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Welsh Government

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# Climate Change Annual Report

December 2013



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## Ministerial Foreword

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Reports of climate change at a global level can often seem distant. Although the latest scientific evidence for climate change significantly reinforces the need to take action and it is only when we look closely at the very real impacts, opportunities and actions taking place at a local level that the effect it is having is understood.

I believe that all governments have a responsibility to respond to this global challenge – we must accept responsibility for what the science is telling us about the impact of our actions and commit to improving the lasting legacy we will leave to future generations.

But this should not simply be a doom and gloom message. We must also not fail to see or to act on the considerable opportunities climate change brings to Wales to improve our economic, social and environmental future. We have an opportunity to do things better, to grow in a way that creates jobs, improves our environment and creates a better society. We must see climate change as the nudge that shows us that in the 21<sup>st</sup> century we can and must aim for all three.

Climate change is neither an environmental issue nor an environmental choice – being at the UN Climate Change Summit in Warsaw recently underlined my belief that we are already well and truly in the midst of a global transition to low carbon economies – and failing to act on climate change will be as detrimental to our economy as our environment. Our industry and business will not only remain important but many are already leading the way on this agenda. As the evidence from the UK Climate Change Risk Assessment and adaptation action in this report highlight, there are also very real risks and acting on climate change will help improve the resilience of our communities.

As I set out in my recent autumn statement, an increasing focus on green growth is central to my ambitions for Wales. This report underlines the scale of the action we are already taking and how we are already using wider opportunities like European funding to support our action. The recent commitment made by the European Union to a minimum of 20% of the next round of EU funds being allocated to climate related action provides even more scope to go further as well as underlining the fact that the whole context of the Europe 2020 growth strategy is already framed by climate change.

The declining trends in our emissions and successful delivery against our annual target represent positive progress. I am particularly pleased that the public sector has shown leadership through the action we and others have taken to address our own impacts, and which will also save money on running costs year on year. However, it is important to recognise that other factors such as the economic downturn have a bearing on the results.

I believe that we can and must do more – to ensure that we meet our long term targets and, more fundamentally, secure prosperity as well as resilience for Wales. In outlining my priorities for my department, I have already set out that we are working to go further, including the use of Wales’ new legislative powers as set out in the Environment Bill. As a government, our vision is not only grounded in the priorities of today, but also in ensuring we support the wellbeing of our future generations and learning the lessons from our past.

Next year, I intend to refresh our climate change policy and focus on the practical action that we can take with partners to deliver. Our ambition is to ensure Wales is at the forefront in seizing the opportunities and we must not get left behind.

**Alun Davies AM**  
**Minister for Natural Resources and Food**

## Executive Summary

This annual report sets out the progress that has been made in reducing greenhouse gas emissions in Wales against our targets and summarises some of the key actions that have been taken to tackle the causes and consequences of climate change.

As a Government, our commitment to action on climate change, set out in the Climate Change Strategy for Wales and re-affirmed in the Programme for Government, demonstrates the long term priority given to addressing this key challenge.

This year's report is all the more significant when seen alongside the scientific evidence provided in the recent 5th assessment report by the Intergovernmental Panel on Climate Change (IPCC). The IPCC report concluded that: the warming of the climate system is indisputable, that much of the recent warming has been caused by human activity and that the future risks of climate change are even greater than first thought. The IPCC report also highlights the increasing risk from extreme weather events. As such, the case for action on climate change is even stronger than in 2010 when our current strategy was produced.

Following the publication of the IPCC report, it is timely that we are updating our own scientific and statistical evidence and reporting on progress in Wales. This report builds on evidence presented in the first progress report, including for the first time the progress made against our headline 3% annual emissions reduction target in devolved areas as well as our progress against the 40% overall emission reduction target by 2020.

This report sets out that for the first year of available evidence, we have exceeded our 3% annual emissions target and provisional data indicates that we are likely to also meet the target for 2012. It also sets out that in terms of progress against the wider 40% target by 2020, emissions have decreased 20.6% against the 1990 baseline. This is positive progress, but given that the economic downturn will have been a contributing factor and it is currently above the trend needed to meet our aim of a 40% reduction by 2020, it also highlights that further work is needed if we are to maintain progress and deliver against our long term commitments.

The report also breaks down emissions by key sectors and highlights that most sectors have shown good progress in contributing to the 3% emissions reduction target. The following sectors seeing significant reductions: Transport Sector (6.8%), Resource Efficiency and Waste Sector (8.8%), Business Sector (13.3%) and Residential Sector (16.5%). Emissions in the Agriculture and Land-use sector have slightly increased however, by 1.2%.<sup>1</sup> This increase, seen since 2009, is largely due to a historical legacy of aging forestry in Wales. The maturation of Wales' forest areas, reduces the size of the forest sink in the Welsh inventory and has led to an overall increase in emissions for the Agriculture and Land-Use Sector. The sectoral breakdown also highlights the very good progress made in the Public Sector, which has taken a lead role in reducing emissions with a reduction of 18.7% in 2011.

In addition to the progress on emissions, the report also summarises key action that has been taken on both climate change mitigation and adaptation. Given that as reported by the IPCC, we are now locked into an inevitable amount of climate change and although global average temperature rises mask considerable regional variability – meaning that future temperature

<sup>1</sup> Forest land in Wales removes carbon dioxide from the atmosphere creating a sink, but as forests age they become less active at drawing down and storing carbon dioxide from the atmosphere. The greenhouse gas inventory uses a model to estimate the impact of these changes on emissions in Wales.

changes in Wales may not necessarily be the same as the global average – our average temperature has nonetheless already increased by 0.7°C (1914-2006). Tackling the significant risks associated with climate change by building our resilience and adapting to climate change is therefore as vital as continuing to mitigate and prevent greater climate change through emission reduction.

The adaptation work is aimed at enabling each sector to specifically adapt to the changing climate and build resilience in a bespoke way, tailored to the differing future impacts each face. In addition, progress more widely in developing our adaptation methodology and in working with international partners is set out within the report. These sections highlight how good progress with the adaptation programme is being made, in particular in further developing our methodology and guidance on adapting to climate change and the development of Sectoral Adaptation Plans. As a Government, we are committed to building on this foundation in an area where Wales has been truly innovative and we are ambitious in striving to make progress.

An independent commentary from the Climate Change Commission on the progress that has been made is also included, following the model of the Sustainable Development Annual Report.

In summary, the report highlights the significant progress made against our emissions targets and the successful action being taken through a number of key initiatives – like *arbed*, NEST and our own estate management – is not only delivering for climate change, but also delivering multiple benefits around jobs, green growth, fuel poverty and increasing the future efficiency of the public sector. It also sets out how we are already striving to go further and build on our progress to date, not only in the delivery of our initiatives but also in taking forward legislation – through for example the Future Generations and Environment Bills – that will provide the framework to address this long term challenge. The report concludes by setting out our intention to refresh our Climate Change policy and work in partnership with others to deliver the practical action required to meet this shared challenge and secure a prosperous future for Wales.



## Introduction

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This is the second progress report since the adoption of our Climate Change Strategy, summarising our progress as a Government in taking action to deliver against our targets and tackle the causes and consequences of climate change.

Under the Climate Change Act 2008, the Welsh Government is required to report to the National Assembly for Wales on the action we have taken to reduce emissions and deal with climate change impacts. In the wake of the recent 5th IPCC report, this report summarises the progress that has been made. In doing so it details Wales' performance using the latest available data in relation to our emission reduction targets. It also gives a summary of the progress that has been made within key sectors – covering both climate mitigation and adaptation.

The report is not designed to be a comprehensive overview of all activity, but to highlight some of the key work the Welsh Government is doing to reach our challenging targets. With the growing importance of adapting to our changing climate, an additional section is included to summarise the wider work that we are doing on adaptation. A section which sets out a brief overview of a selection of case studies is also included to highlight some of the positive examples of practical action being delivered.

The last section of the report sets out the next steps we intend to take in order to build on the positive progress in taking climate action and ensure that we continue to deliver in future years. Annexes are also included in order to give further technical detail on the emissions calculations, on the progress with regard to Wales' Ecological Footprint and on additional information in relation to the UK Climate Change Committee and Climate Change Commission for Wales. Alongside this report, we will also be releasing a separate Technical Annex which tracks progress against actions listed in the Climate Change Strategy for Wales Delivery Plan for Emission Reduction and sets out the agreed emissions reduction indicators for each sector.

## Context

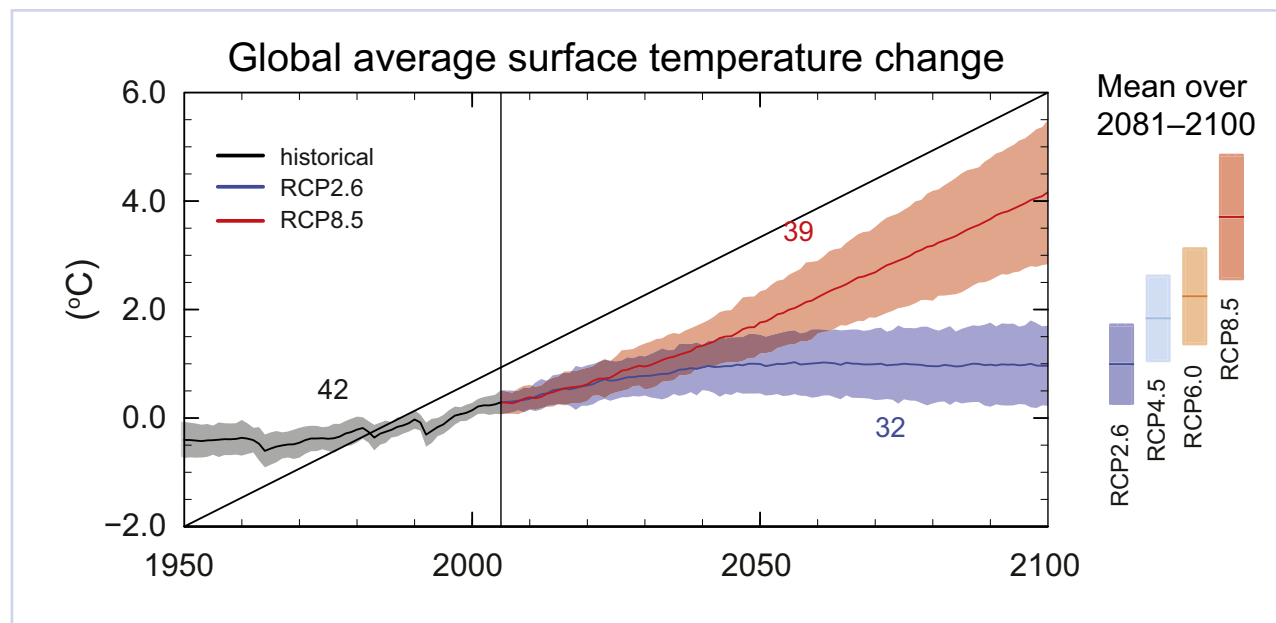
### Changes in Global Greenhouse gas concentrations

The recent IPCC report<sup>2</sup> sets out the scientific evidence showing that as a result of human activity, atmospheric carbon dioxide (CO<sub>2</sub>) concentrations have increased by around 40% and have exceeded 400 parts per million for the first time since the industrial revolution when the dataset began.

The graph at figure 1 shows the direct measurements of carbon dioxide (red line) in the atmosphere and highlights that they are continuing to rise since the dataset began in 1958. The smaller graph inset shows the most recent weekly values of atmospheric CO<sub>2</sub> between 2009 and 2013.<sup>3</sup>

The graph at figure 2 shows the composite records of atmospheric carbon dioxide concentrations for the past 800,000 years. These concentrations are a composite of ice core reconstructions of atmospheric CO<sub>2</sub> and global view data derived from modern atmospheric measurements. The 2012 data shows concentrations far in excess of those for the last 800,000 years and highlights the rapid rise in atmospheric CO<sub>2</sub> since the industrial revolution.<sup>4</sup> This illustrates that present-day concentrations of greenhouse gases as shown by figure 1 substantially exceeded the range of concentrations seen in the past 800,000 years.

**Figure 1**

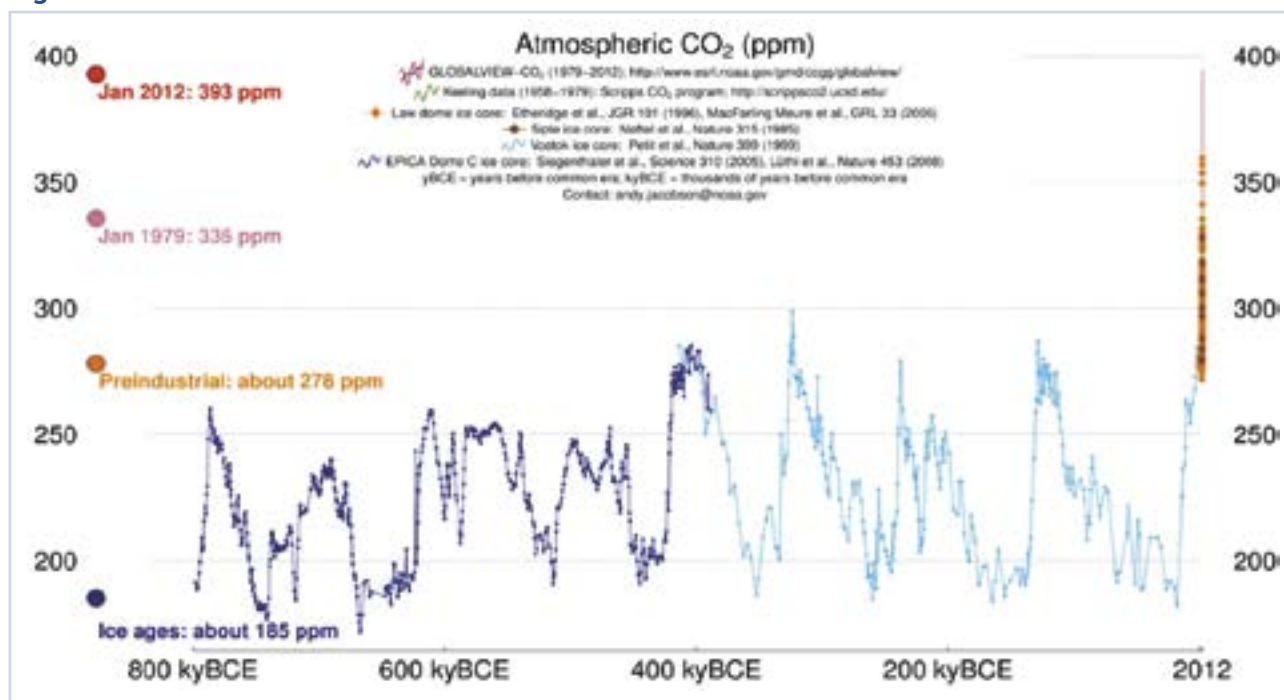


<sup>2</sup> IPCC Fifth Assessment Report (AR5) – Working Group 1 (WG1) The Physical Science Basis <http://www.ipcc.ch/report/ar5/wg1/>

<sup>3</sup> Met Office (2013) Atmospheric concentrations of CO<sub>2</sub> are continuing to rise and have reached 400 ppm for the first time since this dataset began in 1958. – <http://www.metoffice.gov.uk/research/news/climate-guide>

<sup>4</sup> Time history of atmospheric carbon dioxide from 800,000 years ago until January, 2012. <http://www.esrl.noaa.gov/gmd/ccgg/trends/history.html>

Figure 2



Moreover, atmospheric greenhouse gas concentrations are continuing to rise globally and the IPCC report indicates that emissions at or above current rates would induce changes in all components of the climate system, such as the sea level, ocean acidification and changes in weather systems and extreme weather events. These changes – many of which would persist for centuries – are projected to occur in all regions of the globe.

## Changes in the global climate

The IPCC report also highlighted that the warming of the climate system is indisputable, with almost the entire globe having experienced recent increases in surface temperature.

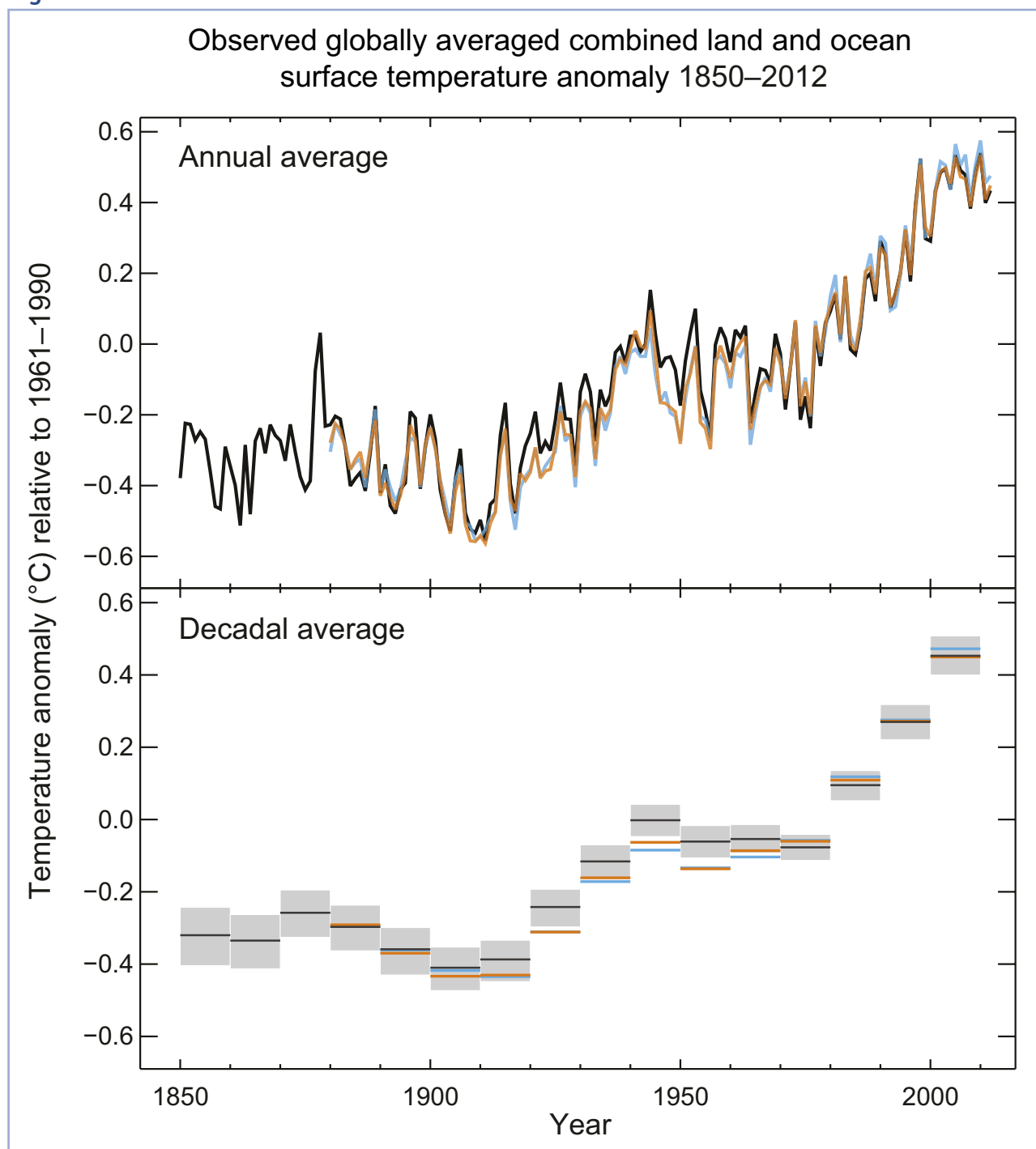
Although the rate of warming was at its highest between the 1970's and 1990's and has slowed more recently, global temperatures are continuing to rise and it is clear that the last decade was the warmest since instrumental records began in 1850. In addition, each of the last three decades have been significantly warmer than the previous one and instrumental records suggest that in the Northern Hemisphere, the period 1983–2012 is likely to have been the warmest 30-year period of the last 800 years and probably the warmest 30-year period of the last 1400 years<sup>5</sup>.

The graph below highlights this pattern and shows observed global land and ocean temperature data sets. The top panel shows annual warming over the 20<sup>th</sup> century and the bottom panel shows decadal warming over the past three decades.<sup>6</sup>

<sup>5</sup> IPCC (2013) data taken from palaeoclimate archives. IPCC, 2013: Summary for Policymakers. <http://www.ipcc.ch/report/ar5/wg1/>

<sup>6</sup> IPCC (2013)\_a) Observed global mean combined land and ocean temperature anomalies from three surface temperature data sets. Top panel: annual mean values over the 20<sup>th</sup> century. Bottom panel: decadal mean values over the past three decades.. IPCC, 2013: Summary for Policymakers. <http://www.ipcc.ch/report/ar5/wg1/>

Figure 3



In addition, the world's oceans have acidified since the beginning of the industrial era as they take up carbon dioxide from the atmosphere<sup>7</sup>. The current rate of change in ocean acidification may be faster than any time over the past 300 million years and this may already be stressing some species particularly in high-latitude oceans<sup>8</sup>. Furthermore, models indicate that as atmospheric carbon dioxide concentrations continue to rise, the impacts on marine ecosystems, and people dependent upon them for food and livelihoods, are expected to increase throughout the 21<sup>st</sup> century.

<sup>7</sup> The oceans have absorbed about 30% of the emitted anthropogenic CO<sub>2</sub> since the beginning of the industrial era, leading to a direct increase in ocean acidification of 26%. Source: IPCC Fifth Assessment Report (AR5) – Working Group 1 (WG1) The Physical Science Basis: <http://www.ipcc.ch/report/ar5/wg1/>

<sup>8</sup> IGBP (2013). Ocean Acidification Summary for Policymakers – Third Symposium on the Ocean in a High-CO<sub>2</sub>. Source: <http://www.igbp.net/publications/summariesforpolicymakers/summariesforpolicymakers/oceanacidificationsummaryforpolicymakers2013.htm>

## Changes in the Welsh climate

Although increases in global surface temperature do not necessarily mean an equal increase in the local surface temperature, average temperatures in Wales have increased. Over the last century<sup>9</sup> Wales has seen an increase in annual daily mean temperature of 0.7°C<sup>10</sup>.

There have also been changes in other key areas that are indicative of a changing climate. Wales has seen a decline in annual precipitation of 0.9%, but this decline masks significant seasonal changes including a 12.8% increase in spring and a 24% decrease in summer precipitation. Sea levels have also risen slightly around the UK – by a rate of 1 millimetre a year in the 20<sup>th</sup> century which has also continued into the 21<sup>st</sup> century.<sup>11</sup>

These changes in our climate influence the likelihood of experiencing extreme weather events meaning that there is now:

- an increased risk of extreme wet seasons and severe flooding, so that for example that the flooding experienced in 2000 is twice as likely now as a century ago;
- an increased risk of extreme hot summers, meaning that the heat wave in 2003 is at least twice as likely as a century ago;
- an increased risk of exceptionally warm months, with the warm November 2011 temperatures in the UK (the second warmest November since at least 1659) now being about 60 times more likely than only 50 years ago); and,
- a reduced risk of extreme cold weather in winter, with the cold December UK temperatures in 2010 only being about half as likely as they were in the early 1960's.

## Future changes to the climate

The United Nations has agreed that a rise in global temperature of more than 2°C above pre-industrial levels could be dangerous, leading to 'unacceptable' levels of climate impacts and being more likely to trigger accelerated or irreversible environmental change.

Limiting climate change to a global rise of no more than 2°C however requires substantial, sustained and immediate reductions of global greenhouse gas emissions. This is illustrated by the latest Met Office models that suggest that greenhouse gas emissions will need to peak in the next few years and then reduce by between 3% and 5% a per year to have a significant chance of limiting global average warming to the 2°C level.

This means that without significant reductions in emissions in the near future, global temperatures are likely to be at least 2°C above pre-industrial levels and could be as much as 5°C higher by the end of this century as shown below. It also highlights that even with a significant reduction in global emissions, some future climate change is now unavoidable because of the locked in climate response to past and current emissions.

The graph at figure 4 below comes from the IPCC report and shows projected global mean temperatures by the end of the 21<sup>st</sup> century for different emission reduction scenarios<sup>12</sup>.

<sup>9</sup> From the baseline 1914- 2006

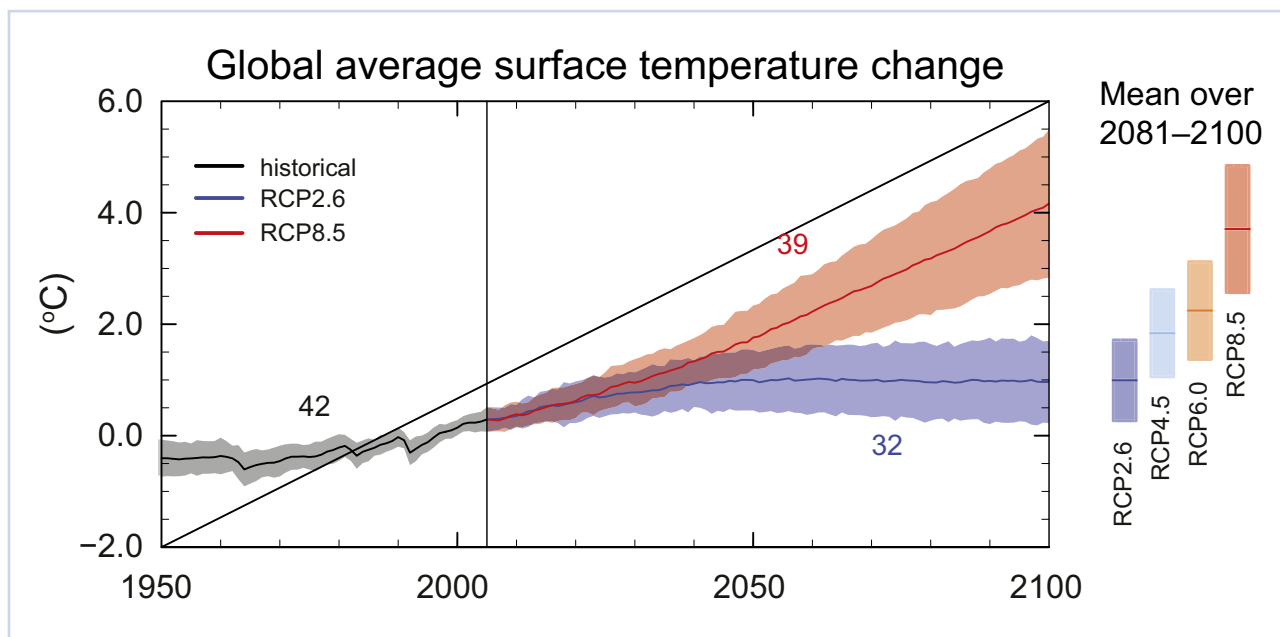
<sup>10</sup> Data taken from 'The climate of the United Kingdom and recent trends' (2009), available at <http://ukclimateprojections.defra.gov.uk>

<sup>11</sup> Met Office Hadley Centre

<sup>12</sup> IPCC, 2013. Global mean temperature change averaged across all CMIP5 models (relative to 1986–2005) for the four representative concentration pathways (RCP) scenarios: RCP2.6 (dark blue), RCP4.5 (light blue), RCP6.0 (orange) and RCP8.5 (red); Likely ranges for global temperature change by the end of the 21st century are indicated by vertical bars for each RCP. IPCC, 2013: Summary for Policymakers. <http://www.ipcc.ch/report/ar5/wg1/>

As a result, adapting to the changing climate is fundamental for the future and there is a need to build resilience to these unavoidable changes. The global importance given to adapting to climate impacts to ensure our future resilience is consequently growing. However the mitigation of climate change by lowering our emissions remains vital, because if growth in emissions continues unrestrained, the potential impacts of climate change of above 2°C would see a future where it may not be possible to adapt to all the changes. Continuing to take immediate action to cut greenhouse gas emissions is therefore crucial if we are to hope to keep future climate change impacts to manageable levels.

**Figure 4**



## Progress against our targets

As a Government, we have two key overarching targets for reducing greenhouse gas emissions in Wales. The first is a target to reduce emissions by 3% annually in areas of devolved competence. The second is a target to reduce overall emissions by 40% by 2020.

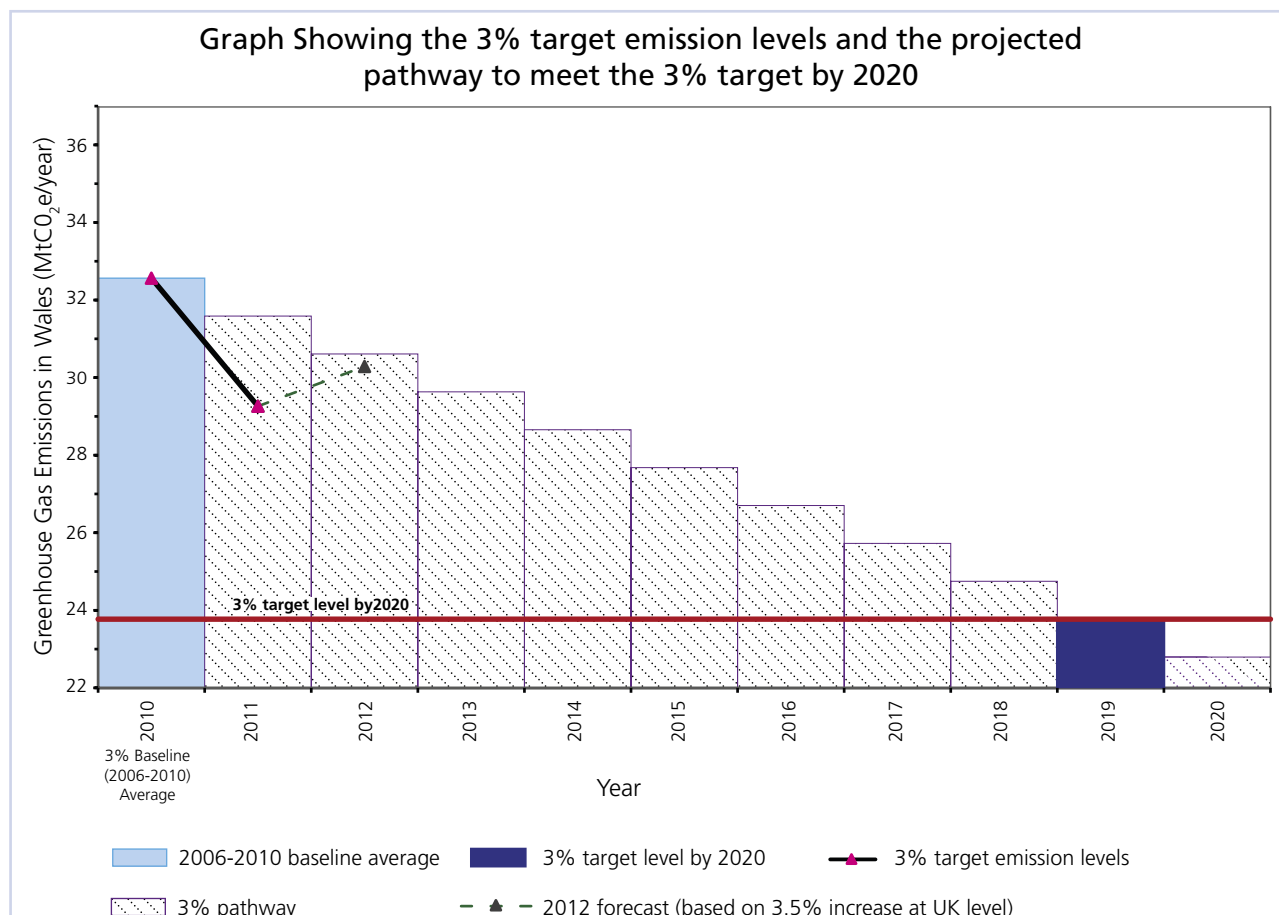
### Progress against our 3% target

The 3% target is a commitment to reduce emissions within areas of devolved competence by 3% each year from 2011, against a baseline of average emissions over the period 2006-2010.

The 3% target and the supporting monitoring framework have been developed to provide a robust mechanism for effectively tracking progress. The emissions reporting and verification procedure means that emissions are generally officially available with a time-lag of approximately 18 months. As a result, this report provides the first opportunity to assess whether Wales has achieved a 3% reduction in the first year (2011) of the 3% target reporting.

The baseline emissions figure for the 3% target is 32.56 MtCO<sub>2</sub>e<sup>13</sup>. However, it is important to note that this average masks considerable variability during the baseline period between years. This is highlighted by the fact that although during the 2006-2010 period there has been on average a 3.3% per year reduction in emissions, this declining trend was reversed between 2009 and 2010, largely driven by a slight economic recovery and the cold winters experienced in 2010.

**Figure 5**



<sup>13</sup> Methodological improvements to the GHG inventory that emerge with each year's data are back-cast across the full inventory time series, including the baseline. The impact of this is that the 2006-2010 baseline is not an entirely fixed reference point and may vary slightly with each new release of the inventory.

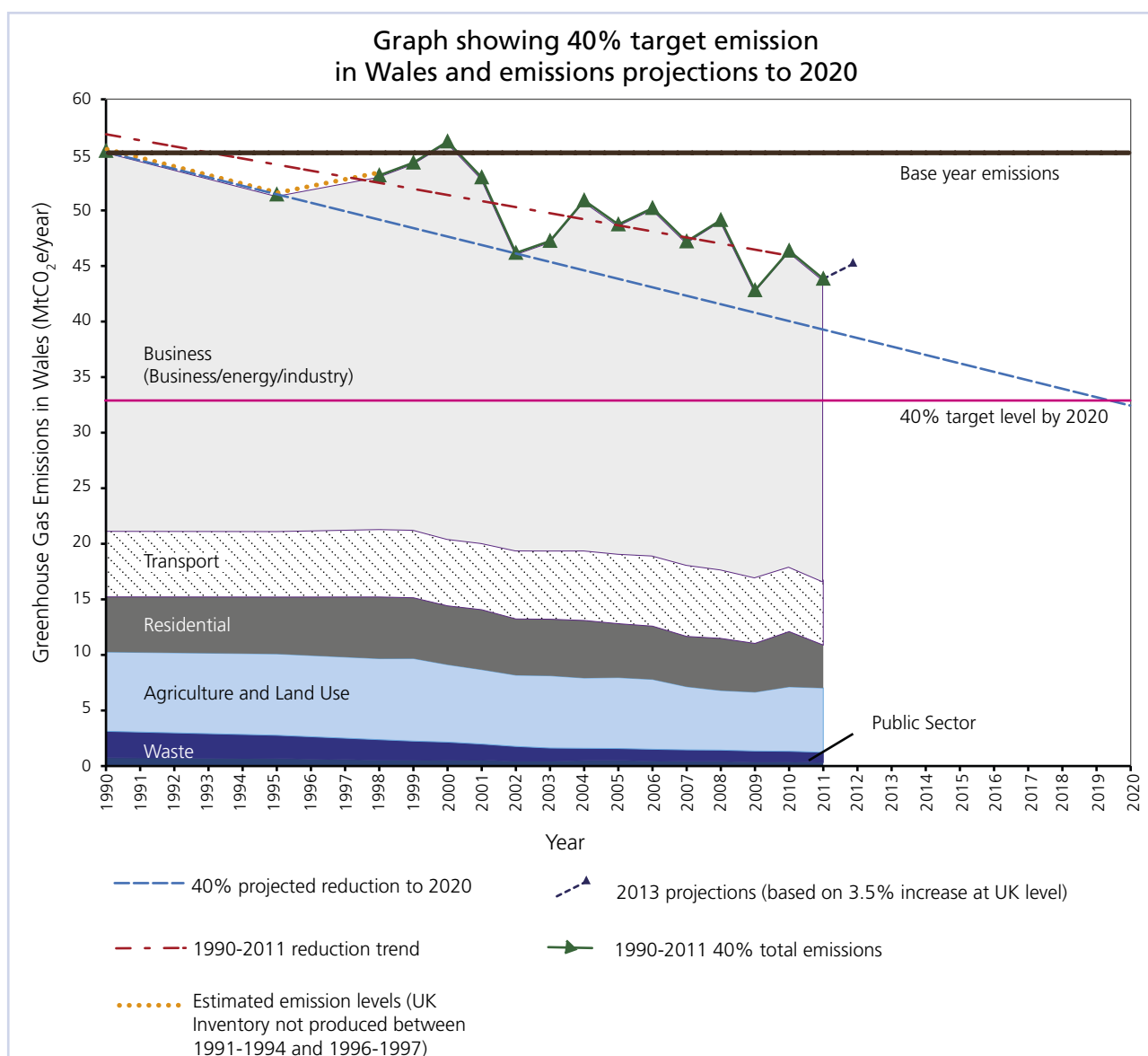
Progress for the target against the baseline is shown in the graph below. It highlights that for in 2011, the emissions were 29.26 MtCO<sub>2</sub>e which equates to a decrease from the baseline of 10.1%. This reduction is therefore in excess of our 3% reduction target for the year. Furthermore, annual emissions in 2011 were lower than in any of the years in the 3% target baseline period.

The graph also includes a provisional emission estimate for 2012, showing that emissions are likely to increase in comparison with those seen in 2011. This highlights that the low emissions figure in 2011 in part reflected a continued low level of economic activity as well as a return to mild winter weather. In addition, emissions for the UK in 2012 indicate an increase due to a shift from gas to coal in for electricity generation and a return to colder winter weather resulting in an increase in residential gas use. There are however large uncertainties in relating this UK estimate to our devolved target, so at this stage it provides a provisional indication only. It would however mean that we would still be on-track to meet our 3% target in 2012, but that 2012 is likely to see an increase on the 2011 figures.

## Progress against our 40% Target

The 40% target relates to our aim of reducing all Welsh greenhouse gas emissions by 40% by 2020. The target is measured from 1990 levels when emissions levels were at 55.25 MtCO<sub>2</sub>e.

**Figure 6**





The graph below shows progress against the target, including the latest figures from 2011. It shows that emissions in Wales have declined from the base year<sup>14</sup> to 43.84 MtCO<sub>2</sub>e in 2011. The annual average decline in emissions is 1.03% per year since 1990 which represents a 20.6% reduction in total emissions.

The graph also shows the relative contribution made by different sectors to the total emissions and highlights that whilst significant progress has been made, the current trend falls short of the projected reduction required to meet the 40% target.

Overall, whilst progress against our targets is encouraging, we recognise that the economic downturn has had an impact and significant further action is required to ensure that our long-term emission reduction commitments are achieved in future years.

## Sector Overview

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Overall, we have met the 3% annual emissions reduction target, with greenhouse gas emissions in Wales reducing by just over 10%. The breakdown in the following section shows that beneath this figure however, there is considerable variation within the sectors. There have been considerable emissions reductions in the majority of sectors in Wales, ranging from 6.8% to 18.7% (Transport and Public sectors, respectively) but for the Agriculture and Land-use sector, emissions have declined on average since 2006 but the 2011 data shows a small increase of just over 1%.

Within the breakdown for each sector a summary of the work has been done to reduce emissions and take action to adapt to climate change is also included.

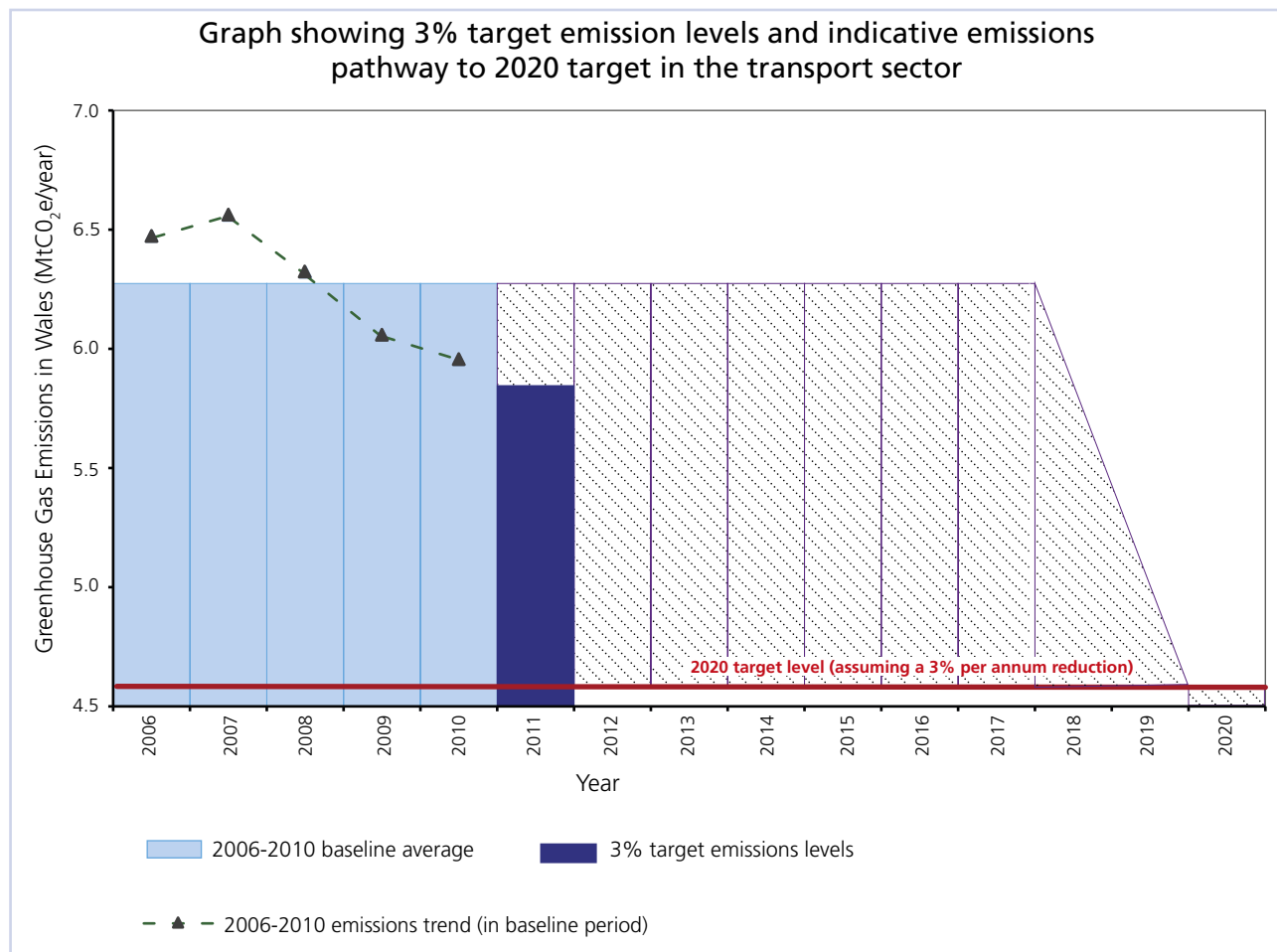
<sup>14</sup> The base year for the 40% target is calculated from the sum of emissions in 1990 for carbon dioxide, methane and nitrous oxide, and in 1995 for the fluorinated gases (HFCs, PFCs & SF<sub>6</sub>).

## Transport Sector

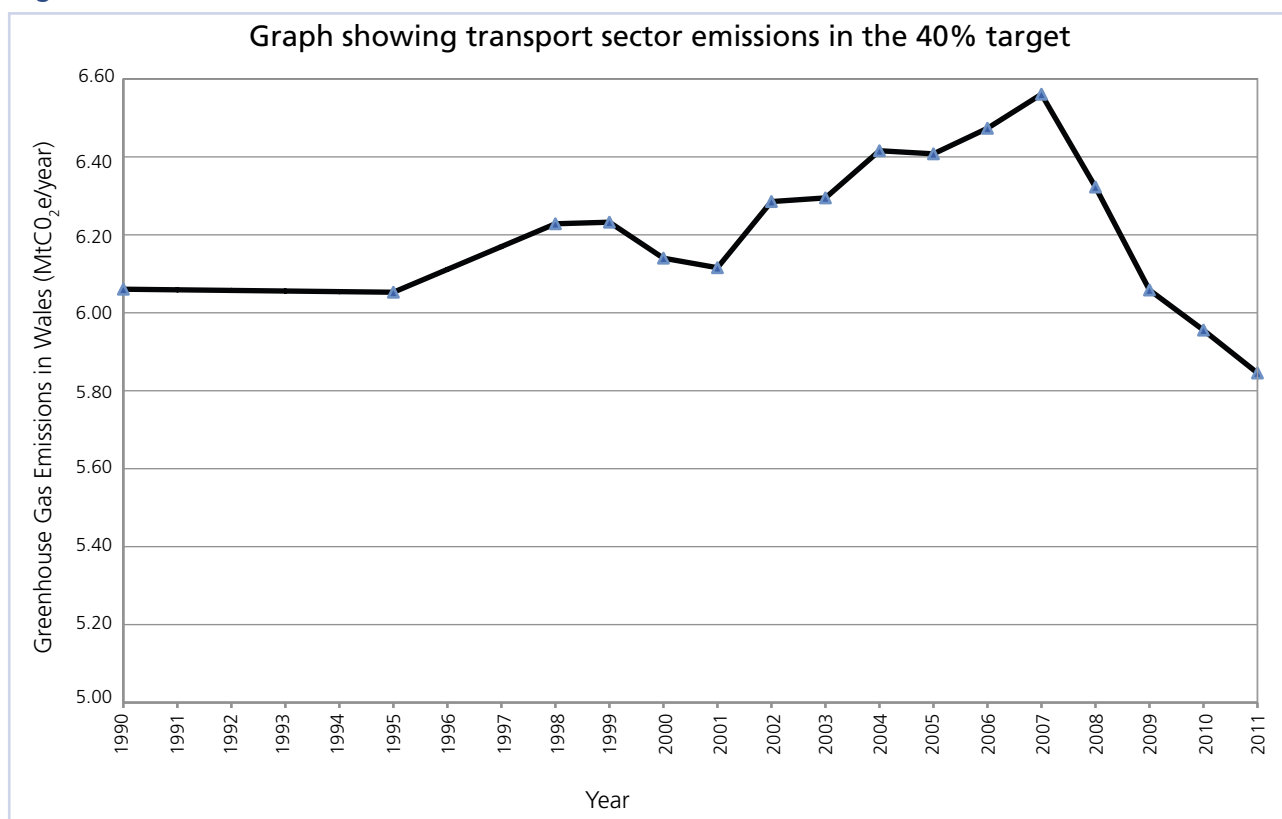
### Progress on emissions

The transport sector is responsible for approximately a fifth (20%) of emissions covered by our 3% reduction target, with the baseline average emission level of 6.27 Mt CO<sub>2</sub>e. As shown by the graph below, the latest data shows that emissions from the transport sector have reduced to 5.85 MtCO<sub>2</sub>e in 2011, which represents a 6.8% reduction compared to the baseline.

**Figure 7**



This reduction in emissions is encouraging, as it suggests that the historical trend between 1990 and 2007 of slowly increasing emissions (driven by an increasing demand for travel) may be reversing. This is illustrated in the following graph.

**Figure 8**

Underlying this trend are a number of factors that have helped to reduce emissions. For example, the fuel efficiency of new cars continues to improve and there has been a slight increase in the proportion of people walking and cycling to work. At the UK level, new car CO<sub>2</sub> emissions have seen a 12% improvement and there has been a 65% increase in ultra-low emissions vehicles. Furthermore, there has been a reduction in road traffic – with an estimated 660 million fewer kilometres travelled on Wales' roads in 2011 reflecting a 2.4% reduction. It must be noted however that road traffic is likely to increase somewhat as the economy recovers.

## Action on Climate Change Mitigation

Our ambition is to put transport onto a carbon reduction pathway, whilst at the same time ensuring that it can continue to support sustainable economic development and social inclusion. The Welsh Government's main levers to influence emissions reduction from transport relate to infrastructure, service provision and action to improve transport planning and to support behaviour change.

Since the last Annual Report, we have taken action in a number of areas to deliver against our commitment. For example, increasing the take up of walking and cycling has been a key priority and support is continuing with a further investment of £5 million to develop safer routes within communities. As a Government, we have brought forward legislation to support progress, with the Active Travel (Wales) Bill being introduced to the National Assembly in February 2013 and enacted in November 2013. The Act will come into force in mid 2014. Over autumn and winter 2013/14 there will be public consultations on the statutory guidance needed to implement the Act, and a Direction on the geographic coverage of the Act. The Act will be supported by the Active Travel Action Plan, and its implementation will be overseen by the Active Travel Board.

We have also continued to promote and invest in the Sustainable Travel Centre and Personalised Travel Planning initiatives through the new Regional Transport Services Grant and the Regional Transport Consortia, and continue to support the use of public transport. Substantial investment has continued to be made in public transport services. For example, a recent review with partners in relation to funding of local bus services has resulted in new Regional Transport Services Grants for passenger services, providing £30 million to help local authorities boost the number and range of subsidised bus and community transport services, including Bwcabus, the rural on-demand bus service.

We have invested in rail safety and accessibility to provide a safe and welcoming environment, on both trains and stations to encourage greater use of rail services.

In addition, we have maintained the Wales Freight Facilities Grant scheme, which supports the transfer of freight from road to rail where this will secure environmental benefits, including reduced greenhouse gas emissions. We also worked to help secure electrification of the Great Western Main Line and the Valley Lines to improve rail services and will be working with the UK Government on a business case for the electrification of the Crewe-Holyhead line.

In parallel, improvements have continued to be made in the management of Wales' road infrastructure. Better traffic management, including the introduction of variable speed limits on the busiest parts of our road network such as the M4, have not only helped to improve traffic flows but also reduce greenhouse emissions.

In the ICT Sector we are making good progress with the £400m Next Generation Broadband project, supported by the European Regional Development Fund. This will play an important role in reducing future emissions from transport, particularly from the Business Sector.

## Action on Climate Change Adaptation

The 2012 UK Climate Change Risk Assessment (CCRA)<sup>15</sup> highlighted that most of the potential risks posed by climate change essentially represent a shift in the duration or frequency of weather conditions that the transport sector already has to deal with (such as heavy rainfall, high temperatures, flooding and high winds, and the associated safety issues, network closures and damage to infrastructure). The CCRA highlights that the flooding of road and rail and the associated disruption is projected to increase. It is estimated that about 22km of motorways, over 2,300km of A-roads and other roads and over 400km of railway lines are at significant likelihood of flooding. It is projected that these figures would gradually rise as flood risk increases, with an overall increase of about 20% by the 2080s.

Our aim is to build resilience to prepare for likely future impacts by reducing the vulnerability of Wales' transport network, especially to flooding. This will help to reduce the risk of economic impacts associated with such events and help to keep people safer.

A key long-term outcome of the Wales Transport Strategy is a transport system that is adapting to the impacts of climate change and work is being done in a number of areas including:

<sup>15</sup> The Welsh report of the UK Climate Change Risk Assessment  
<http://wales.gov.uk/topics/environmentcountryside/climatechange/publications/riskassess>

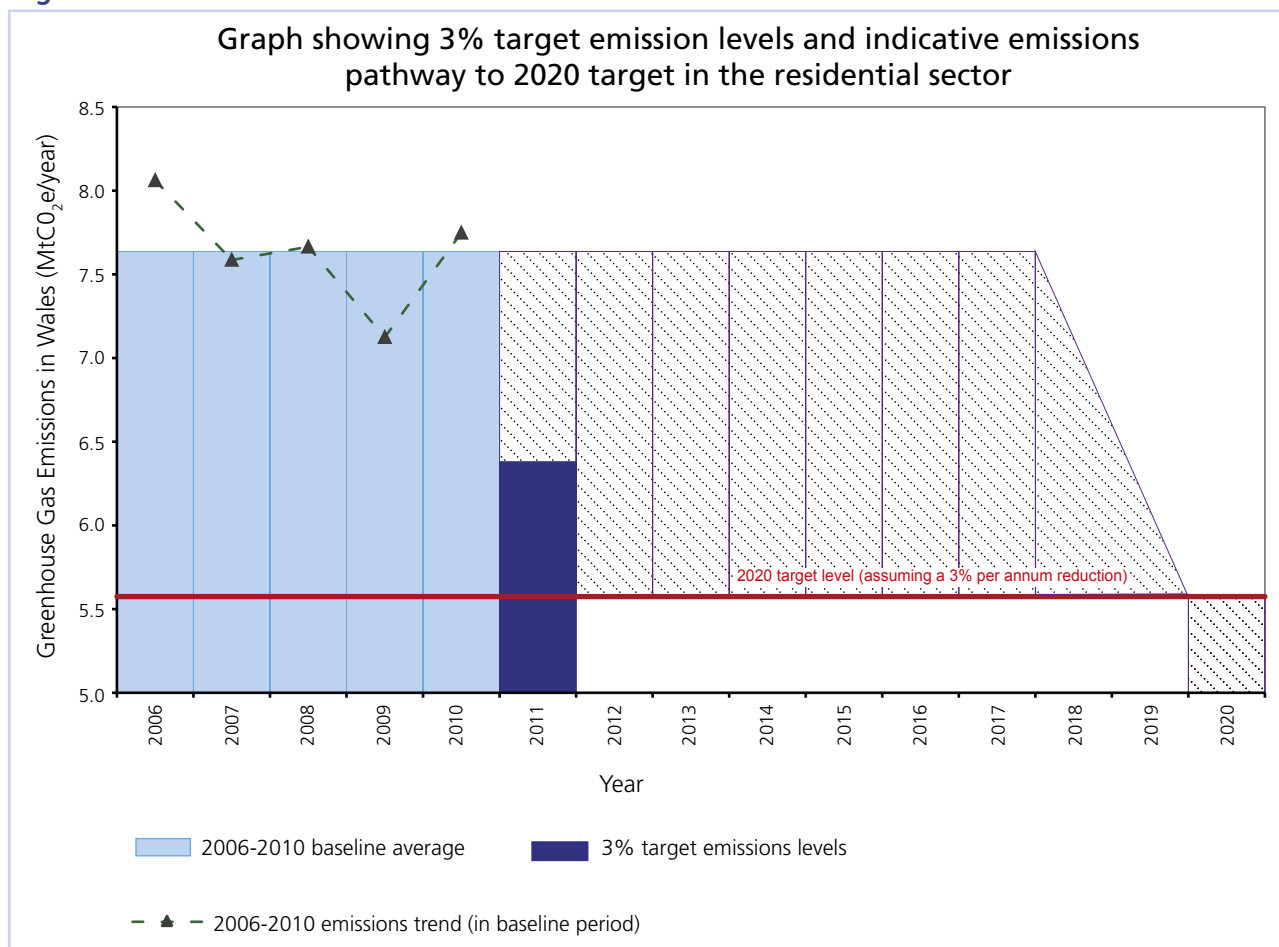
- *Biodiversity*: In 2004, we published a Trunk Road Biodiversity Action Plan with the aim of maximising opportunities for protecting and enhancing our diverse natural environment and supporting its ability to adapt to the likely effects of climate change;
- *Drainage*: We are currently updating our records of drainage assets on the trunk road network and maintaining a list of areas across the network that have experienced flooding or are at a high risk of flooding so that mitigation measures can be implemented in the short to medium term, pending permanent works to the address the problems. New schemes are designed with reference to best practice guidance on sustainable drainage solutions;
- *Water Quality*: We are currently identifying every outfall on the trunk road network, assessing its potential to pollute watercourses and preparing a priority programme of remedial works to achieve the 2015 deadlines for water quality controls set out in the Water Environment (Water Framework Directive) (England and Wales) Regulations 2003; and
- *Design Standards and Written Guidance*: The trunk road network in Wales is operated, maintained and improved in accordance with the Design Manual for Roads and Bridges. These standards are frequently updated to ensure that they reflect best practice with respect to climate change, environmental management and sustainability.

## Residential Sector

### Progress on emissions

The residential sector is responsible for 22% of emissions covered by the 3% target. The baseline average emissions in the sector are 7.64 Mt CO<sub>2</sub>e and the latest data shows emissions of 6.38 MtCO<sub>2</sub>e representing a reduction of 16.5% as highlighted by the graph below.

**Figure 9**



This continues an overall decline in residential sector emissions of 1% per year over the baseline period, driven largely by improvements in residential energy efficiency and reductions in the energy intensity of UK electricity generation. However, residential sector emissions are subject to considerable inter-annual variability relating to the weather and the associated fuel consumption for heating. This is illustrated by the significant increase in residential sector emissions during the cold winter of 2010.

### Action on Climate Change Mitigation

Emissions from the residential sector can be reduced primarily by improving the energy performance of existing and new buildings and also by encouraging behaviour change. Our goal is to increase energy efficiency and reduce the energy demand from the residential sector, whilst at the same time working to tackle fuel poverty, helping all households cut their fuel bills and stimulating opportunities for low carbon growth in the construction sector. The

Welsh Government also aims to increase the level of micro-generation of renewable electricity.

The Welsh Government's Energy Efficiency and Fuel Poverty Programmes have continued to cut greenhouse gas emissions and improve the energy performance of homes in Wales. Our innovative approach has meant that these programmes have not only tackled fuel poverty, but have also stimulated jobs and low carbon growth. Together they have made improvements to over 7300 homes and the second year of the *arbed* ERDF 2 project has seen over 1500 properties across Wales approved for a range of energy efficiency measures.

The improvements undertaken by Nest are estimated to have delivered energy savings averaging over 14,000KWh per annum, with projected total lifetime CO<sub>2</sub> savings of over 250,000 tCO<sub>2</sub>e. In addition to improving the homes of low income, private sector households, Nest also provides an advice service that is open to all households. In 2012-13, Nest gave energy saving advice to over 21,500 households – helping people to reduce their energy use, lower their energy bills, and reduce their carbon emissions.

We have also continued to allocate £108m per year to the Major Repairs Allowance, which helps Local Authorities and Registered Social Landlords to upgrade existing social housing to meet the Welsh Housing Quality Standards. This includes challenging energy efficiency targets for older homes and as at 31st March 2013, a total of 163,917 dwellings (74 per cent of social housing) were fully compliant, achieving an energy performance (EPC) rating of 65 or above<sup>16</sup>.

In July 2013, plans were announced to revise Part L of the Building Regulations. The revisions will mean that new non-domestic buildings must now achieve a 20% reduction in CO<sub>2</sub> emissions in comparison to 2010 standards with an 8% reduction in the CO<sub>2</sub> emissions from new homes. Part L of the Regulations is a further step towards delivering the EU obligations of “nearly zero energy” new buildings by 2021.

In 2012, new rules allowing the installation of renewable micro-generation equipment on buildings without the need to obtain planning permission came into place. As a Government we have also been supporting micro-generation at a community level through the ‘Ynni’r Fro’ community renewables scheme. This five year scheme provides support and preparatory grants to enable communities to get schemes to the construction stage. Loans are also available to support construction and the scheme has worked with nearly 200 community groups. Currently there are more than twenty schemes approaching the construction phase that are receiving support.

There is therefore a clear commitment within Welsh Government to reducing emissions from the built environment and we aim to go further and have recently announced an additional £70m to our energy efficiency programme that will be used to attract investment from the energy company obligation ‘ECO’. This will enable us to significantly scale up support for energy efficiency improvements in domestic property, particularly those living in the most deprived areas of Wales. We will also look to increase our investment through the next round of EU structural fund programmes and the Rural Development Plan and include a greater

<sup>16</sup> excluding acceptable fails.

focus on behaviour change activity alongside capital investment.

## **Action on Climate Change Adaptation**

The UK Climate Change Risk Assessment highlights that 20% of the population in Wales and one in six properties are at risk of coastal, river or some other form of flooding. Given that changes in our climate are predicted to increase the risk of flooding, this highlights the need to increase resilience. Another risk highlighted in the report is the effects of heat in the urban environment which is likely to become increasingly important as temperatures rise, including both the environment within buildings and the wider urban environment. As well as environmental impacts, there are very real social and economic ones as highlighted by the fact that for some properties, flood insurance and mortgages may become increasingly difficult to obtain.

Our aim is to reduce the consequences of climate change and extreme weather events on people and the communities that they live in. This can be done by reducing people's existing vulnerability in terms of their homes and their own personal response to these events. This will help to keep people safe and healthy and reduce the risks of economic costs.

In taking action to adapt to climate change in the residential sector, we have developed flood plans that reduce the flood risk for over 40,000 people. Furthermore, in 2012/13 the Welsh Government invested over £54 million on flood and coastal risk management, including more than £25 million in schemes that improve protection to 1,500 properties. All improvement schemes are future proofed and include adaptability to take account of forecast increases in rainfall and sea level rise due to climate change. In March 2013 we also updated the Welsh Government's Development Advice Maps, which identify areas of flood risk where new development should be avoided.

Our Flood Awareness Wales project, which encourages households to take practical steps to make themselves more resilient to the impacts of flooding, has also continued meaning that since 2010, 64,000 households have been contacted and work with over 200 communities carried out across Wales. Developed flood plans which protect over 40,664 people also reduce the economic and social impact of flooding as these cover schools businesses and caravan parks.

In addition, we are working with other Governments in the UK to improve the availability and affordability of home insurance in flood risk areas, with the intention that a solution is delivered through the UK Water Bill.

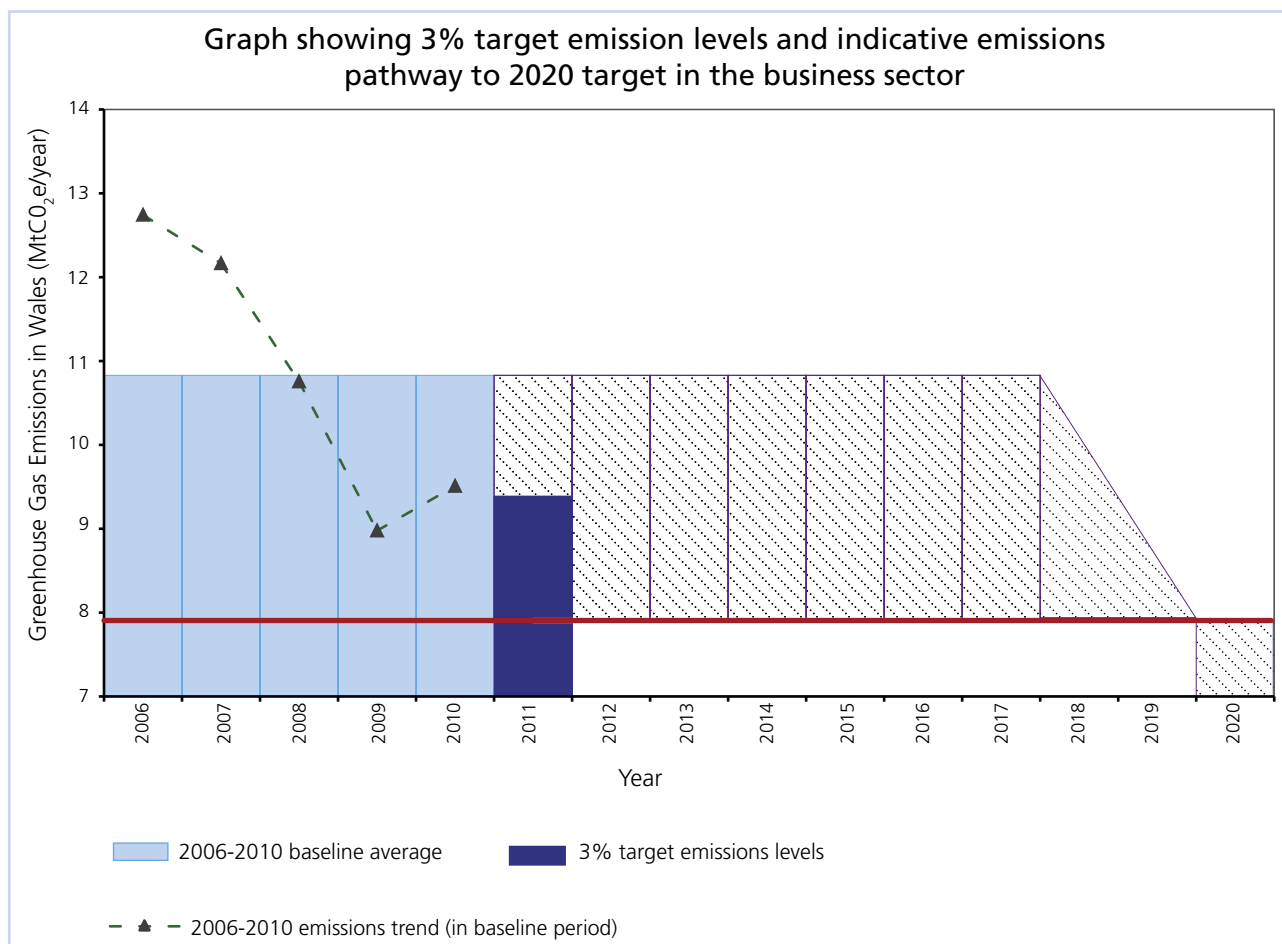


## Business Sector

### Progress on emissions

The business sector accounts for 32% of emissions covered by the 3% emissions reduction target<sup>17</sup> and has a baseline emission level of 10.83 MtCO<sub>2</sub>e. The graph below shows the latest emissions data at 9.39 MtCO<sub>2</sub>e which corresponds to a reduction in emissions within the sector by 13.3%.

**Figure 10**



A considerable portion of this reduction is undoubtedly due to the economic downturn in the UK during this period, with a dramatic reduction in emissions beginning in 2007. There is therefore a high potential for a rebound in business sector emissions in future years, depending on the rate and type of economic growth in Wales going forward. End-use electricity consumption accounts for 52% of sector emissions within the 3% target and is primarily for heating, lighting and operating equipment in the sector. As such, temperature

<sup>17</sup> This excludes direct emissions from heavy industry and energy generation.

has a considerable influence on the sector emissions with increases in emissions during colder years associated with increased heating demands. The cold winter in 2010 is partly responsible for the increase in business sector emissions in 2010 as shown in the above graph.

## Action on Climate Change Mitigation

The Programme for Government sets out our ambition in creating a sustainable, low carbon economy in Wales. In order to do this, we are helping businesses to increase their energy and resource efficiency and decrease their carbon intensity. We are also working to further grow the green economy in Wales, which already accounts for £5.5 billion within the environment, carbon and renewables sector and 41,000 jobs. This is highlighted by the success of our arbed and Nest energy efficiency schemes which are helping to create or sustain around 300 jobs as well as developing new skills.

In the Energy sector, *'Energy Wales: A Low Carbon Transition'* sets out our aim to drive the change to a sustainable, low carbon economy for Wales. Between January 2010 and April 2013 there has been £1.4 billion investment in the renewable energy market in Wales, with the potential to support nearly 2,000 jobs. We are working to attract further inward investment, focusing on removing barriers to investment and maximising the long term benefits to Wales. In doing so, we are working to plan and manage the relationship between energy developments and our natural environment and ensure our communities benefit from both energy and transmission infrastructure. This includes work with the onshore wind industry, which has led to a better understanding of supply chain opportunities for Welsh companies and how communities adjacent to wind farms can derive long-lasting benefit from the investment.

In Anglesey, we are working to maximise the upcoming private sector investment in 'Anglesey Energy Island', estimated to be around £25 billion. We also continue to support Vattenfall in their Pen y Cymoedd wind development on NRW managed land, where Vattenfall have recently announced £100m of Welsh contracts and committed to paying approximately £1.8m annually into a community benefit fund for over 20 years whilst also delivering a new £350,000 mountain bike trail. In parallel, we are also supporting the development of key skills with the launch of the new wind turbine apprenticeship programme at Grwp Llandrillo Menai by the First Minister in December 2012.

Work is also taking place to ensure Wales can benefit from further developments in renewable technologies, in particular in marine energy. The Marine Current Turbines' tidal stream project in the Skerries has benefitted from Welsh Government support since its earliest days and February 2013 saw the consent to the marine licence for a 10MW tidal array. Tidal Energy Limited's Deltastream tidal demonstrator also continues to be developed through Welsh Government supported European funding.

## Action on Climate Change Adaptation

A changing climate will have both negative impacts and positive opportunities for businesses in Wales. The 2012 UK Climate Change Risk Assessment estimates that the number of non-residential properties at significant likelihood of river or tidal flooding will increase from 24,000 today, to between 30,000 and 65,000 by the 2050s. Extreme weather also causes disruption to transport routes, supply chains and can cause global resource shortages.

In working to increase resilience in the business sector, our aim is to reduce risk and for businesses to become more climate resilient, thereby decreasing negative economic impacts. We also want to support businesses to make the most of opportunities that climate change brings as new market opportunities continue to emerge in areas such as energy, sustainable construction and payments for ecosystem services.

We are supporting increased resource efficiency and adaptation to climate change within businesses through our Business Wales support service, which aims to improve the efficiency of business process. In September 2012, we published the Corporate Social Responsibility Framework and have run a series of events hosted by BT, Airbus, British Gas, Sony UK and General Dynamics to promote responsible business best practice and encouraging individual companies to:

- build healthy, safe and fair workplaces;
- have good community relationships;
- operate in a low-carbon, resource-efficient and sustainable way; and,
- act fairly in the marketplace.

The Welsh Government continues to support SME's through a number of services including The Carbon Trust who offer face to face support, on-site energy audits, hold stakeholder events and workshops and interest free loans (managed by Salix Finance Ltd). Energy Saving Trust also delivers an enhanced energy advice service within Wales and provides support to SMEs to gain accreditation to the Micro-generation Certification Scheme.

We have also reviewed the range of energy advice services that are offered and recognise that a more simplified delivery service model is needed. We are working to move to this new model from April 2015. The revised service will provide resource efficiency and micro-generation support to a range of audiences – through existing advice services such as Business Wales and Farming Connect and through a single contact number for the remaining domestic, community and public sector audiences.

In the Tourism sector, we have established and managed a Sustainable Tourism Framework and Forum, which is developing a suite of information and guidance tools to help tourism businesses improve their resource efficiency, encourage visitors to use public transport and future-proof their business against climate change impacts.

In 2013, the Welsh Government published its guide to 'future proofing your business: A practical guide to weathering climate change for the Welsh tourism industry'. This was in response to the challenge of climate change and to the vulnerability of the industry to its effects. It contains management steps and practical actions and includes other sources of guidance for businesses to mitigate and adapt to climate change. There is advice that all tourism businesses should consider, but particularly those businesses vulnerable to flooding and climate change through rising temperatures, drier weather, droughts, heat waves and warmer seas. Advice for new projects and different types of business such as accommodation providers, catering and events, visitor attractions, gardens, zoos and golf courses, and businesses located on the coast, can also be found.

Work has taken place on embedding sustainable development principles into our procurement, which encourages businesses to look for ways in which to make their goods and services more energy and resource efficient. We use a Sustainable Risk Assessment tool for all contracts over £25k and use a Sustainable Procurement Assessment Framework (SPAF) tool to measure and monitor performance and drive on-going improvement in delivering contracts..

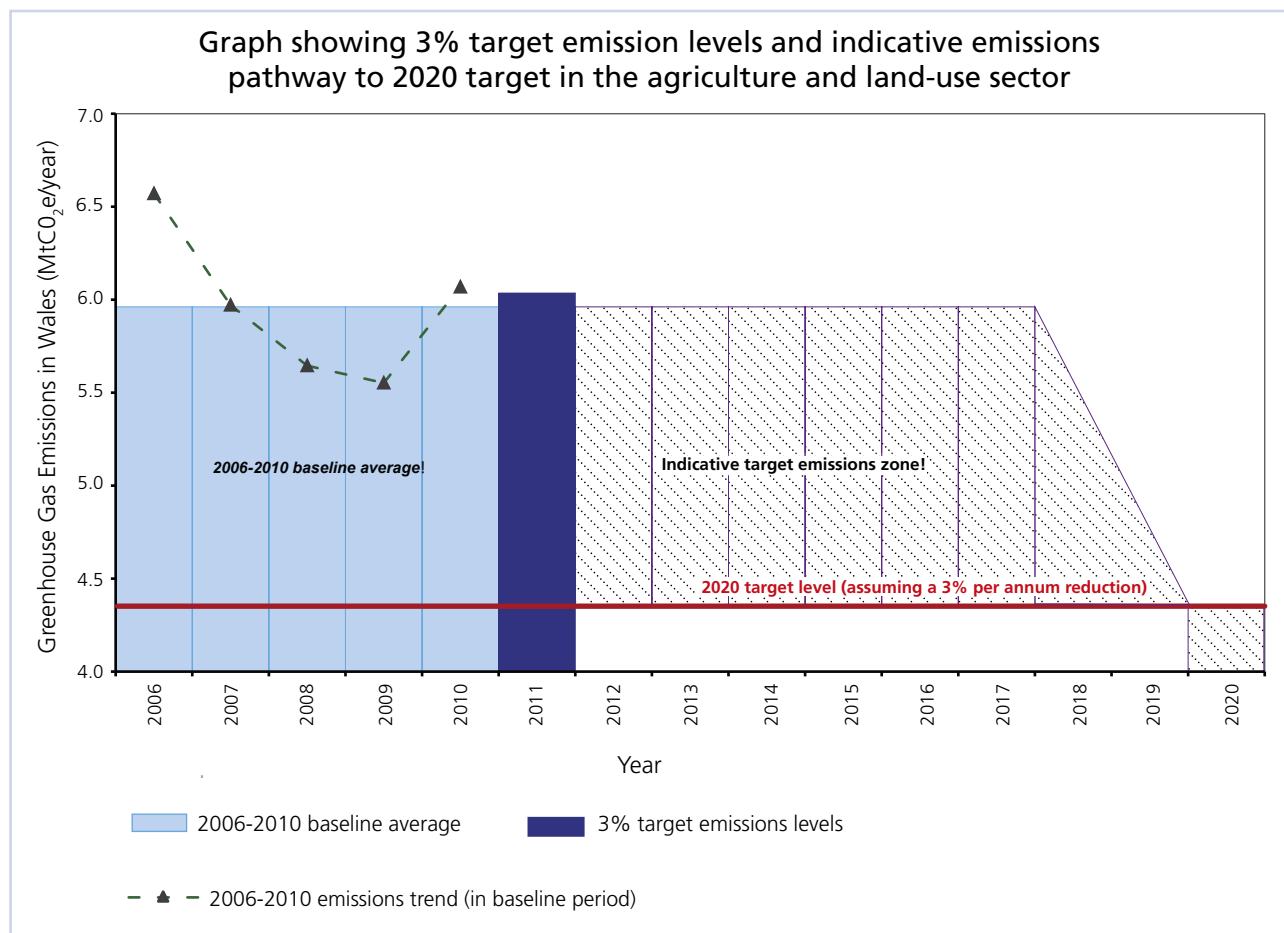
We also recognise that it is essential that we work with businesses to reduce flood risk and flood plans have therefore been developed to reduce the risks faced by over 40,000 people as well as businesses. In 2012/13 the Welsh Government invested over £54 million on flood and coastal risk management including more than £25 million in schemes that improve protection to 1,500 properties. In March 2013 we updated the Welsh Government's Development Advice Maps, which identify areas of flood risk where new development should be avoided. We are also investing over £150 million in flood and coastal erosion over the life of this Government. Benefits of our investment include supporting or creating 930 jobs, 6,000 job losses avoided, and 7,000 homes and businesses that will benefit from reduced flood risk.

## Agriculture and Land-Use Sector

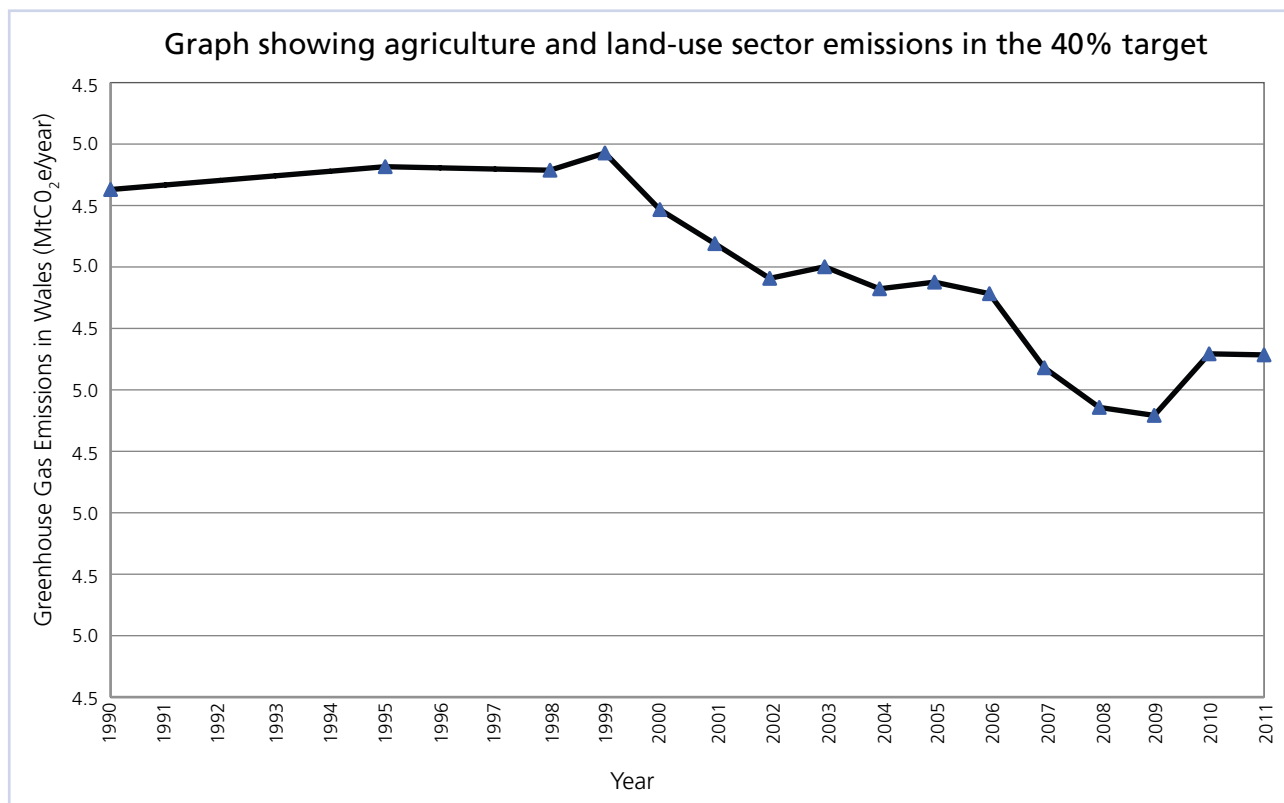
### Progress on Emissions

The Agriculture and Land Use sector accounts for 21% of emissions covered by the 3% target and has a baseline emission level of 5.96 Mt CO<sub>2</sub>e. The graph below shows the latest emissions data at 6.04 Mt CO<sub>2</sub>e which corresponds to an increase in emissions from this sector by 1.2% above the baseline.

**Figure 11**



End-use electricity consumption accounts for less than 5% of total emissions in the sector and the vast majority of emissions are direct (by-source) emissions. These direct emissions are dominated by methane produced by enteric fermentation in ruminant livestock and nitrous oxide from livestock manure deposition and fertiliser applications. The historical trend in direct sector emissions shows a picture of declining emissions since 1999, mainly due to reduced livestock numbers and reductions in fertiliser use.

**Figure 12**

Nevertheless, agriculture and land-use emissions have risen since 2009, largely due to<sup>18</sup> a historical legacy of aging forestry in Wales and an associated sharp decrease in the modelled forest sink in Wales inventory. This increase in overall sector emissions reflects the maturation of forestry crops which were largely planted in the 1950s-1970's, however the sharpness of the impact between 2009 and 2010 is considered to have been overestimated by the model.

Given the slight increase, we are commissioning a review of Land Use Climate Change, which will consider the refinement of both mitigation and adaptation policy in this area as part of our next steps. The Review will use the recommendations in the Land Use Climate Change Group report of March 2010<sup>19</sup> as a starting point. It is important to note however that there is great uncertainty associated with the carbon footprint of agriculture and land use and an important aim of the Review is to provide a more robust evidence base to support decision makers in the sector and the wider food chain to deliver emission reductions and improved climate change resilience.

## Action on Climate Change Mitigation

Our ambition is to reduce GHG emissions from agriculture and to protect and increase the carbon stocks in soils and biomass, whilst also supporting the sustainable growth of agriculture and farming businesses. This ambition is reflected in our various key policies and strategies including the Glastir sustainable land management scheme, Woodlands for Wales, Dairy and Red Meat environmental road maps and our forthcoming Action Plan for the Food and Drinks Sector.

<sup>18</sup> Forest land in Wales removes carbon dioxide from the atmosphere creating a sink, but as forests age they become less active at drawing down and storing carbon dioxide from the atmosphere. The greenhouse gas inventory uses a model to estimate the impact of these changes on emissions in Wales.

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GHG emissions from agriculture and land use can be reduced in a number of ways: more efficient use of fertiliser and manure, best practice soil and livestock management, increasing carbon sinks (e.g. through tree planting), and increasing energy efficiency on farms and renewable energy generation in rural areas. It is also important to maintain existing carbon stocks, especially in upland peatlands.

One of the Welsh Government's main levers to influence climate change action in the Agriculture and Land Use sector is the implementation of the Wales Rural Development Plan. Under the current 2007-13 plan the primary mechanisms have been knowledge transfer services supported under Axis 1 of the Rural Development Plan (RDP) – Farming Connect and the Farm Advisory Service – and agri-environment and forestry schemes supported under Axis 2. These measures are underpinned by statutory environmental management requirements, planning regulations and, for farmed land that attracts single farm payment, the Good Agricultural and Environmental Condition requirements of cross compliance. Additional activity is funded through core funding of Natural Resources Wales and their management of the Welsh Government Woodland Estate.

The Welsh Government's Farming Connect Knowledge Transfer Programme has included climate change at 432 events with the red meat sector and highlights that many of the actions needed to reduce emissions also increase the efficiency and profitability of red meat production – a win-win situation. Topics discussed have included best practice for soil carbon management, the benefits of grassland based farming and how to achieve production efficiencies. Farming Connect has also played an important role in encouraging farmer engagement with agri-environment schemes and efficiency grants through business advice. Seven projects focusing on development and innovation were also supported by the livestock levy board Hybu Cig Cymru, to disseminate information to the agriculture industry, which included material on climate change.

Farming Connect also runs Agrisgôp, a fully funded management development programme. This is currently running several local action-based learning groups around wind energy and anaerobic digestion. There have also been numerous Farming Connect clinics, discussion groups, seminars, on-farm events, podcasts, factsheets and Gwlad articles on climate change related issues, and there is a network of demonstration farms showing how solutions can be put into practice.

The Glastir scheme, introduced in 2009, has also gathered pace. Agri-environmental land management is delivered through the Glastir Entry, Commons and Advanced Schemes, which now cover 207,000 hectares (13%) of agricultural land in Wales, including 83,500 hectares (48%) of common land. These schemes combine incentives for sustainable grazing levels with investments such as hedge creation and streamside corridors. These measures work for both emission reduction and climate change adaptation. Considerable focus has been placed on getting sign up from the dairy sector – this has led to the introduction of novel options such as payments for slurry injection which reduces emissions and the risk of slurry run-off into water courses during high rainfall. The Glastir Advanced Scheme (covering 23,500 hectares to date) adopts a highly targeted approach to environmental interventions using a GIS decision support system where carbon management has been one of the highest priorities for farm selection.



Glastir Woodland Creation (GWC) works towards the Land Use Climate Change Group's suggested target of creating 100,000 hectares of new woodland over a twenty year period to offset emissions. Tree planting is only available on organo-mineral soils to ensure a net increase in carbon sequestration, whilst contributing water quality and quantity benefits and improved soil stability. Recently there has been an encouraging increase in annual planting rate, with 800 hectares planted in 2012/13. The Glastir Woodland Management (GWM) scheme was introduced in 2012 to encourage sustainable woodland management, which can increase carbon sequestration rates whilst also increasing resilience to climate change.

The Glastir Efficiency Grant (formerly known as the Agricultural Carbon Reduction and Efficiency scheme) is a capital grant scheme for infrastructure delivering improved resource efficiency on farm, such as more energy efficient dairy equipment. To date, £1.5 million has been approved under the grant with mainly slurry and manure management investments being supported.

In March 2012 we published a report<sup>20</sup> on the carbon footprint impact of agri-environment schemes. Entry into the Tir Cynnal scheme resulted in an average 3% reduction in calculated emissions. Greater reductions in emissions occurred on entry to the Tir Gofal scheme (11%) and Organic Farming Scheme (18%) in association with reduced animal numbers. Carbon sequestration increased the most on entry to the Tir Cynnal scheme (27%) in comparison to the Tir Gofal (23%) and the Organic Farming Scheme (10%) and was largely due to increased areas of woodland and hedgerows. We continue to fund the Organic Scheme in Wales, which currently includes 8% of the agricultural land.

The Welsh Government is currently developing its next Rural Development Plan (2014-20) under the EU Common Agricultural Policy. Climate change will be a key cross-cutting theme throughout all parts of the Plan with both reducing emissions and building resilience to a changing climate being embedded into policy measures.

## Action on Climate Change Adaptation

Agriculture and forestry are extremely sensitive to the climate. The Climate Change Risk Assessment highlighted that warmer temperatures may improve grass, crop and timber yields in Wales and allow the introduction of new crops. The yields of some timber crops may however decline and serious threats may arise from an increase in flood risk and coastal erosion and reductions in the availability of water in summer for livestock and crop irrigation. Drought, fire, storm damage, pests and diseases may also pose an increasing threat.

Our aim is to build resilience in the agricultural and land use sector to our changing climate by harnessing the opportunities from a warmer and longer growing season and ensuring that ecosystem services are maintained – all of which will help to strengthen the rural economy and communities that live there.

A key component of the Land Use Climate Change Review will be to consider the actions needed to make the agriculture, land use sectors and wider food chain more resilient to a changing climate by developing a climate change risk assessment. This information will help to inform future decision making in the sector.

<sup>20</sup> <http://wales.gov.uk/topics/environmentcountryside/farmingandcountryside/farming/schemes/glastir/tircynnal-tirgofal-monitoring-evaluation/?lang=en>



Responding to climate change is one of the key themes in our forestry strategy, Woodlands for Wales. A key objective is increasing the diversity (species, structure and genetics) of woodlands in Wales to make them more resilient to pests, diseases and drought stress. Trees and the products they produce can be a way of reducing the effects of, and risks resulting from, climate change.

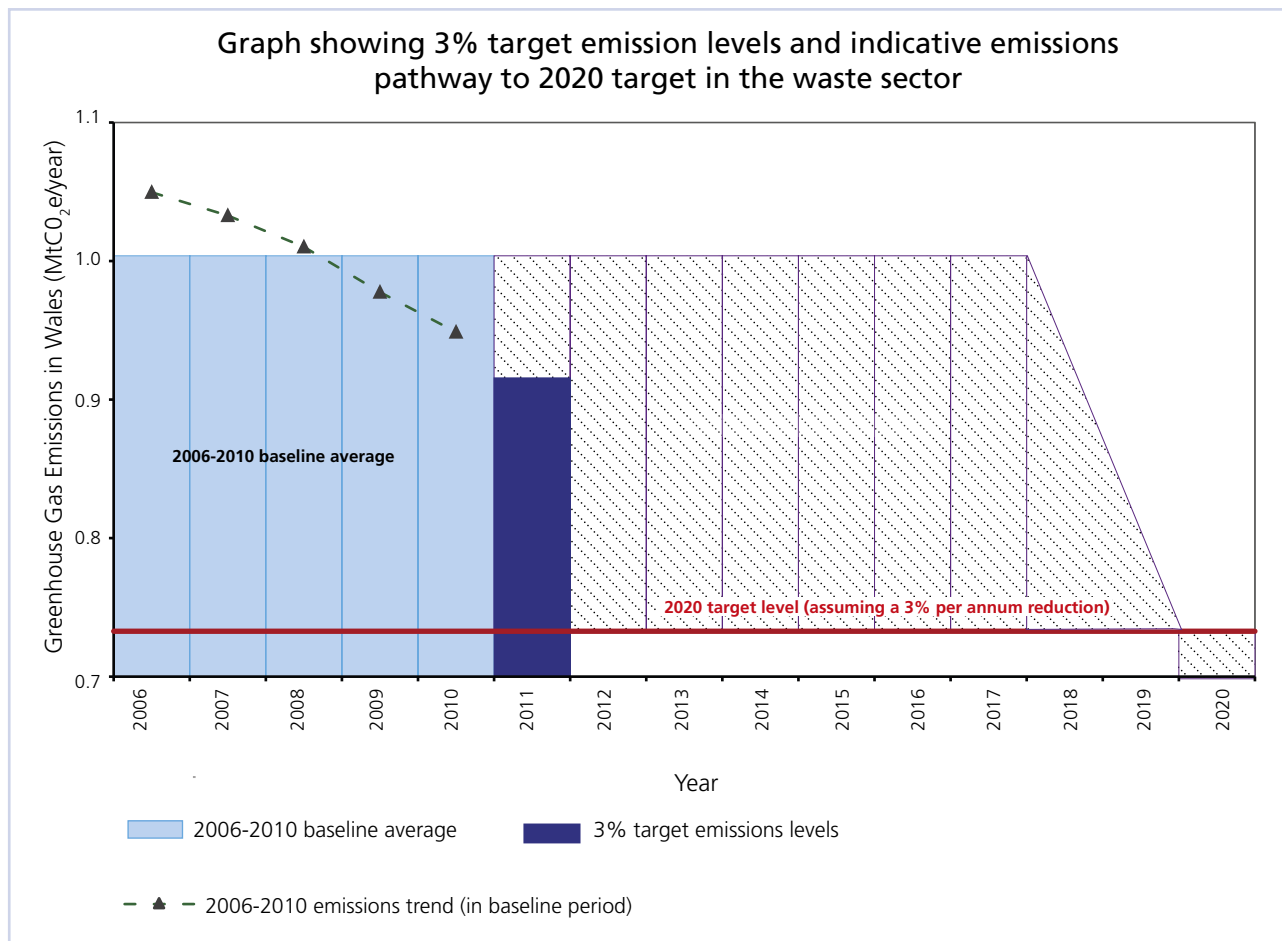
The establishment of Natural Resources Wales in April 2013 is a key first step towards delivering on our commitment to integrated natural resource management and our proposals for an Environment Bill set out in our White Paper builds on this work in proposing the establishment of a new statutory framework for natural resource planning and management. This is key for tackling climate change as it will allow proactive and innovative responses to challenges and opportunities that exist at the national and local level. The Environment Bill White Paper is currently out for consultation, closing in January 2014.

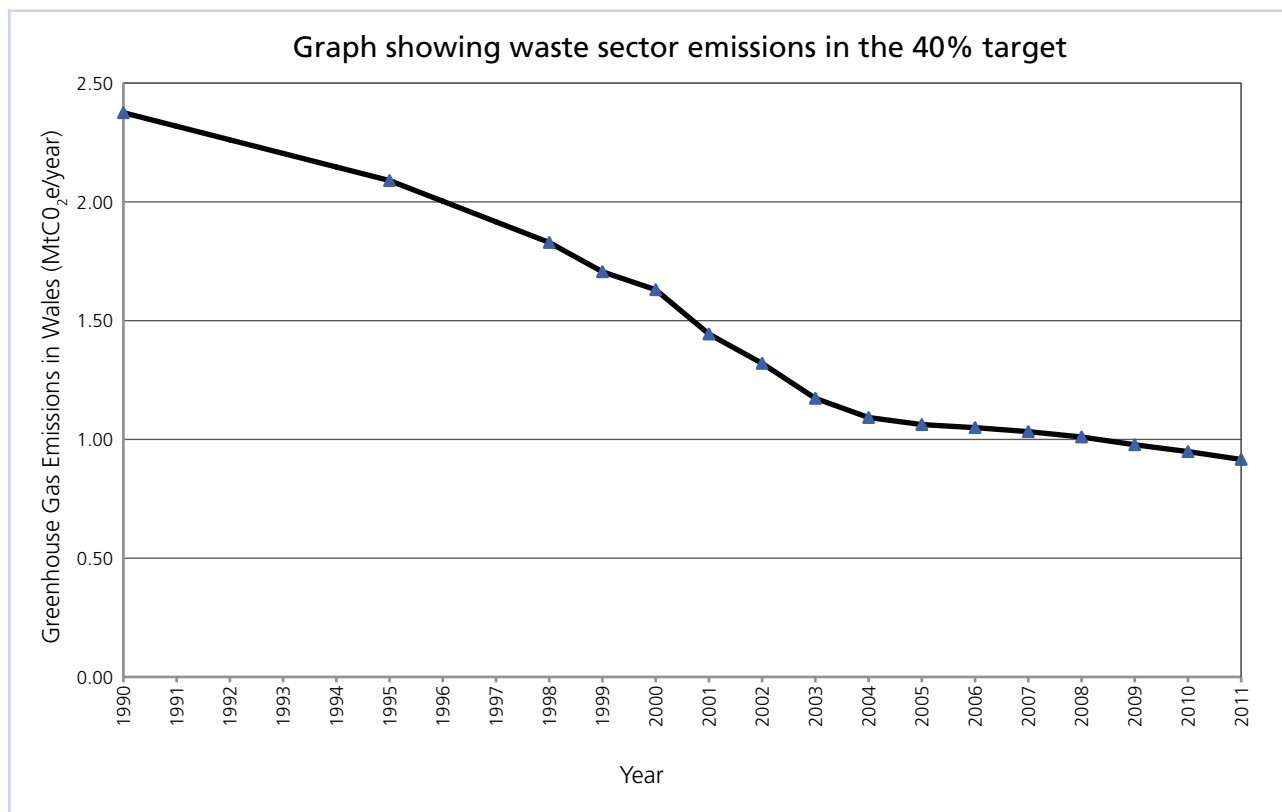
## Resource Efficiency and Waste Sector

### Progress on Emissions

The resource efficiency and waste sector emissions account for 3.1% of the total 3% target emissions and baseline emissions for the sector are 1.00 MtCO<sub>2</sub>e. The graph below shows that resource efficiency and waste sector emissions have reduced by 8.8% from the 2006-2010 baseline to 0.92 MtCO<sub>2</sub>e.

**Figure 13**



**Figure 14**

The waste sector is dominated by methane emissions (93%) with minor emissions of nitrous oxide (7%) and carbon dioxide (<1%). Methane emissions from landfill accounts for the vast majority (84%) of the total sector emissions.

As shown in the graph above, waste sector emissions declined steeply between 1990 and 2004 by approximately 3.9% per year. This trend has continued, with emissions reducing year-on-year; however the average rate of emission reduction has fallen to approximately 2.4% per year for the baseline period. The decrease in emissions has mainly been due to the progressive introduction of methane capture and oxidation systems in the management of landfill sites. Furthermore, the total mass of waste being disposed to landfill in Wales decreased by 45% between 2006 and 2011 and the diversion of local authority collected biodegradable municipal waste from landfill has increased (the amount going to landfill having halved over the baseline period).

As the profile of the waste sector lends itself much more to mitigation action than adaptation, for this sector the action reported is on mitigation only.

### Action on Climate Change Mitigation

The Welsh Government's main levers to reduce emissions from the resource efficiency and waste sector relate to the provision of support to Local Authorities to capture and treat biodegradable waste; wider action on waste prevention work; and regulatory instruments relating to the landfilling of waste, operations at landfill sites and waste water treatment plants.

Through all Wales procurement, the Welsh Government is supporting over £500m of private sector investment in new waste treatment facilities. This is the largest co-operative

procurement across Welsh Government and Local Government and the largest private finance programme in Welsh Government. The Waste Infrastructure Procurement Programme (WIPP) provides advice and funding to Local Authorities to help them secure new waste treatment contracts, with a focus on treatment facilities for recycling food waste and for the recovery of residual waste ('black bag' waste left after all the materials that can be recycled and composted have been removed).

Food waste can be recycled effectively using anaerobic digestion facilities and 19 local authorities are part of the Welsh Government's programme to procure treatment contracts using anaerobic digestion. The first facility to be completed under the WIPP was in Gwynedd, in October 2013.

Residual waste can be treated effectively in Energy from Waste (combined heat and power) plants and 10 local authorities have formed two procurement groups – Prosiect Gwyrdd and the North Wales Residual Waste Treatment Project – to procure new residual waste treatment facilities.

In addition, the Collaborative Change Programme supports local authorities to evaluate their waste management performance and produce robust business cases, with a view to ensuring that all local authorities optimise their potential to operate sustainable waste management services. The latest recycling statistics for Wales show the highest quarterly recycling figures ever recorded in Wales or any UK nation, with combined reuse/recycling/composting rate of local authority municipal waste at 52 per cent for the 12 months to the end of March 2013, compared to 50 per cent for the 12 months to the end of March 2012.

In relation to land fill operations, Natural Resources Wales have assumed responsibility for conducting technical reviews of landfills and working with operators to maximise the capture of methane gas (work previously carried out by Environment Agency Wales). Methane emissions from landfill are also dropping due to a reduction in biodegradable inputs. In addition, we are currently consulting within the Environment Bill White Paper on legislative proposals to further support a step change in the management of waste in Wales.

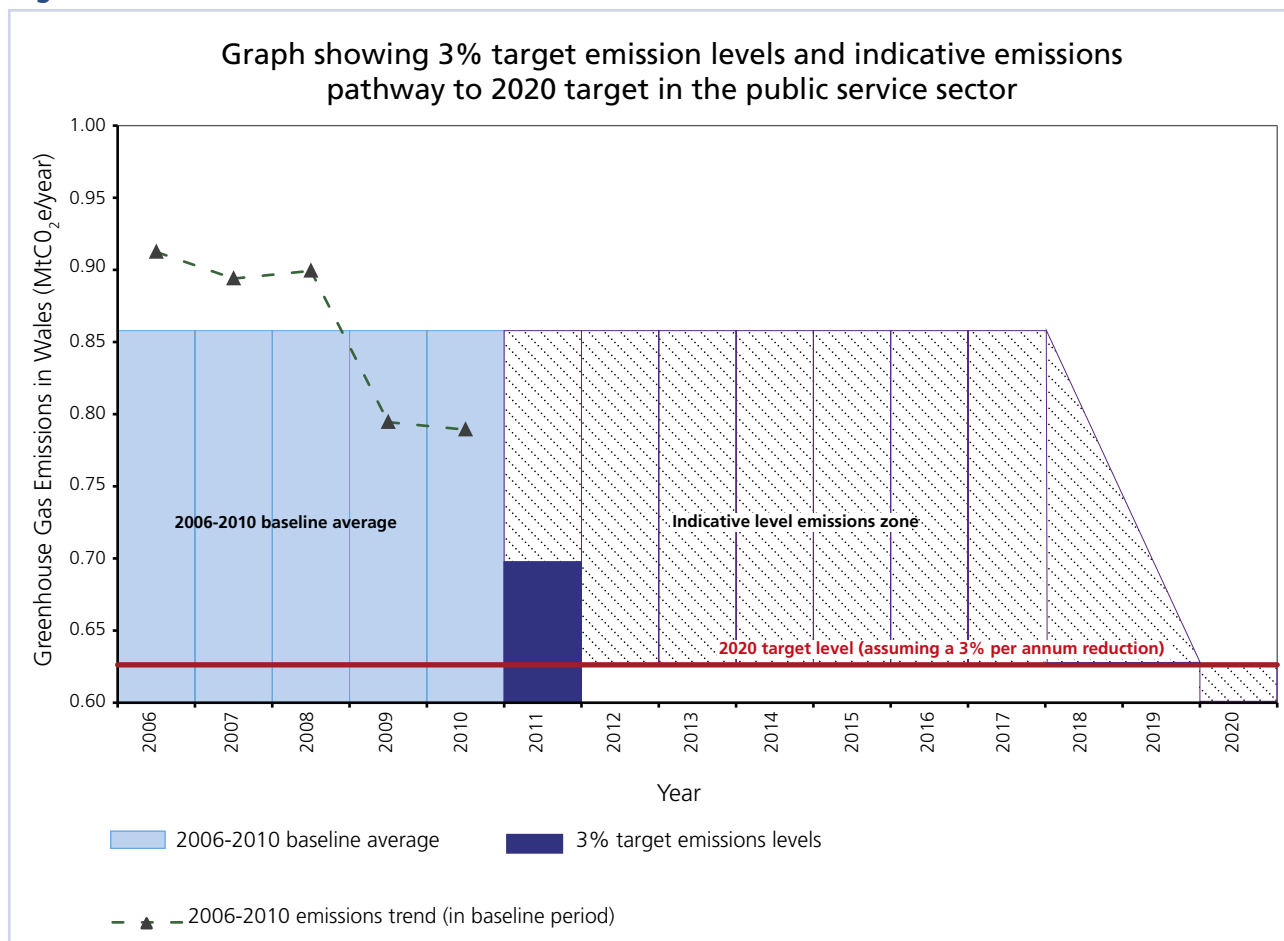
The most effective way of reducing the impact of waste management on the environment is to generate smaller quantities of waste. The Welsh Government supports a range of activities resulting in waste prevention, including the Love Food Hate Waste campaign, support to business clusters (e.g. Hospitality and Food Services Agreement), and the Courtauld Commitment 3 (2013-2015). The Courtauld Commitment is a voluntary agreement, funded by UK, Scottish, Welsh and Northern Ireland governments and delivered by WRAP. The total UK impact of the Courtauld Commitment 3 is predicted to be a reduction of 1.1 millions tonnes of waste (including a 20% reduction in food waste), a reduction of 2.9 million tonnes CO<sub>2</sub>e and a cost benefit of £1.6 billion to consumers, the food and drink sector, and local authorities. All of our activities in relation to waste prevention have been evaluated and, along with new initiatives, are included in the Waste Prevention Programme for Wales.

## Public Sector

### Progress on Emissions

The public service sector accounts for 2.4% of the total 3% target emissions in 2011 and has a baseline of 0.86 Mt CO<sub>2</sub>e. The public sector has achieved the greatest reduction of all sectors in 2011, an 18.7% reduction to 0.70 MtCO<sub>2</sub>e.

**Figure 15**



Public service sector emissions are dominated by CO<sub>2</sub>, accounting for 99.8% of total sector emissions in 2011. These emissions are primarily associated with the combustion of natural gas to heat buildings and end-use electricity consumption which accounts for 57% of public service sector emissions.

Public service sector emissions have declined by 3.4% per year on average over the baseline period, with a switch to more efficient gas powered heating across many public service sector buildings and increased efficiency of fuel use in general having a considerable impact.

### Action on Climate Change Mitigation

The Welsh Government has been actively managing its own buildings and property portfolio in order to reduce emissions from heating and electricity consumption. Other main levers to reduce emissions in the public sector include the Welsh Government's Outcome Agreements with Local Authorities along with other delivery agreements with public bodies.

Emissions from the Welsh Government's Administrative Estate have fallen by over 23% since 2006/7 and by 17% since 2010/11, due to a rationalisation of the estate (down from 76 sites

in 2008 to 35 in 2013), and on-going efforts to improve the energy performance of buildings. Simultaneously there have been reductions in waste creation, the proportion of waste sent to landfill and water consumption. More information is provided in the annex on 'Examples of Action in Wales' section of this report.

Public sector bodies more widely are also working to reduce emissions, as well as improving their environmental performance regarding waste and water. For example, Cadw is working on integrating modern technologies within buildings in historically and archaeologically sensitive settings (see case study) and low energy solutions are being built in to all visitor centre refurbishments. Combined heat and power (CHP) has been installed at the National Museum, Cardiff, as well as renewable energy generation, low carbon heating and improved thermal performance at other National Museum Buildings, plus a relaxation of environmental conditions for display of collections to reduce requirements for air conditioned galleries. Several bodies are simultaneously working to encourage staff and visitors to use sustainable transport.

The NHS Wales, Local Health Boards and Trusts submit their carbon diagnostic tool (CarDio) returns each year, allowing them to track their progress and benchmark against each other. Each NHS organisation has recently developed an Emissions Reduction Action Plan containing a 5 year programme of projects to reduce emissions, identifying the capital costs and future revenue savings. The plans are currently being assessed by the Welsh Government and the NHS Wales Shared Services Partnership. Local Health Boards are also currently registering for Phase 2 of the Carbon Reduction Commitment Energy Efficiency Scheme.

We have made substantial investment in new, energy efficient public buildings, including under the transitional school and Further Education capital grants, the Flying Start Programme, the Substance Misuse Capital Funding Grant and the Community Learning Libraries Grant.

Through our procurement processes and grant funding guidelines, the Welsh Government is working to ensure that public funding is supporting our work towards embedding climate change considerations through numerous programmes of work. As part of our £500m Work Based Learning programme, all providers are required to implement an Environmental Management System.

The 21<sup>st</sup> Century Schools Programme – our long term capital investment programme to upgrade or provide new school buildings – sets a Schools Standard for energy consumption in order to reduce recurrent costs and carbon emissions, whilst also improving the educational setting. Some of the projects coming out of the Welsh Government's £26 million Invest to Save grant programme for the public sector are addressing emissions reduction. For example, Wrexham County Borough Council received £930k to deliver a range of projects to reduce emissions, including boiler and lighting upgrades in schools, PC power management software, Combined Heat and Power, driver training, and a behaviour change initiative. This has resulted in a cost saving on energy bills of £1.4 million since 2009/10 and they are now running their own internal Invest-to-Save budget and looking to reduce emissions further.

Other Welsh Government programmes are also making links to climate change. For example front line staff from the *Keep Well This Winter* campaign (run by Age Cymru and funded

by the Welsh Government) have been trained to help older people in fuel poverty find help with managing their fuel bills. The Welsh Government's Vibrant & Viable Places Regeneration Framework has been published to give policy support for economic regeneration interventions that also help with climate change action, though inclusion of housing energy conservation measures, renewable energy schemes, local food production, sustainable transport and land management for carbon storage and flood alleviation.

We are also implementing the Next Generation Broadband project that will deliver multiple benefits to households, businesses, schools and the public sector, whilst also helping to reduce the demand for travel in the future. For example, the Learning in Digital Wales Grant programme seeks to improve school and local authority internet connectivity, allowing learners to access online teaching resources via the all-Wales learning platform Hwb and potentially reducing emissions from travel and printing. We estimate that a move to server based computing across the education system in Wales has the potential to significantly reduce carbon emissions (up to 45,000t CO<sub>2</sub>) and school energy costs (estimated up to £8m p.a.) and carbon footprint.

## Action on Climate Change Adaptation

The Climate Change Risk Assessment highlights a number of risks that will effect the public sector, from direct health effects on people (which are likely to affect those that are most vulnerable) to changes in demands for public sector services (such as the increase need for emergency responses in flood events and heat waves). As well as risks to the sector climate change could see a decrease in cold related deaths and winter illnesses alongside an increase in people enjoying healthy outdoor activities in warmer, drier summers.

Our aims are to build resilience in the public sector to a changing climate and harness the opportunities which will help to strengthen our economy and benefit our communities.

We have taken a number of actions to try and build resilience in the public sector. Health bodies, local authorities and the fire service are all designated as key reporting authorities under the Climate Change Act 2008 and as such must have regard for our statutory 'Preparing for a Changing Climate' guidance, which helps organisations in Wales to assess, prepare and act on risks from a changing climate. We have updated our Adaptation Policy Statement which identifies reporting authorities in Wales and the use of adaptation powers in the Climate Change Act 2008. Alongside the updated policy Statement, the Welsh Government has published all 5 parts of its Preparing for a Changing Climate statutory guidance<sup>21</sup> which all reporting authorities should have regard to in their adaptation planning. The Guidance sets out a five-part, cyclical approach to developing a planned response to managing climate change impacts.

A Climate Change and Health Working Group was established in the autumn of 2007 to consider the health effects and risks of climate change. In 2009 the Working Group produced a publication "Tackling the health effects of climate change: an adaptation action plan", which provided the health input to the Welsh Government's Climate Change Strategy for Wales.

This document recognises that climate change is a significant and emerging threat to public health and well-being, and details adaptation priorities and objectives for action to ensure

<sup>21</sup> <http://cadw.wales.gov.uk/about/partnershipsandprojects/aboutpartners/histenvgroup/climatechange/?lang=en>

efficient and robust measures are in place to deal with:

- Weather related impacts (such as heat-waves and flooding)
- Potential increases in food borne related illnesses;
- Ensuring the continued safety of drinking and recreational bathing waters;
- Air quality issues;
- Potential threats from new infectious diseases; and
- Ensuring NHS healthcare facilities remain resilient.

One of the key priorities to be produced from the Health Adaptation Action Plan was a Heat-wave Plan for Wales in the summer of 2009. The “Heat-wave Plan for Wales: A Framework for Preparedness and Response” was first introduced in Summer 2009 and at that time the then Minister for Health and Social Services asked NHS Bodies, Local Health Boards, Local Authorities and other stakeholder agencies in Wales to incorporate this guidance into their own plans, setting out clearly the specific preparations and actions they should take in the event of a heat-wave or conditions of extreme heat in Wales. The Plan was in place for the summer months in successive years until 2013 and aimed to enhance resilience in the event of a heat-wave. The plan is now undergoing a review but guidance is available on the Welsh Government website that aims to reduce the risks to health associated with extreme heat by alerting appropriate health, social and other care staff and members of the public (especially vulnerable groups) to the dangers of excessive heat.

The Chief Medical Officer for Wales’ Annual Report for 2012 contains a section on the issues of climate change and extreme weather events. It highlights the impacts these can potentially have on health and well-being in Wales – ranging from acute to chronic health effects and direct impacts, such as sunburn, or indirect impacts, such as carbon monoxide poisoning from generators used to pump water out of flooded properties. It also acknowledges the importance of mitigation and adaptation actions to address climate change and extreme events and the need for continued monitoring. Taking appropriate action and building our understanding of the health impacts of climate change and extreme weather events is a key part of how we are learning lessons to ensure our future resilience.

In the 2013 annual report, the Chief Medical Officer will recommend that the Welsh Government and Public Health Wales work with local and national agencies, such as the NHS, local government and Natural Resources Wales, to improve community resilience, the provision of public health advice and the implementation of recovery strategies to respond to extreme weather and other natural events. A better understanding of how the risks from extreme weather events and climate change affect health services in Wales is also needed, therefore the Chief Medical Officer will also recommend that the Welsh Government work with Local Health Boards to explore these risks and disseminate findings to others, through its Climate Change Knowledge Transfer Programme.



## Wider Adaptation Activity

To ensure that Wales is well-placed to adapt to a changing climate, we are delivering a national, co-ordinated approach on adaptation via our Adaptation Framework. Our framework approach addresses vulnerability to climate change impacts by:

- Building the evidence base
- Mainstreaming adaptation
- Communicating on climate change impacts and adaptation

The following sections briefly set out actions we are taking to support the framework.

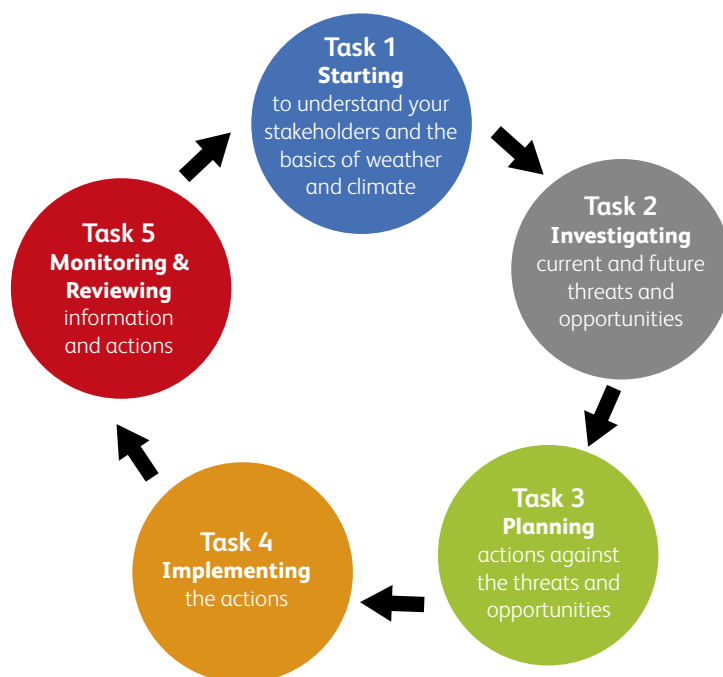
### Building the evidence base

The Welsh Government is a member of the UK Government's Domestic Adaptation Programme Board which looks at adaptation issues across the UK. As part of this group we have been building the evidence base around the impacts of climate change through active engagement in UK research programmes, such as being a co-funder of the Economics of Climate Resilience report published this year by the UK Government.

We are also working with the UK Government and other devolved administrations in preparation for the next UK Climate Change Risk Assessment in 2017.

### Mainstreaming adaptation

To ensure Wales is resilient to a changing climate, adaptation needs to be integrated into all sectors and at all levels. A key mechanism for doing this is through our commitment to the development of Sectoral Adaptation Plans. To do this we have been working with the Climate Change Commission for Wales Adaptation Task and Finish group to produce guidance, tools and resources for sectors. These plans look to take sectors through a risk assessment process set out in the diagram below, which is similar to our Adaptation Statutory Guidance and the EU Strategy on adaptation to climate change. The risk assessment process will help each sector to develop an understanding of the threats and opportunities from a changing climate to the aims of their sector and look to develop a planned response.



Although originally our aim was to produce all the SAPs by end of 2013, this was extremely ambitious and although sectors are working through the process, we have yet to finalise all the plans. We remain however fully committed to producing the SAPs, especially in view of the recent IPCC report. This activity will therefore be prioritised as a key part of the policy refresh in the New Year, but the following is an overview of progress made in a number of key areas to date:

## Natural environment and Agriculture

We are working to integrate climate resilience into the Natural Resource Management programme through the Environment Bill and Policy Instructions.

We are developing a joint specification for a research project, which will look to highlight the risks to the agriculture sector. This will provide a key evidence base and will also help to inform the RDP process.

In 2012, a report on *A strategic approach for assessing and addressing the potential impact of climate change on the historic environment of Wales was produced for the Historic Environment Group*<sup>22</sup>. The report identified and assessed the sensitivity of historic assets to climate change and produced a risk assessment based upon sensitivity to change, likelihood and impact of the risks identified. The report will support the production of a sectoral adaptation plan for the historic environment of Wales.

## Health

The health sector has a plan in place and an update of progress in the health sector is provided in the public sector section.

## Business and tourism

We are working with the tourism sector on a project which will look to understand how the consequences of climate change will affect the tourism sector and take actions to adapt. The project looks to undertake a high level risk assessment for the sector and create a number of tools and resources to help the sector (including SME's, industry and strategic decision makers) plan and prepare for the consequences of climate change.

## Marine

We are working with the other governments in the UK to implement the Marine Strategy Framework Directive, to put measures in place to achieve Good Environmental Status (GES) in our waters by 2020. Good Environmental Status means marine waters that provide ecologically diverse and dynamic (oceans and) seas which are clean, healthy and productive within their intrinsic conditions, and the use of the marine environment is at a level that is sustainable, thus safeguarding the potential for uses and activities by current and future generations. Achievement of Good Environmental Status will result in healthy marine waters and more resilient ecosystems.

The UK Marine Strategy Part 1<sup>23</sup> was launched in December 2012 and we are currently developing a programme of monitoring which will be consulted on in early 2014. Following that, a programme of measures to achieve Good Environment Status will be established by December 2015.

<sup>22</sup> <http://cadw.wales.gov.uk/about/partnershipsandprojects/aboutpartners/histenvgroup/climatechange/?lang=en>

<sup>23</sup> <https://www.gov.uk/government/publications/marine-strategy-part-one-uk-initial-assessment-and-good-environmental-status>

Marine planning will provide an important tool for meeting the long-term challenges posed by climate change, and we have consulted on our approach to marine planning in Wales. Together with the other governments in the UK, we published the UK Marine Policy Statement (2011) that sets out the policies that will help achieve sustainable development in the UK marine area. Our aim is to publish a National Marine Plan for the Welsh inshore and offshore areas by 2015.

## **Building resilience in communities**

The Pathfinder programme was commissioned to both offer some “hand holding” support for communities in six local authorities and to research what worked when communities lead on climate action. The work took a community based approach to helping community groups tackle climate change through carbon reduction initiatives and behaviour change projects. The work finished in April 2013 and the report findings are due to be shared over the next couple of month. The summary report and reports from the Learning Histories used by the groups to explore their journey identified the learning for communities and for Government. The reports will be disseminated at two events in the near future. A large number of stakeholders (local authorities, third sector organisations and other partners) participated in supporting this work and by taking part in the Advisory Group, chaired by the Chair of the Climate Change Commission for Wales – Peter Davies.

The Cynefin change programme, which began in April 2013, builds on the Pathfinder programme and other work and takes a place-based approach to improving the quality of life for communities by starting with their immediate local environment and looking at the multiple benefits that a high quality, green space can bring. Keep Wales Tidy, Fly Tipping Action Wales and Environment Wales officers are part of the nine, locally-based Place Coordinators – in Anglesey, Cardiff, Carmarthenshire, Merthyr Tydfil, Neath Port Talbot, Newport, Rhondda Cynon Taff, Swansea and Wrexham. All Coordinators are now working with communities of place to identify specific local issues and find solutions by bringing together public, private and third sector organisations. A number of the Place Coordinators are looking at climate change adaptation measures and community resilience, particularly with regard to flooding. They are also using Time Banking and other mechanisms to support this and other work. The focus for the places is to develop greater resilience and sustainability with regard to future shocks including climate change and to secure long term environmental, social and economic benefits for the communities.

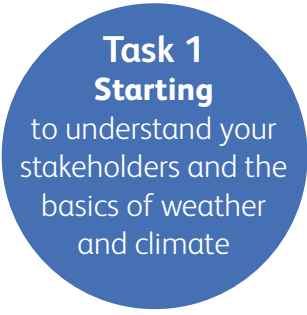

As a Government, we also fund Renew Wales, funded under the Big Lottery Dormant Accounts Fund. The programme helps 200 community groups to tackle the causes and impacts of climate change through advice, training, mentoring and technical support from other experienced community practitioners. A recent conference held by Renew Wales shared good practice and learning from across the groups they supported.

## **Communicating climate change impacts and adaptation**


Our knowledge transfer programme is an exchange process between the Welsh Government and its key stakeholders in Wales. It aims to build resilience against the impacts of climate change through the exchange of knowledge, skills, and resources between the Welsh Government, organisations and sectors in Wales, whilst understanding stakeholder’s needs and requirements to enable effective action against the impacts of climate change. The

Knowledge Transfer Programme has initially focused on building capacity and has developed a number of tools and resources to support sectors and organisation, as they go through the risk assessment process.

Progress to date includes developing a risk assessment process and guidance (Preparing for a changing climate guidance) for organisations and sectors in Wales. Alongside the risk assessment process, there has been a number of tools developed to support the different stages of the process including those set out in the table below.

Risk Assessment Stage	Tools and resources to support sectors and organisations in their adaptation planning
 <p><b>Task 1 Starting</b> to understand your stakeholders and the basics of weather and climate</p>	<p><b>Knowledge Hub</b></p> <p>The Welsh Government's Climate Resilience and Extreme Weather Knowledge Hub is a community of practice on adaptation to support reporting authorities. It provides a database of resources for organisations and sectors to help them in their adaptation planning.</p>
 <p><b>Task 2 Investigating</b> current and future threats and opportunities</p>	<p>In 2009 the Countryside Council for Wales produced a media based assessment for all local authorities in Wales, which covered 60 different newspapers across Wales. The Welsh Government and Natural Resources Wales (NRW) have updated the resource so it now contains over 13 years of media based information on previous weather events<sup>24</sup> across Wales and breaks down the consequences into impacts on the different sectors – <a href="http://wales.gov.uk/topics/environmentcountryside/climatechange/publications/?lang=en">http://wales.gov.uk/topics/environmentcountryside/climatechange/publications/?lang=en</a>. This resource will help organisations and sectors and save time and effort through researching how previous weather events have affected their sector.</p> <p><b>Climate impact across Wales – communicating vulnerability</b></p> <p>Using news items from the BBC news website, sectors can now see how they are already vulnerable to weather and climate in Wales over the last 2 years, by using the Welsh Government's National Climate Impact Profile.</p>

<sup>24</sup> For further information on LCLIP's please see UKCIP's website <http://www.ukcip.org.uk/lclip/>.

Risk Assessment Stage	Tools and resources to support sectors and organisations in their adaptation planning
 <p><b>Task 3</b> <b>Planning</b> actions against the threats and opportunities</p> <p><b>Task 4</b> <b>Implementing</b> the actions</p> <p><b>Task 5</b> <b>Monitoring &amp; Reviewing</b> information and actions</p>	<p><b>Welsh Local Authority Adaptation Resource</b></p> <p>For the Welsh public sector, planning for the long term risks of climate change is particularly challenging in a short and medium term environment of financial constraints and austerity. The service specific material contained in this resource should provide further information to support a clear business case for why planning for the long term is relevant now. The resource consists of a publication and accompanying spread sheet. The resource covers thirteen different local authority services and looks at the service risks, actions that can be taken and provides links to further resources.</p>

Alongside the tools and resources we have worked jointly with external stakeholders on a number of workshops and events to raise awareness and build capacity and resilience. These events include:

- A joint workshop with Natural Resources Wales, the Climate Change Consortium for Wales and others to help users use the UK Climate Projections 2009 for the assessment of future impacts in Wales;
- An adaptation workshop with the National Park Authorities in Wales, to help them to progress through the first two stages of the *Preparing for a changing climate guidance*; and
- A joint event with the Climate Change Consortium of Wales and Climate Change Commission for Wales providing a science to policy briefing on the recent IPCC 5th Assessment of climate change science, sponsored by the Minister for Natural Resources and Food.

## International activity

In the past year progress has continued to be made with the work of technicians and experts from Wales focussing on assisting with Climate Change Adaptation through agro-forestry tree planting and the distribution of fuel efficient stoves. This has been done with the support of the Size of Wales project.<sup>25</sup>

Joint investigations continue into the feasibility of using Carbon Finance to fund the expansion of the project.

Wales and Lesotho agreed a joint programme of work on climate change at the UN Climate Change Summit in Doha (December 2012). The aim of the partnership is to exchange knowledge, skills and resources in jointly producing a Climate Change Strategy and delivery plan for Lesotho.

To date, two Welsh placements have taken place with Lesotho Meteorological Services (LMS). Both placements were successful with initial work on building the partnership and ground work for the strategy being completed. The next steps are looking to continue working together and support LMS in building capacity around climate change policy development.

This work helps to ensure that Wales continues to play its part internationally, working with partners through both the Network for Regional Governments for Sustainable Development and the Climate Group where Wales is contributing to key work streams to support the effective exchange of knowledge and information. Most recently, at the United Nations Conference of the Parties in Warsaw (COP 19), as well as further developing partnerships and sharing information we contributed to events led by the networks above and through the UK Delegation to the growing recognition of the vital role played by 'subnational' or regional and state level governments in tackling climate change. One of the agreed outcomes from COP19 being the formal recognition of the role of subnational governments for the first time in the text agreed on the Ad-hoc Durban Platform (ADP).

<sup>25</sup> <http://www.sizeofwales.org.uk/index.html>

## Commentary from the Climate Change Commission for Wales

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The Climate Change Commission was established by Welsh Government as an independent, cross sector, cross party body, to provide advice, build consensus, mobilise action and review progress. We are pleased to have the opportunity to provide an independent commentary on the Welsh Government's Climate Change Annual report – the first report that reports on progress against the targets in the Climate Change Strategy.

The Commission welcomes the reduction in carbon emissions recorded against the baseline, particularly in the public, business and residential sectors, but recognises that the emission levels have been largely driven by external factors, including the economic downturn, variations in the weather and public sector cuts. However, it does also reflect the high level of investment in product and process innovations that have increased efficiency and reduced emissions in public and private sectors.

It is, however, often difficult to ascertain where policy interventions may have had significant impact in emission reduction, even in high profile investments which undoubtedly deliver multiple benefits such as *Arbed*, but where actual reduction figures have been difficult to monitor. Such interventions are though critical in making emission reduction 'citizen easy'. In this respect, we also welcome the Active Travel Bill and the recent announcements about the Active Travel Development Guides, which will bring safer routes for walking and cycling and recognise the learning from the progress made in waste reduction.

The Commission welcomes the focus on the links between poverty and climate change. This is important globally as the work of the Wales for Africa initiative highlights, but also in Wales where the poorer communities are less able to cope with the impacts of climate change itself, while policies designed to address climate change can also have negative consequences for such communities.

On adaptation, we particularly welcome the publication of the Government's updated Policy Statement and five-part Statutory Guidance issued under the Climate Change Act 2008. We consider that Preparing for a Changing Climate offers an excellent framework for delivering robust adaptation in Wales. We are pleased that the Government has written to the various reporting authorities, drawing their attention to the guidance and pointing out they must have regard to it in their adaptation planning. We urge the Government to follow up this initial engagement at regular intervals to review progress.

One area where we continue to have concerns, however, is in relation to progress with the Sectoral Adaptation Plans (SAP's). We have consistently emphasised the importance of Welsh Government undertaking these plans; they are a major component of its Climate Change Strategy and represent the Government's strategic response to the challenges identified by the UK Climate Change Risk Assessment, published in January 2012. We are, therefore, very concerned at the lack of progress in 2013. We do, nevertheless welcome the publication of guidance for their production, and the clear link with the Government's Statutory Guidance on Adaptation.

If the Government is to make serious progress here we strongly recommend the following three-pronged approach, which is designed to build capacity within the process. First, stagger the production of the plans, so that later plans learn from earlier ones. Second, link production of



the SAP's to the adaptation planning that is being undertaken by the reporting authorities. Third, create a framework whereby Commission members and their networks can work directly with Government officials through a clear and declared partnership approach. We look forward to working closely with the Government on this in 2014.

However while the report highlights programmes which are making a positive contribution, albeit difficult to measure in respect of impact, the Commission welcomes the Minister's recognition that there needs to be a refocusing of efforts to ensure we address the projected shortfall against the 40% target and the prospect of an economic upturn increasing emission levels.

The Commission does not believe that the climate change strategy itself requires significant change, but that we need to increase the focus on delivery in key areas. We have set out seven key areas of action for accelerating the delivery, which reflect the principles set out in the Minister's commitment to ensure we meet the delivery trajectory for emission reduction. These include accelerating the transition to a low carbon economy through a green growth strategy; focusing on delivering retro fit to scale to drive green growth, addressing priority sectors in land use and transport, as significant contributors within areas of devolved competency; recognising the key role of public sector leadership facilitating wider change, mobilising civil society and ensuring adaptation sector plans are developed and applied effectively.

We particularly welcome the focus in the report on applying the principles of green growth, which the Commission recommended to the Council for Economic Renewal, but this will require a better understanding of the barriers and opportunities for investing in low-carbon opportunities and the policies required to encourage such actions.

Decarbonising energy supply and delivering high levels of energy efficiency are at the heart of the strategy, as generators for green growth, tackling fuel poverty, improving health and well-being. The Commission wrote to the First Minister earlier this year following a review of the delivery of Energy Wales. We recognised that Welsh Government has limited competency in decarbonising energy supply, but needs to focus on scaling up distributed low carbon energy generation and capacity of landowners and communities to generate energy and income. We need to see greater alignment of decision-making across the public sector to enable increases in local generation.

The Commission is clear that delivering energy efficiency solutions to domestic and business customers must be the top priority. The Commission stresses the importance of ensuring improved delivery of advice and support for energy efficiency solutions through the planned procurement process and resulting framework contracts. This must be an area of risk in future delivery as current systems are dismantled and replaced through new provision.

Equally, the Commission is clear as to the importance of achieving near to zero emissions from new build and Ministerial announcements in respect to lowering of emission standards in the short-term need to be accompanied with a clear pathway to meet EU directive requirements by 2021. Mixed messages from the Government in respect to the priority of emission reduction must be avoided if we are going to achieve our targets.

The European Structural and Investment programme has a key role in being catalyst for low carbon transition and should focus on accelerating delivery of what we know works while



also investing in innovation. It will be important that all ESI programmes are assessed for their contribution to emission reduction and adaptation. The Commission would want to see greater evidence of impact from investment through Higher Education led programmes and avoidance of proliferation of different schemes, which have the potential to confuse and the inability to be sustained.

The Commission has consistently highlighted engaging civil society to enable a community led approach as a key priority area. The Commission has expressed concerns over the effectiveness of elements of the “Communication and Engagement” Strategy that was developed to help deliver the climate change strategy. There are specific points that the Commission has made in respect of engaging communities, including learning from the Supporting Sustainable Living Grant scheme, which operated under this strategy, about engagement, behaviour change and co-production that should not be lost. In order to enable widespread community action, the climate change message needs to be made ‘real’ to different audiences and communities and the third sector enabled to act from their own starting points. Concerns expressed to the Commission from civil society of current provision of support and programmes include a ‘patchwork’ of short-term or stop-start support; a lack of flexibility; complex programmes that are not easy to engage with; and a perceived preference for ‘re-inventing the wheel’ rather than building on existing exemplars.

It is notable that Agriculture and Land Use is the only sector where emissions are actually increasing, with the aging of the forest stock reducing its effectiveness as a carbon sink. This reinforces the Commission’s concerns over the lack of progress in delivering on the recommendations of the Land Use and Climate Change Report, which included significant targets for increased woodland planting. We do recognise the important contribution that Farming Connect is making to supporting farms in reducing emissions, but stress the importance of an immediate independent review to improve the effectiveness of emission reduction programmes across this sector.

The progress report highlights the need to align senior level decision-making and the Commission would stress the importance of aligning decision making across Government and local Government as the first priority. Equally, in reviewing the governance structure for managing climate change there needs to be a clear internal leadership and accountability across departments to ensure consistency of message. It is also important that the core climate change team is effectively resourced to fulfil its functions.

The Minister has clearly set out his commitment to Wales playing a leading role in responding the challenge of climate change. We look forward to working with the Minister to deliver on this commitment to achieve a ‘step change’ through an increased focus on delivery across all sectors.

## Summary and Next Steps

In confirming that Wales has met its 3% annual emissions targets for 2011, with most sectors having shown good progress in terms of emission reduction this report shows that significant progress has been made against the Climate Change Strategy, since its development in 2010. It also shows the significant progress against the wider 40% target by 2020, with emissions decreasing by 20.6% against the baseline. Although this is positive progress, we recognise that the economic climate will have been a contributing factor and more must be done in order to continue to deliver against our 3% target and our aim of a 40% reduction by 2020.

Although the sector by sector summaries highlight the progress made, we recognise that we must build on this progress and go further if we are to meet our longer term emission reduction targets as part of our wider global responsibility. As highlighted by the IPCC report and the UK Climate Risk Assessment, the case for climate action is clear. Moreover, with the opportunities for green growth, action on climate change is also key to and goes hand in hand with the achievement of our wider Government priorities of jobs, sustainable growth and tackling poverty.

Scientific understanding, as detailed in the IPCC report, highlights that continuing our work on climate change mitigation is vital if we are to avoid the most severe climate scenarios. It also highlights though that some climate change is inevitable and is already being seen, meaning that action on adaptation is as important to Wales' future. Our commitment to the development of Sectoral Adaptation Plans and ensuring the different sectors of Business and Tourism, Health, Communities, Natural Environment and Infrastructure specifically adapt to our changing climate and build resilience to future climate impacts, is therefore a key priority as part of our policy refresh going forwards.

In October 2013, the Department of Natural Resources and Food published *Shaping a more Prosperous and Resilient Future*, setting out the future policy direction for the Department of Natural Resources and Food. It recognises that climate change is one of the key challenges we face and requires cross-cutting action. The priorities that it sets out for the department – green growth, resource efficiency, resilience and tackling poverty – have climate action embedded throughout. In addition, the way it highlights that we are aiming to transform the management of our natural resources – in a joined-up way so that they are able to deliver long-term economic, social and environmental benefits – is a crucial component of how we will be taking forward our climate policy. It also illustrates how as a Government, we are already going further in using the new legislative powers at Wales' disposal that were not available at the time of the development of the current strategy.

With this report providing a good baseline for our future direction, following the report we intend to take forward a policy refresh during 2014, but picking up on the input of the Climate Change Commission for Wales, in doing so, our aim is to focus on the practical action that can be taken – across government and with our partners. The previous strategy was innovative in how it prioritised both mitigation and adaptation along with our work on engagement and behaviour change and provides a good platform to build on in ensuring that Wales is both resilient and well placed to prosper in the future.

As with every great challenge, reacting quickly and effectively can also provide significant opportunities. Taking climate action can provide a long term competitive advantage for our economy and modern, resource efficient, innovative and sustainable businesses are a central part of the answer to the climate change challenge.

As this report highlights, action to mitigate and adapt to climate change is not an environmental issue or just about meeting our emission reduction targets, it is a key consideration for how we must look at all sectors and is fundamental to how we can build the Welsh economy, ensure the resilience of our communities and enhance our environment in line with our commitment to sustainable development.

## Annexes

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### UK Committee on Climate Change

The UK Climate Change Committee published *'Progress reducing emissions and preparing for climate change in Wales'* in January 2013. This is a high level report aimed at establishing long term trends on how Wales is adapting over time to the impacts of climate change.

Overall, the report found that Wales has continued to make progress implementing emissions reduction policies, particularly in the residential and waste sectors. The report outlined how the impact of climate change poses a number of opportunities and threats to the Welsh economy. The UK Committee on Climate Change also credited Wales with how it continues to invest in the most productive and innovative ways in order to drive sustainable growth, reduce emissions and increase the living standards of citizens in Wales.

### The Climate Change Commission for Wales' 2nd Annual Report

The Climate Change Commission for Wales published its 2nd annual report in February 2013 . The report assessed the progress the Welsh Government is making on implementing measures contained in the Climate Change Strategy for Wales and built on the recommendations proposed in the UK Committee on Climate Change's second progress report to Welsh Government. The report also reviews progress the Commission has made over the past year and sets out its priorities for action in 2013/14.

The Climate Change Commission made thirty-seven recommendations within the following seven identified priority themes for action:

1. Focus on building resilience to manage the impact of a changing climate.
2. Scale-up efforts to reduce emissions from the built environment.
3. Address the transport challenge that is central to our approach to sustainable development.
4. Accelerate the transition to a low-carbon economy.
5. Ensure leadership from the public sector to communicate and engage people on the challenges of climate change.
6. Engage civil society to achieve a significant impact in tackling climate change.
7. Manage our land use to reduce emission levels from this sector.

As a Government, we welcome the input of the UK Committee on Climate Change and the Climate Change Commission for Wales. The action we have taken as a result is incorporated into the sector specific actions on climate mitigation and adaptation. Going forward, our aim is to work with all our partners and all sectors in Wales to ensure that in refreshing our policy we achieve the best results for the citizens of Wales.

## Examples of Action in Wales

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In this section, we have briefly outlined some case studies to highlight some of the positive climate action being taken.

### The Welsh Government Estate

In placing Sustainable Development as our central organising principle, we are committed to showing leadership in the management of our own estate. For example, we are committed to achieving at least a 30% reduction in GH gas emissions from our buildings and other fixed infrastructure by 2020 (on a 2011 baseline). This not only aligns with our Climate Change goals, but importantly also delivers value for money and long term savings in increasing the resource efficiency of the estate.

### Results to date indicate positive progress

In the recently published State of the Estate report, it shows that our Administrative Estate has made the following progress from 2010/11 to 2012/13.

- Energy consumption has fallen by 13%; representing savings of 4030MWh
- CO<sub>2</sub> emissions have fallen 17%; which is 2170 tonnes LESS released into the atmosphere.
- Savings of £268,929 on energy when factoring in sector price rises.

Monitoring and managing other environmental parameters have resulted in similar improvements: a 28% improvement in domestic waste created; and a 37% reduction in water consumption over the past 2 years, each of which have beneficial climate change impacts.

### Further information can be found at:

<http://wales.gov.uk/docs/hrd/publications/131031-state-estate-1213-en.pdf>

## **Reducing the carbon footprint of the educational estate in Wales**

The 21<sup>st</sup> Century Schools Programme is a One Wales commitment and a unique collaboration between the Welsh Government, the Welsh Local Government Association (WLGA) and local authorities.

The 21<sup>st</sup> Century Schools Programme aims to deliver sustainable school buildings. A key element of the programme has been to develop a school standard, with a specific element focussing on sustainable schools. This will provide practical guidance on making schools more sustainable by reducing energy use, CO<sub>2</sub> emissions, and improving the school environment.

Through the transitional capital investment projects and as we continue to develop the 21<sup>st</sup> Century Schools Programme, we continue to work with Local Authorities to ensure that all new school buildings capital projects meet the Building Research Establishment Environmental Assessment Method (BREEAM) 'excellent' standard. The standard ensures best practice in sustainable design and has become the de facto measure used to describe a building's environmental performance. Thirty five transitional projects will achieve this by 2014-15.

### **For further information relating to the programme:**

<http://21stcenturyschools.org/?skip=1&lang=en>

or alternatively please contact:

Melanie Godfrey, Programme Director

Tel: 02920 826057

Email: [21stcenturyschool@wales.gsi.gov.uk](mailto:21stcenturyschool@wales.gsi.gov.uk)

## **Alternative residual waste treatment: Prosiect Gwyrdd**

Prosiect Gwyrdd (Project Green) - is a partnership between Caerphilly Borough County Council, The County Council of the City and County of Cardiff, Monmouthshire County Council, Newport Council and Vale of Glamorgan Council.

The purpose of the partnership was to deliver the best long term sustainable and cost effective solution for waste after recycling and composting has been maximised.

Prosiect Gwyrdd will receive over £4.2 million of Welsh Government funding each year to divert non-recyclable waste from landfill over a 25 year period. The project also received Welsh Government support throughout its procurement process.

Prosiect Gwyrdd has demonstrated that, on average, it will divert 162,862 tonnes of non-recyclable waste from landfill each year by using this waste as a fuel to generate electricity using the Energy from Waste (EfW) process. This will provide an annual net benefit predicted carbon saving of 51,392 tonnes CO<sub>2</sub> equivalent in comparison to continued landfill. Ash produced by the EfW process will also be diverted from landfill to produce construction aggregate. The EfW process is also potentially capable of supplying surplus heat to users in the vicinity of the site via a proposed heat distribution network. Furthermore, as the cost of

sending waste to landfill continues to rise, it is anticipated that Prosiect Gwyrdd will save the partner authorities approximately £500 million over the next 25 years, as well as creating jobs in the waste and resource management industry.

If these benefits were replicated for other residual waste treatment groups across Wales, there would be an annual net benefit of approximately 180,000 tonnes CO<sub>2</sub> equivalent in comparison to continued landfill.

**For further information please see:**

<http://www.caerphilly.gov.uk/prosiectgwyrdd/english/home.html>

or contact;

Prosiect Gwyrdd

Tel: (029) 2071 7523

E-mail: [info@prosiectgwyrdd.co.uk](mailto:info@prosiectgwyrdd.co.uk)

## **arbed 2 - Fochriw scheme**

The Fochriw scheme is nearing completion, and it is expected that around 320 houses in the area will receive energy saving measures by the end of the scheme. As a direct result of the arbed 2 project, funding was made available to purchase photovoltaic panels to be installed on the Community Hall roof, and to allow the village to generate electricity and claim through the feed-in tariff, estimated at around £750 per annum. The panels on the Community Hall were launched at a ministerial event in October.

**Melin Homes are the Welsh Government's South Wales Project Managers of arbed 2 and can be contacted via:**

Melin Homes

Tel: 0845 3101 102

E-mail: [enquiries@melinhomes.co.uk](mailto:enquiries@melinhomes.co.uk)

## **The Mynydd y Gwrhyd Wind Farm – Community Projects**

The scheme is developing a community-owned wind farm 20 miles north of Swansea with support from our Ynni'r Fro programme. The wind farm will be a wholly owned trading subsidiary of Awel Aman Tawe, gift aiding all profits back to the community. All profits from the wind farm will be used for low carbon regeneration projects in the local community. The wind farm will have two turbines and each will be rated at 2MW. Estimates are that each year the turbines will:

- generate 10,000 MWhrs;
- save 9,000 tonnes of CO<sub>2</sub>;

- provide £1 million in income from electricity sales;
- produce clean energy to the equivalent of 2,000 homes; and
- create seven jobs within Awel Aman Tawe, located in a Communities First area.

During the construction phase the scheme is creating employment for local suppliers. There are also plans for an educational programme for 11 local schools. The income from the scheme will be used in a local revolving energy fund to finance renewable energy and energy efficiency work on up to 25 homes per annum, targeted at fuel poor households. This project has secured all the required planning consents and will shortly begin the construction phase.

**To apply to the programme or for more information visit:**

<http://www.energysavingtrust.org.uk/wales/Communities/Finding-funding/Ynni-r-Fro-programme>

or contact:

Tel: 029 2046 8340

Email: [ynnirfro@est.org.uk](mailto:ynnirfro@est.org.uk)

## **Woodland Carbon Code**

The Woodland Carbon Code, launched in July 2011, will help encourage and attract investment in new woodland creation. The Woodland Carbon Code is an independently audited standard, devised by a group led by the Forestry Commission and including UK, Scottish and Welsh Governments and industry partners, to certify woodland creation projects that can measure and account for the capture and storage of atmospheric carbon.

The Plant! Scheme is a joint project between the Welsh Government, NRW and Coed Cadw/The Woodland Trust, enabling the planting of a tree for every child born or adopted in Wales. It has now supported the planting of over 200,000 native broadleaf trees since it began in 2007.

Natural Resources Wales produces around 800,000 tonnes of sustainable timber per annum from the public woodland estate owned by the Welsh Government.

A further update on how Wales is continually looking to increase woodland cover is outlined in the recent "Woodlands for Wales strategy" which sets out a 50 year plan for developing and using Welsh woodlands and trees to bring maximum benefit to the people of Wales.

**Further information can be found at:**

<http://wales.gov.uk/topics/environmentcountryside/forestry/woodlandsforwales/?lang=en>



## **Wales' Ecological footprint**

The ecological footprint is one of the Welsh Government's five headline indicators of sustainable development in Wales. In 2008 a report was published which looked at how close people in Wales are to living within environmental limits .

The five main constituents that make up the footprint are housing, transport, food, other consumer items and public services. Wales identified its footprint of approximately 4.4 global hectares per person in 2006 - this footprint would require approximately two and a half planets worth of resources if everyone in the world lived with the same level of impact.

## **The Ecological and Carbon footprints of Wales: latest data update and analysis**

Ecological and carbon footprints are important indicators in understanding the environmental impacts of consumption. They complement environmental assessments of production systems and are valuable in understanding the pressure placed on the environment outside territorial boundaries.

The ecological and carbon footprints of Wales have been calculated alongside the UK figures for 1992-2006 by the Stockholm Environment Institute (Figure 1). In 2006 the carbon footprint of Wales was 15.6 tonnes per person (including 6 greenhouse gases) and the ecological footprint was 4.4 global hectares (gha) per person, both showing an increase from their levels in 1992. A carbon budget level should be approximately 5.5 tonnes of CO<sub>2</sub> per person in 2027 (territorial) to be inline with the UK 80% reduction targets for 2050 (based on the UK Climate Change Committee budgets for 2023-2027).

This project, led by SEI and with partners GHD, will update the ecological and carbon footprint figures for Wales providing a 2011 estimate, alongside a detailed description of the methodology for future application and monitoring. This document outlines the current progress toward this goal, with final delivery of the data, methodology and report due by the end of 2013.