car use Large growth in public transport	Very large growth in aviation Large growth in car use Large growth in public transport
Transport fuels	Oil Electricity H ²	Oil Electricity H ²	Oil Biofuels Electricity H ²	Oil Biofuels Electricity H ²	Oil Biofuels Electricity
Use of hydrogen	Stationary and transport uses. Production from gasification and renewables. No pipelines	Transport uses Production from gasification, nuclear and renewables. No pipelines	All sectors including aviation. Production from gasification, nuclear and renewables. Pipelines and H ² by wire	Stationary and transport uses. Production from renewables and nuclear. Extensive pipeline system	No hydrogen
These scenarios would create the following CO₂ emissions (compared to today's figures which are shown in brackets in column one).					
Road transport	15% (21%)	7%	7%	5%	0%
Public transport	3% (2%)	1%	1%	0%	0%
Aviation	12% (6%)	45%	38%	68%	61%
Commercial / public	30% (12%)	7%	10%	3%	3%
Industry	30% (29%)	27%	15%	9%	21%
Household	18% (25%)	12%	25%	2%	4%
Shipping	7% (5%)	1%	4%	13%	11%

What the options mean for a city like ours...

Decarbonising energy demand

- ◆ Efficiency improvements can dramatically decarbonise many sectors.
- ◆ Demand reduction offers greater flexibility than a low carbon supply.

Decarbonising energy supplies

- ◆ Supplying low carbon energy from renewable resources is both technically and economically viable.
- ◆ Innovation is needed to overcome institutional, economic and social barriers.
- ◆ A society with high carbon based energy demand will face future infrastructure challenges.

Decarbonising transport

- ◆ Low carbon futures do not preclude increases in personal mobility.
- ◆ Emissions from international aviation and shipping must be included in carbon targets.

Government needs to

- ◆ Implement and enforce greater energy efficiency standards in buildings, goods and transport.
- ◆ Policies will need to take issues such as fuel poverty and the real costs of supplies into account.
- ◆ All the '60 per cent reduction' futures require immediate action—but some require more action than others.

Is economic growth possible?

- ◆ Yes—growth is the problem but guided growth within environmental limits is possible.

Who are the main culprits?

- ◆ Industry, commerce, household use and transport (road, air and shipping). Of these aviation and shipping are the most difficult sectors to decarbonise, but they are also the sectors experiencing the greatest level of current and projected growth. Even the more modest projections of growth could be incompatible with the 60 per cent CO₂ reduction targets. Some tough decisions will be needed to offset expansion in one area against reductions in other areas.

Efficiency, growth and consumption

- ◆ Energy efficiency measures need to complement actions on climate change. They should not lead to even greater use of carbon-based fuels. Careful analysis will be needed to support the design and integration of efficient supplies for future industrial and household use.

Energy consumption patterns

- ◆ Household and industrial/commercial demand are likely to remain the biggest users of energy—so solutions need to be tackled at every level. Growth in the aviation sector remains a concern despite technological change.
- ◆ Low carbon energy supplies are technically feasible and are not economically prohibitive, but do require changes to our present energy supply models. Reducing exposure to global changes in supply, the costs of carbon based fuels and security of supply will be a major bonus.
- ◆ The current emphasis on centralised supplies will be reduced and the growth in the renewables sector, particularly solar and marine, is something that Plymouth has vested interests in encouraging.

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Climate change scientists fear we have reached the 'tipping point' – the point at which mitigation becomes the only solution. The Hadley Centre for Climate Change Research at the Met Office in Exeter have suggested that, if it were not for economic growth, the Government could achieve its carbon reduction targets without recourse to explicit carbon mitigation policies. As a balance is sought between sustainable economic growth and the impact of climate change a solution needs to be found. In short we need to take action now!

Securing a manageable approach to growth

What impact might these options have on the Sustainable Community Strategy

The Local Strategic Partnership has the task of developing a new Sustainable Community Strategy for the city and delivering it through the Local Area Agreement. Tackling climate change is highlighted in Government guidance as one of the key themes within the process. Given the suggested options, the growth scenarios and the need to consider local circumstances, it would appear that the LSP needs to :

- ◆ Consider the implications of the Government's priorities for sustainable development—these include 'climate change and energy'.
- ◆ Consider the implication of the Regional Spatial Strategy and other regional targets for climate change and sustainable energy.
- ◆ Consider the impact of climate change and energy indicators on Local Area Agreements.
- ◆ Recognise the regional definition of a genuinely sustainable community - a community that is healthy, socially just, productive and living within environmental limits.
- ◆ Acknowledge the implications of the ODPM's definition of a sustainable community and it's inclusion in Plymouth City Council's Sustainable Development Policy Statement.
- ◆ Incorporate carbon reduction measures in the Sustainable Community Strategy, establishing a series of citywide targets with agreed actions and deadlines. Build on the existing climate change target in the City Strategy.
- ◆ Adopt Plymouth's eco-footprint as a key indicator of progress towards these targets

with the aim of stabilising and, then, reducing its size.

- ◆ Insist on energy efficient construction standards for all new housing and developments including targets that incorporate the use of renewable energy sources.
- ◆ Reduce the waste of materials.
- ◆ Adopt plans that reduce the need to travel and improve citywide and intra-regional car free access through an integrated approach to planning, regeneration and the use of the latest technologies.



- ◆ Encourage the reduction of travel miles by supporting the procurement of locally sourced goods and services and the regional sustainable procurement consortium.
- ◆ Address how strategic development will adapt to unavoidable climate change due to the greenhouse gas emissions already in the climatic system (these include flood risks)
- ◆ Ensure that proposals for urban growth and regeneration incorporate quality, diverse urban green spaces.
- ◆ Incorporate sustainability criteria (checklists) in to the development of Local Area Agreements.



What benefits might emerge from such an approach?

There are numerous outcomes from such an approach including :

1. The widespread use of locally generated, renewable energy sources—including micro generation.
2. The development of business expertise in low carbon technologies to make Plymouth a 'centre of excellence' in this field.
3. An attractive city for inward investment.
5. Reduced air pollution through efficient, eco-friendly public transport networks.
6. Neighbourhoods that are compact and pedestrian friendly with a heart that provides a focus for community life—such as those created by NRF funded Homezones.
7. Reduced waste, energy and water savings and increased cost effectiveness.
8. Concentrations of eco-homes with high environmental standards.
9. Reduced flood and damage risks to the city—leading to fewer insurance claims and greater security in the housing market.

Take immediate action...

We are encouraging the Local Strategic Partnership to...

Make a clear statement of commitment :

- ◆ Plymouth will respond to the national need to reduce CO₂ emissions to combat global climate change and the implications for our quality of life. In doing so we will honour the commitments set out in the Nottingham Declaration on Climate Change, signed by the City Council in March 2005.
- ◆ We will encourage actions that mitigate the impact of climate change.
- ◆ We will seek to minimise energy use wherever possible, encourage the use of energy from, and investment in, renewable resources and promote energy efficiency.
- ◆ We will work towards a low carbon economy, using innovation and creativity to adapt our lifestyles in a sustainable, climate friendly way.
- ◆ In keeping with Plymouth's commitment to the Devon, Plymouth and Torbay Declaration on Climate Change and Fuel Poverty, signed by the City Council on 2nd March 2005, the following actions are recommended to the Council and its partners in the Local Strategic Partnership.



Acknowledge the potential impacts

The following commitments are drawn from the statements set out in the Devon, Plymouth and Torbay Declaration on Climate Change and Fuel Poverty, and the Nottingham Declaration on Climate Change; both signed by the City Council in March 2005.

The Local Strategic Partnership should confirm their commitment to action to tackle the local and global impacts of climate change. In doing so they are asked to acknowledge :

- ◆ That climate change and fuel poverty are real and current threats.
- ◆ Evidence continues to mount that climate change and fuel poverty is a real and current threat to our quality of life.
- ◆ Climate change will have a real and far reaching impact on the City's economy, society and environment.
- ◆ Fuel poverty has a detrimental effect on people's health and well-being – issues that the Local Strategic Partnership is committed to improving.
- ◆ Moves towards a low carbon economy would benefit the City's economic prosperity, the wellbeing of our society, the efficient use of resources and the protection of our environment.

Acknowledge the potential for action at a local level.

Through the work of the Local Strategic Partnership, Plymouth welcomes :

- ◆ The social, economic and environmental benefits to Plymouth that will come from actions to combat climate change and fuel poverty.
- ◆ The recognition, by all sectors within the partnership, of the need to combat climate change and fuel poverty and the policies, initiatives and research already undertaken to support this commitment.

- ◆ The emissions targets agreed by central and regional government, through the Climate Change – UK Programme and Regional Spatial Strategy, and the programmes for delivering change adopted throughout the UK.
- ◆ The opportunity for local government to lead the response at a local level and to play a major role in delivering the UK's commitment to the reduction of global warming.
- ◆ The opportunity for all of us to encourage and help residents and local businesses to reduce their energy costs, to reduce congestion, to improve the local environment and to tackle fuel poverty in our communities.
- ◆ The additional powers to address the social, economic and environmental well-being of our communities contained within the Local Government Act 2000, which assist in the process.
- ◆ The potential for a low carbon economy that improves our quality of life, increases our

economic prosperity and assists in the delivery of an effective and efficient transport system.



Above all - Take action

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- ◆ Support the development of Plymouth's Climate Action Plan—see Briefing Two - Climate Action Plan (available from the same contacts above)
- And
- ◆ Initiate change in your organisation using the advice lines and information list on the back page of this Briefing.

Your Views...

What action do we need to take to initiate local action? We would like to hear your views on the potential for a low carbon economy. Please direct your comments to the Environment and Sustainability Partnership at the address, telephone number or email address on the back page.

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 and Climate Change

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.

QUESTION : The development of a low carbon economy is fundamental to this commitment but now, as then, the question is “do we have the drive to take these changes forward?”

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 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.

The Environment and Sustainability Partnership working with:



Contact us...

Telephone: 01752 304220

email:
sustainability@plymouth.gov.uk

Write to us at: The Environment and Sustainability Partnership,
Civic Centre, Plymouth PL1 2AA