Appendix A

Our Approach to the Low Carbon Regions Project Process

In order to meet the report brief set out by the WSP team, the SDC has undertaken a comprehensive programme of research and engagement, including:

- Consultation on the definition and monitoring implications of a Low Carbon Region, with the SDC's sustainable development panel and Cynnal Cymru-Sustain Wales board members, staff and Transformation Nation Partners. The SDC posed the following questions to the consultees:

  1) When can a region say that it is on track to become a Low Carbon Region?

  2) When can a region call itself a Low Carbon Region?

  The responses received provided a wealth of informed opinion, from which the SDC was able to draw out consistent messages and crucial points for consideration. These are elemental in the SDC's proposed definition and have helped to shape the suggested two-phase approach to regional emissions reduction in Chapter 2.

- A significant desk based study of low carbon related policy, projects and initiatives. This enabled the construction of a comprehensive low carbon resource bank addressing the built environment and energy, transport, rural land use and food and waste sectors (see resource bank). This resource bank provides background information on a wealth of low carbon solutions alongside case studies, tips for replication and recommendations for delivery through the Area Groups. As part of the construction of these technical documents the SDC took into account previous papers released from the Climate Change Commission for Wales in order to ensure consistency in national and regional strategy. This portfolio of low carbon solutions formed the basis of discussion at the subsequent workshops.

- On-going dialogue and ideas testing with the central and regional WSP teams.

- A presentation and feedback session with interested individuals from Welsh organisations and the Welsh Assembly Government.

- Two first stage workshops to prioritise low carbon solutions and provide feedback on the direction of the project. One with SDC England staff and Commissioners and one with Commissioners of the Climate Change Commission for Wales.

- A series of regional, roaming workshops – one in each of the Spatial Plan regions of Wales. A full summary of which is given below.

Low Carbon Region Workshops Summary

Workshop attendees included representatives from the public, private and third sectors within the region, as invited by the Spatial Plan Area Manager. A good range of participants attended including, for example, local authority planning, transport and sustainability officers, National Trust officers, Transition Town representatives, local power station representatives, Countryside Council for Wales officers, University researchers and managers and representatives from community energy projects.

These workshops were intended to utilise the local knowledge of the individuals present to enable SDC to gain an insight into the particular challenges facing, and opportunities arising, within each region in the transition to low carbon. The workshops also acted as a platform to open communication and initiate collaboration on regional carbon reduction efforts.

Workshop participants were divided into four discussion groups based upon their field of interest / expertise:

- Built environment and energy
- Transport
- Rural land use and food
- Waste

For each discussion group, the workshop was divided into three distinct sessions:

1. **Visioning**

   Participants were asked to put forward the words and phrases that came to mind when envisaging how their region will look and feel in 2050 once the 80% emission reduction target has been met. The messages that were strongest and which occurred most frequently during each region's visioning session, are given in the regional sections of chapter 5.

2. **Prioritising Low Carbon Solutions Using a Difficulty / Impact Matrix**

   Each sector discussion group was given a set of cards, each containing a different option for reducing carbon emissions from that sector. So, for example, the cards of the waste group contained carbon reduction options such as anaerobic digestion facilities using local waste, reusable nappy schemes, implementing the demolition protocol for all new buildings, packaging minimisation in the food sector and source segregated closed loop recycling systems. The group was asked to consider the impact each option could potentially have on

emission reductions within the region and how difficult they would be to implement there. After assessing the options, each was positioned on a difficulty / impact matrix as illustrated below:
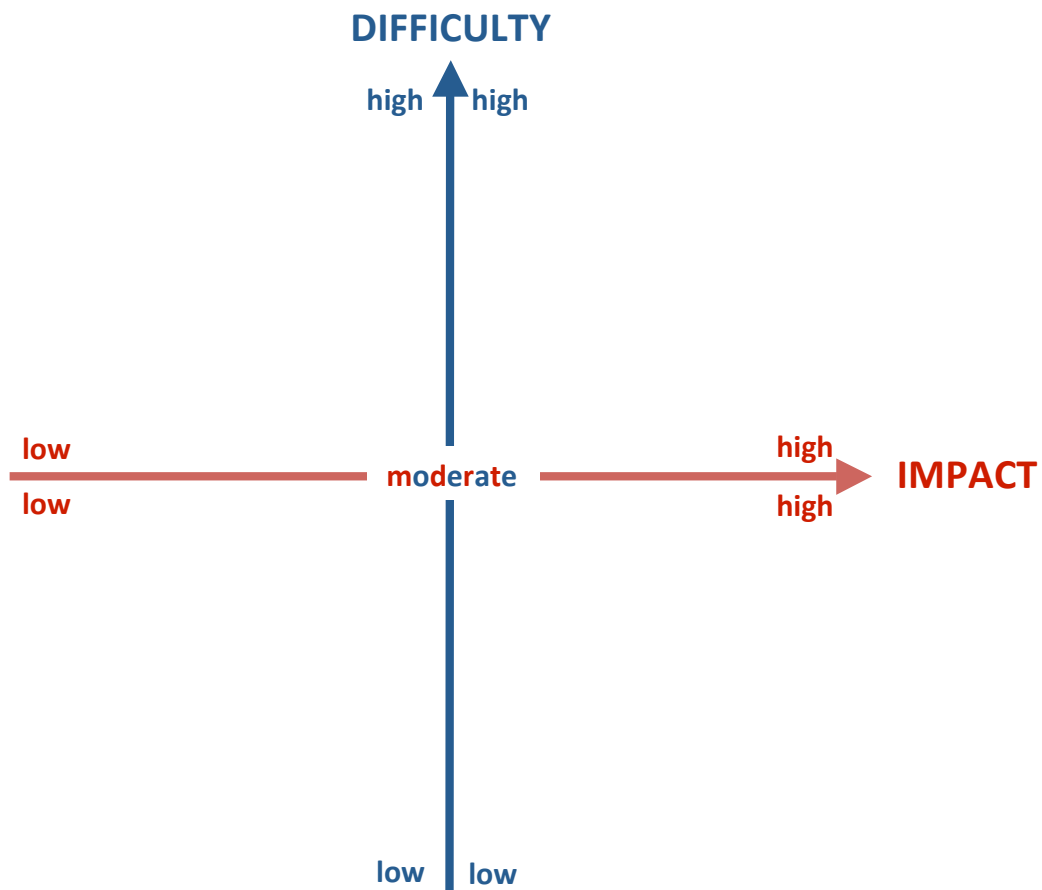
This matrix, provides a helpful prioritisation tool, with solutions placed in the bottom right corner (moderate to high impact and moderate to low difficulty) presenting the priorities for action within the region.

To carry out this exercise participants had to rely upon their experience and expertise to **estimate** the potential impact of the options. This is therefore a useful guide to regional prioritisation based upon local knowledge and opinion, but cannot be taken as a definitive method of prioritising solutions. Based upon this exercise and wider workshop discussion, a workshop priority solution for each region in each sector is given in the regional chapter - chapter 4.

3. **Considering the Role of the Wales Spatial Plan in the Delivery of Low Carbon Solutions**

   Following the prioritisation of carbon reduction options in the previous workshop session, participants were asked to discuss the potential role of the WSP and its Area Groups in delivering the highest priority options. Discussion groups were also asked to consider where the responsibility for delivery should lie if it were deemed to be outside of the remit of the WSP. Within most discussion groups, following consideration of the highest priorities, a general discussion on the role of the WSP in the transition to low carbon was also had. This session helped to shape the whole of this report, providing ideas and insights into the strengths of the WSP and how this can be utilised as a framework for regional carbon reduction.

Key workshop discussion points and outputs are summarised for each region in Chapter 4. A full workshop write up from each workshop has been provided to the relevant WSP Area Manager, and are available upon request from the SDC in Wales.

SDC sees this set of regional workshops as having been a first catalytic step towards concerted regional action on low carbon transition.

Appendix B

 Other Low Carbon Strategies

Existing, operational carbon reduction strategies provide an ideal reference / guide for strategy development. Suggestions of useful reference documents are:

- The South West Climate Change Action Plan 2008 to 2010 is an example of a regional action plan for carbon mitigation (and adaptation), created and delivered by collaborative action between councils and key regional partner organisations.
  http://www.swcouncils.gov.uk/nqcontent.cfm?a_id=3580&tt=swra

- The East Midlands Regional Climate Change Partnership's Regional Programme of Action 2009 to 2011 is another example of a collaborative cross sectoral carbon reduction strategy on a regional level. http://www.climate-em.org.uk/

- The London Borough of Camden's Environmental Sustainability Delivery Plan 2008 to 2012 has a clear format and demonstrates the successful integration of a range of strategies.
  https://www.camden.gov.uk/ccm/content/environment/policies-reports-and-data/delivering-a-sustainable-camden-delivery-plan-2008-2012.en;jsessionid=C85BE4982ED0C46175E3F87703B1EB85.node2

Appendix C

Regional Priorities and Opportunities Identified within the Wales Spatial Plan Synergising with Carbon Reduction Opportunities

<u>**Central Wales**</u>

Improve linkages and spread growth from key centres to wider hinterlands	• Increase support for ICT connectivity and uptake, and support home working • Provide demand responsive transport to key public transport nodes or routes
Support existing rural economic sectors	• Support co-operative approaches to farming to allow landscape scale management and joint marketing of products to serve larger markets e.g Pontbren environmental co-operative • Support local food production through a local diet project, public sector procurement, promotion of community supported agriculture, providing support for landowners to access energy markets e.g. for biomass
Building higher value sustainable tourism	• Support rural eco tourism in conjunction with Visit Wales e.g. through eco tourism awards • Work with Tourism Partnership Mid Wales to engage tourism businesses in improving sustainability e.g. Local Food Talks
Introducing new sustainable economic opportunities for a knowledge economy	• Take a zoned approach to the refurbishment of existing building stock to cluster renewable energy businesses • Support microgeneration energy from waste technologies and carbon sequestration projects to create research and managerial knowledge jobs
Building effective cross border collaboration	• Partner with other Low Carbon Regions in the UK and Europe to transfer knowledge, skills and learn from good practice elsewhere • Partner with other European regions to bid for EU collaborative funds for carbon reduction projects
Develop renewable energy technologies	• Provide support for community energy projects e.g. through a development officer • Establish an Energy Services Company

North East Wales –

Border and Coast

Strengthening key hubs as a focus for investment in future employment, housing, retail, leisure and services	• Work with local planning authorities to ensure new housing development are sited to increase the density of existing settlements increasing the viability of public transport and community energy projects • Develop key hubs as low carbon zones to attract carbon reduction related investment
Take a zoned approach to the refurbishment of the existing building stock to cluster renewable energy businesses, including high value manufacturing of microgeneration technologies	• Energy efficiency, decentralised energy and sustainable transport projects all present opportunities to create specialised green jobs • Work with public bodies to ensure public procurement stimulate demand for local goods
Developing / updating the skills of the current and potential workforce	• Facilitate discussions between sector skills, HE/FE and construction and energy businesses to assess the skills needed to deliver sustainable construction and refurbishment • Work with constituent local planning authorities to ensure planning requirements create demand for these skills
Developing travel solutions to improve the accessibility of the rural hinterland	• Further develop community transport, demand responsive transport and village park and share facilities to improve accessibility and reduce single occupancy car journeys
Ensuring good access to services such as health across the region	• Work with constituent local planning authorities to ensure the location of homes, jobs and services • Make use of telehealth to provide access to healthcare services
Maximise the opportunities from the fibre speed investment	• Explore the potential use and development of a video conferencing hub or home working hub connected • Promote the use of ICT as a replacement for travel in business and to enhance international connectivity

North West Wales –

Eryri a Môn

Ensuring sufficient skills provision e.g. through a regional approach to skills assessment for key sectors	• Include an assessment of the skills needed for low carbon transition prioritising key sectors such as sustainable construction and energy generation
Local housing market assessment including travel to work patterns and relationship between place of work and home	• Select sustainable transport investments based upon evidence of travel patterns e.g. Identification of the need for demand responsive transport to large employment sites or the potential for a video conferencing hub to displace work travel
Support and establish indigenous business in both urban and rural areas	• Provide support for home businesses including information on set up and tax implications • Work with constituent local planning authorities to develop planning requirements for home working facilities e.g. live/work units in new housing developments • Develop home working hubs at strategic sites
Sustainable development and growth in the agricultural sector	• Support co-operative approaches to farming to allow landscape scale management and joint marketing of products to serve larger markets e.g. Pontbren environmental co-operative • Support local food production through a local diet project, public sector procurement, promotion of community supported agriculture, providing support for landowners to access energy markets e.g. for biomass
Exploitation of ICT	• Promote the use of ICT as a replacement for travel through telehealth, providing home business/home working support and video conference hub establishment
Expanding activity in waste reduction, reuse and recycling	• Support the establishment of re-use centres for furniture and building materials • Support the development of energy from waste technologies • Develop a low carbon zone with a focus on zero waste to focus investment and provide a model for replication possibly focused on Bangor as a settlement of national importance in the WSP

A programme of acti on on ICT will be developed

- Increase support for ICT connecti vity and uptake, and support home working
- Provide demand responsive transport to key public transport nodes or routes

New housing development with emphasis on sett lements within the strategic hubs and revitalising and sustaining smaller communiti es

- Work with consti tuent local planning authoriti es to ensure new developments are sited to deliver co-locati on of homes, jobs and services and to raise the density of housing to increase the viability of community energy schemes and public transport services

Developing indigenous business – support ng small and micro businesses to grow and compete

- Invest in ICT including provision of support for home businesses such as informati on en set up and tax implicati ons
- Work with consti tuent local planning authoriti es to develop planning quirements for home working faciliti es such as live/work units in new housing developments
- Develop home working hubs at strategic sites

Enhancing tourism faciliti es and services

- Work with visit Wales and the Regional Tourism Partnership to promote and support eco-tourism
- Work with the Regional Tourism Partnership to engage tourism businesses in improving sustainability and sourcing produce locally e.g. Local Food Talks

Creati ng healthier communiti es by increasing access to outdoor recreati onal opportuniti es

- Expand and create walking and cycling routes parti cularly within and between key sett lements
- Develop promoti onal schemes such as a bike buddy website to increase walking and cycling commutes

Encouraging local communiti es and businesses to take positi ve acti on in support of the region's vision of sustainability

- Provide support for community energy projects e.g. through a development offi cer
- Promote local agricultural produce through encouraging community supported agriculture
- Provide land for community food growing
- Establish local campaigns such as waste reducti on and local diets

South East Wales –

Capital Region

Work on the vision, objectives and proposed outcomes for strategic opportunity areas, allowing greater coherence in their development and planning	• Ensure this accounts for / is used to strategically place new developments to infill existing settlements to increase housing density and the viability of public transport services and community energy projects; to deliver the co-location of homes, jobs and services; and to ensure public transport accessibility
Development of an international business park as a strategic employment priority	• Ensure business travel is limited through capitalising upon ICT connectivity and the potential for a video conferencing hub • Ensure access to and information on sustainable transport options for workers e.g. a demand responsive dedicated shuttle bus and workplace travel planning
Adapt the economy to the demands and opportunities of a low carbon market place	• Take a zoned approach to tackling carbon reduction to cluster renewable energy businesses and expertise • Identify and harness the region's carbon reduction strengths
ICT has a major role to play in reducing strain on the transport system	• Invest in ICT connectivity alongside promotion of its use and support for home business start up • Identify strategic sites for video conferencing hubs to minimise business travel • Work with local planning authorities to ensure ICT connectivity in new developments
Upgrading the skills of those in and out of work	• Support and invest in renewable energy, sustainable construction and energy from waste infrastructure to stimulate demand fro green skills • Facilitate communication between business and HE/FE to match training and skills development to industry requirements
Sustaining and developing places that are safe for people to walk and cycle	• Work with constituent local planning authorities to call for greenways in new developments • Work with local authorities to reallocate and design road space in key settlements to favour cyclists

Swansea Bay –

Waterfront and

Western Valleys

An ICT strategy for the region will be developed

- Alongside improved connectivity ensure its use is promoted e.g. through advice on home business start up, through identifying strategic sites for video conferencing hubs and through working with the business sector to utilise ICT as a replacement for travel

Sustainability will be promoted in the economy through making best use of local people, producers and suppliers

- Instigate a zoned refurbishment programme pledging to use local workers
- Work with Value Wales to support public sector procurement to create markets for local sustainable produce
- Instigate a local diet programme to stimulate demand for local food

Enable the whole of the city region to be recognised across Europe as a premier place to live and work in a modern sustainable way

- Develop a holistic low carbon zone e.g. around Swansea to radiate progress on emissions reduction throughout the region
- Partner with another European Low Carbon Region to enable knowledge transfer and build a European reputation for sustainability

Developing an integrated skills strategy

- Include the skills requirement for low carbon transition prioritising key sectors such as sustainable construction and microgeneration

Empowering local communities and business to become actively involved in positive actions towards achieving the region's vision for sustainability

- Provide support for community energy projects e.g. through a development officer
- Promote local agricultural produce through encouraging community supported agriculture
- Provide land for community food growing
- Establish local campaigns such as waste reduction and local diets

Public services are amongst the largest employers in local communities and have a role to lead by example...

- Work with LSBs or directly with the public sector to ensure procurement of local goods and produce to stimulate local markets
- Work with the public sector to lead by example on low carbon transition including electric and hybrid vehicles in forward commitment procurement models, energy efficiency refurbishment of the estate, waste minimisation and travel planning

Appendix D

List of Sector Specific Mechanisms to Reduce Emissions at a Regional Level (taken from the 'Resource Bank' chapters 8-11)

Mechanisms to Reduce Carbon Emissions from the Built Environment and Energy Sectors

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Box BE2. Mechanisms to reduce the embodied energy of new build

    I.   Develop a standard for materials to be used in new builds, based upon BRE's Green Guide to Specification

    II.   Work with local authorities in the region to incorporate the above standard into planning guidance

    III.   Encourage organisations represented on the Area Group to lead by example and incorporate the above guidance into developments for which they have influence

    IV.   Work with relevant partners such as the Forestry Commission Wales and relevant construction organisations, to look at what is needed to proliferate timber frame housing within the region

    V.   Establishment of building materials reuse centres (BMRCs)

Box BE5. Mechanisms to increase the energy efficiency of new build

    I.   Local Development Plans to identify how to bring existing housing / building densities up to a level which will make combined heat and power systems and/or district heating schemes viable

    II.   Local Authorities to require sustainable construction standards that go beyond that outlined in Planning Policy Wales

    III.   When implementing the above Local Authorities could allow developers to contribute to a carbon neutral fund through a Section 106 agreement where carbon neutrality cannot feasibly be delivered due to financial or site constraints

    IV.   Use exemplar sustainable buildings in the region to raise awareness of energy efficiency and microgeneration technologies.

Box BE10. Mechanisms to increase the energy efficiency of the existing stock

Mapping the Region's Housing Stock

    I. Thermal mapping of the existing building stock

    II. Energy Auditing of the existing building stock

    III. Mapping of fuel poor households within the region

    IV. Mapping of housing types within the region

    V. Identify priority areas for housing refurbishment

Engagement with the Construction Sector

    VI. Encourage the construction trade to recommend energy efficiency improvements during routine refurbishments/repairs

    VII. Work with the construction sector to identify the skills and training needed to specify and install low carbon measures

Communication to Householders

    VIII. Identify ways in which to incentivise energy efficient householders to have an 'open house' for x days per year.

    IX. Increase the number of smart meter installations, e.g. loans of smart meters through local libraries

Refurbishment via a Zoned Approach

    X. Partner with relevant organisations to develop bids for EU, CERT and CESP funding

    XI. Use Section 106 to require developers to fund energy efficiency improvements of the existing stock

    XII. Business and Public Sector Energy Efficiency

    XIII. Work with the Carbon Trust to promote its energy efficiency loans scheme to SMEs in the area.

    XIV. Work with the Carbon Trust to upgrade Public Sector buildings in the area

    XV. Switch off street lights during periods of low demand (i.e. 12pm -5am)

    XVI. Intelligent traffic signals and street lighting

Box BE11. Mechanisms to promote Renewable Energy

I. Work with local authorities to streamline the planning process for renewable energy planning applications

II. Identify suitable locations for district heating schemes, e.g. range of building types to create an even heat load, linking forestry resource to fuel for biomass district heating.

III. Wind Turbines for large businesses / business parks – Ecotricity Merchant wind power scheme

IV. Explore the possibilities of establishing Energy Service Companies

V. Establish an Energy Partnership to explore ways in which organisations within the region can work together to drive forward energy projects.

VI. Provide advice /support to community energy projects

VII. Facilitate impartial communication on the pros and cons of renewable energy developments in the area

Mechanisms to Reduce Carbon Emissions from the Transport Sector

Box T1. Mechanisms to Reduce the Need to Travel

I. Work with local authorities to ensure Local Development Plans or supplementary planning documents require:

    a) the co-location of homes, jobs and services through infilling or mixed development

    b) dense town and city layouts (aiming for 50 houses per hectare or above)

    c) consideration to be given to the need for a live/work approach to development

    d) ICT connectivity as standard in new developments

II. Work with Visit Wales and the Regional Tourism Partnership to promote local holidays and explore opportunities for sustainable travel to tourist destinations and between attractions

III. Work with local service boards and local authorities to maximise the benefits of Welsh Assembly Government Broadband initiatives

IV. Explore innovative options for the expansion of broadband connectivity in partnership with the private sector e.g. Anglesey wireless broadband access utilising radio links

V. Provide support for ICT exploitation in conjunction with local authorities, including producing written materials and guidelines for home business start up; exploring opportunities for establishing strategically positioned home working and video conferencing hubs (in conjunction with the private sector); establishing a promotional programme for the use of ICT for home working, business meetings, telehealth e.g. South West Wales' Cancer Network and co-ordinated online food shopping.

Box T2. Mechanisms to Promote Travelling Via More Sustainable Means

I. Work with local authorities to ensure Local Developments and supplementary planning documents require:

   a) provision for walkers and cyclists in new developments including green corridors, cycle parking, showering facilities for cyclists in employment developments, wide pavements

   b) developments to meet public transport accessibility standards (to be developed in partnership by the WSP Area Group, local authorities and the regional Transport Consortium)

   c) limited car park space numbers in new builds & mandatory provision of cycle parking

II. Work with local authority planning and regeneration departments to favour public transport, walkers and cyclists in road layouts through: filtered permeability – providing direct walking and cycling routes and limiting car travel to key roads; providing wide and continuous cycle lanes; bus gates allowing access to buses only or fast bus lanes

III. Work with local authorities and local service boards to incorporate procurement of hybrid / electric vehicles into forward procurement models of the public sector

IV. Seek funding to explore opportunities to pilot e.g. biogas fuelled public transport in conjunction with the private sector or an electric transport town or rural community

V. Exploring opportunities for local authority planning officers to work with developers to incorporate recharging infrastructure into new developments to ensure they are future ready

Box T2. Mechanisms to Promote Travelling Via More Sustainable Means Continued

VI.   Improve public transport , walking and cycling networks through:

    a) "Auditing" existing public transport networks to identify e.g. where a cycle route ends abruptly or where a bus time could be altered to better match e.g. end of shifts

    b) Facilitating discussion between public transport operatives to improve integration

Box T3. Mechanisms for Behavioural Change / Smarter Choices

I.   Work with the regional Transport Consortium to promote and develop travel plans for local authority buildings, public sector buildings, key workplaces, schools, key tourist attractions and targeted residential areas. Promote the concept of a travel plan champion within each organisation

II. Work with local authority planners to explore opportunities to require developer funded travel plans for large new residential developments

III. Promote the pooling of resources across local authorities and regional transport consortia to create a small dedicated Smarter Choices team

IV. Instigate a rolling programme of individualised travel marketing in partnership with local authorities and the Transport Consortium to target key communities

V.   Implement cycling schemes such as: a travelling Cycling Ambassador Scheme – expert cyclists who travel between communities on bikes to deliver educational cycling events and cycling course; a bike bus project – cyclists commute to work or school along a set route with a set timetable; a bike buddy website – allowing inexperienced cyclists to pair up with experienced cyclists who travel the same commuter route

VI. Work with local authorities to promote behavioural change e.g. through promotion of eco driving and making more of existing opportunities including in town without my car day, bike week, national lift share day

Box T4. Mechanisms to Reduce Emissions from Freight

    I.   Promote local production and consumption e.g. local food consumption through the mechanisms highlighted in the Land Use section of this report to reduce food freight

    II.   Explore in partnership with regional Transport Consortium and town / city council the need to limit freight movement in city centres through charging / restricted delivery hours with a view to stimulating consolidation centre establishment / modal shift

    III.   Explore in partnership with the regional Transport Consortium, the retail and construction sectors, the opportunity to establish strategically sited shared consolidation centres e.g. Norwich (alongside a waste disposal facility where possible to take waste away in the empty delivery lorry)

    IV.   Explore opportunities to secure part funding for eco-driver training for LGV and HGV drivers, to be match funded by the industry (equivalent to SAFED driver training government initiative operating in England)

    V.   Work with the Wales Freight Group / regional Transport Consortium to provide targeted fuel efficiency campaigns and advice for freight businesses e.g. procurement of aerodynamic cabs, correct tyre inflation, improved trailer fill

    VI.   Seek a private sector partnership to pilot biofuel, biogas from anaerobic digestion or bio-methane from waste fuelled HGVs

    VII.   Explore in partnership with the Regional Transport Consortium and the Wales Freight Group opportunities for the modal switch of freight to rail / water

Mechanisms to Reduce Carbon Emissions from the Rural and Land Use Sector

Box RLU2. Mechanisms to Reduce Emissions from Agricultural Practices

I.   Promote the uptake of energy auditing and carbon accounting on farms

II. Work with relevant partners such as NFU, FUW, CLA and Farming Connect to engage farmers in improved livestock and crop management for green house gas emission reductions

III. Promote and support research into reducing methane and nitrogen compound

Box RLU3. Mechanisms to Reduce Non-Renewable Energy and Fuel Use on Farm

I.   Work with relevant partners such as NFU and Farming Connect to increase awareness and uptake of simple fuel reduction techniques

II. Work with relevant partners such as NFU and Farming Connect to support and promote microgeneration uptake on farm, keeping up to progress with potential funding from the Low Carbon Buildings Programme and the second Wood Energy Business Scheme

III. Utilise part of the resources put into ESCO, energy partnership or revolving fund establishment to target energy efficiency and renewable energy uptake in the agricultural industry

IV. Work with relevant partners such as NFU and Farming Connect to support and promote the use of existing and purposefully planted biomass crops for conversion to heat, power and fuel

V.   Facilitate communication between groups of famers / co-operatives and local biomass plant developers to co-ordinate biomass supply and demand

VI. Support the establishment of environmental farming co-operatives

Box RLU4. Mechanisms to Increase Local, Seasonal Food Consumption.

  I.   Lobby the Welsh and UK governments to develop a single comprehensive carbon footprinting procedure for all food produce

 II.   Work with local authorities and Local Service Boards to increase public sector local food procurement through using criteria such as seasonality and freshness to justify local choice

III.   Work in partnership with specific industry representatives such as the regional Tourism Partnerships, alongside local producers to directly promote procurement of local, sustainably produced food in the private and third sectors. This can be expanded to promote choice editing for local, sustainably produce by food retailers within the region

 IV.   Create and make publically accessible a database of local, sustainable food producers

  V.   Initiate and promote a regional local diet programme

 VI.   Work with local authorities to increase land provision for community food growing, exploring the opportunity for a community farm, community gardens and allotments

VII.   Work with local authorities to ensure land provision for food growing is a requirement in all residential and school developments e.g. roof gardens in blocks of flats, community or individual vegetable gardens.

Box RLU5. Mechanisms to Conserve and Enhance Carbon Stores

   I.   Undertake a mapping exercise (building upon existing soil carbon maps) to identify highest carbon content soils most in need of protection and degraded soils with the most potential for sequestration through restoration to inform e.g. Local Development Plans and conservation expenditure.

  II.   Work with relevant partners such as NFU, Forestry Commission to explore opportunities to promote soil carbon aware land management in agricultural and forestry practices (beyond what is required as part of the Single Payment Scheme).

 III.   Explore with organisations such as National Park Associations opportunities for soil carbon restoration projects e.g. a programme of individual or co-operative landowner engagement and delivery for ditch blocking on organic soils or peat land restoration.

 IV.   Support the establishment of environmental farming co-operatives to deliver landscape scale farm woodland planting for example or bioenergy crop planting.

  V.   Seek partnerships with large landowners to instigate woodland planting on mineral soils.

 VI.   Partner with research institutions to pilot soil carbon sequestration schemes such as biochar incorporation or peat bog restoration to culminate in best practice advice for landowners.

VII.   Work with relevant partners such as Wood Knowledge Wales to identify opportunities for regional contributions to promoting the use of local, sustainable timber in construction, furniture and fittings.

VIII. Work with local authorities / local service boards to specify in planning guidance or own estate construction standards the need for utilising renewable timber frames in new developments.

Mechanisms to Reduce Carbon Emissions from the Waste Sector

Box W1. Mechanisms for Waste Prevention and Minimisation

I. Set a framework at the regional level to reflect the need for the sustainable use of natural resources

II. Promote higher resource efficiency across all sectors by encouraging waste reduction, reuse, recycling and composting

III. Promote the use of Welsh recyclate in Welsh manufacturing, e.g. in construction and maintenance and infrastructure projects

IV. Promote low impact packaging and waste minimisation across the food sector

V. Integrate supply chains so that there is less consumption of raw materials and waste production is reduced e.g. through industrial symbiosis

VI. Consider the impacts of a products design on its lifecycle with an aim of reducing wastage, maintenance and energy consumption

VII. Choose and promote the design of products that can be reused or easily remanufactured

VIII. Set voluntary targets for waste reduction and the incorporation of recycled content on all public sector funded construction projects

IX. Reduce impacts through implementing the Demolition Protocol on all new developments

X. Support the use of Site Waste Management Plans by the construction and demolition industry

XI. Any major public sector capital expenditure should seek to reduce waste arisings throughout product life cycles, as well as sharing knowledge of these processes with government, and with the private sector

Box W2. Mechanisms to Increase Reuse

    I. Make improvements to bulky household waste collections to maximise reuse and recycling

    II. Consider procuring reused furniture on public sector estates and the provision of reused furniture for social housing tenants

    III. Ensure adequate provision of reuse at household waste recycling centres (HWRCs)

    IV. Promote freecycle networks, local charity shops and organise 'give and take' days

    V. Support reusable nappy schemes and education on their use

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Box W3. Mechanisms to Increase Recycling

    I. Move from co-mingled collection of waste to source segregated or twin stream collection systems

    II. Focus on source segregated and closed loop recycling systems

    III. Improve collection efficiency by optimising routes to reduce vehicle fuel consumption

    IV. Make improvements to bulky household waste collections to maximise reuse and recycling

    V. Improve recycling rates at HWRCs by following best practice guidance

    VI. Consider setting up trade waste recycling centres

Box W4. Mechanisms to Increase Composting

    I. Treat food and other putrescible waste (e.g. agricultural slurries) by anaerobic digestion (AD) to produce biogas for local heat /combined heat and power (CHP) or to produce biomethane for transport.

Box W5. Collection and Treatment

I. Integrate the collection and treatment of municipal solid waste (MSW), construction and demolition waste (C&D) and commercial and industrial waste (C&I)

II. Place a cap on the treatment of residual waste by energy from waste (EfW) of 30-35%. Any EfW facilities should be at least 60% efficient and linked to CHP

III. Segregate contaminated waste wood for use as biomass in CHP facilities that comply with the waste incineration directive (WID)

IV. Capture and convert landfill methane into biomethane as a replacement transport fuel

Box W6. Delivery through Partnerships

I. Introduce waste minimisation champions throughout the public sector to raise awareness and stimulate action

II. Implement consistent waste awareness campaigns across spatial regions to stimulate behavioural change across all sectors

III. Consider joint working to redesign collection rounds to allow cross-boundary collections and also the sharing of vehicles and depots for optimum efficiency

IV. Work with major retailers to help supplement local recycling infrastructure

V. Where waste volumes are low and costs are high, explore the use of inter-organisational waste contracts to achieve economies of scale

Appendix E

List of Sector Specific Measures of Success (taken from the 'Resource Bank' chapters 8-11), to be used as indicators in the regional low carbon strategy.

Measures of Success for the Built Environment and Energy Sectors

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Box BE3. Measuring success for the embodied energy of new build

- Percentage of new homes meeting CSH level 3 or above
- Percentage of non residential developments achieving BREEAM Very Good or higher
- A standard is developed for materials to be used in new builds, based upon BRE's Green Guide to Specification
- How many local authorities in the region to incorporate the above standard into planning guidance?
- How many organisations in the region incorporate the above guidance into their policy?
- Number of timber frame buildings in the region
- Establishment of a building materials reuse centre (BMRCs)
- Turnover of the BMRC
- Construction material diverted from landfill
- Emissions saved by using materials with low embodied energy

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Box BE6. Measuring success for the energy efficiency of new build

- Percentage of new homes meeting CSH level 3 or above
- Percentage of non residential developments achieving BREEAM Very Good or higher
- Local development plans include land allocated to increase housing densities to make CHP or DH schemes viable
- Local authority sustainable construction requirements are set above those required through Planning Policy Wales
- A carbon neutral fund is established for developments which cannot meet the above
- Number of visitors to sustainable building "open days"

Box BE12. Measuring success for existing stock

- **National Strategic Indicator 18 EEF/02:**
  a) **Percentage reduction in carbon dioxide emissions in the non domestic public building stock**
  bi) **Percentage reduction in energy use in the housing stock**
  bii) **Percentage reduction in carbon dioxide emissions in the housing stock**

- Percentage of housing stock which has been subject to thermal mapping and/or energy auditing
- Fuel poor households and housing types are mapped across the region
- Priority areas for refurbishment are mapped across the region
- Percentage of the region's housing stock refurbished to EPC C or above
- Number of construction firms within the region with at least one employee who has attended a sustainable construction course
- An analysis of skills and training needed to install low carbon measures is undertaken within the region
- Number of sustainable construction training course opportunities within the region
- Number of energy efficient building "open days" held within the region each year
- Number of smart meters loans through libraries within the region
- Number of homes targeted via a regional energy efficiency campaign
- Number of buildings for which funding is secured to refurbish them through a zoned approach
- Percentage of public sector buildings refurbished
- Number of businesses within the region accessing Carbon Trust energy efficiency loans
- Number of businesses within the region achieving Green Dragon Environmental Standard Levels 3 to 5
- Number of businesses taking part in a regional energy saving competition
- Local authority energy and CO_2 savings through street light switch off / dimming

Box BE14. Measuring success for renewable energy

- Regional renewable generation capacity
- Renewable energy resources are mapped across the region
- The renewable energy resource map is used to guide installation
- Percentage of renewable energy generation planning applications approved within a year
- Suitable locations for district heating schemes are identified across the region
- Number of large businesses and business parks powered by wind turbines
- Establishment of an ESCO
- Establishment of an energy partnership
- Number of community energy projects within the region
- Number of DH / CHP schemes within the region
- Number of homes powered by renewable energy within the region
- Number of schools with a microgeneration technology installed within the region

Measures of Success for the Transport Sector

Box T2. Measuring success for reducing the need to travel

- Percentage of new developments designed to deliver co-location
- Percentage of new developments with ICT connectivity
- Establishment of a project addressing sustainable travel to tourist destinations in conjunction with Visit Wales or / and the Regional Tourism Partnership
- Broadband coverage area
- Number of home working and video conferencing hubs
- Creation of written materials and guidelines to support home business start up
- Number of new home businesses established per year
- Number of hospitals / surgeries utilising ICT to reduce travel
- Number of businesses encouraging home working amongst their employees

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Box T4. Measuring success for travelling via more sustainable means

- Percentage of regional population using public transport on a weekly basis
- Percentage of journeys made on foot or bicycle
- Percentage of developments with green corridor and cycle parking facilities
- A public transport accessibility standard is developed and adopted for all new developments
- Percentage of developments with capped parking space provision
- Percentage of large developments and regeneration projects providing for walkers and cyclists e.g. inclusion of filtered permeability
- Number of public sector organisations committing to hybrid, electric or hydrogen vehicle procurement in forward commitment procurement models
- Establishment of a trial project for the use of e.g. biogas in public transport
- Number of electric car recharging points in the region
- Percentage of public transport operatives participating in integration projects and initiatives
- Number of worker car journeys displaced by demand responsive transport to key employment sites
- Number of bus services with real time passenger information service available
- Establishment of an ultra light rail or electric trolley bus service in the region's key urban centre(s)
- Number of bike rentals from city centre bike pick up and drop off scheme
- Number of businesses and public sector buildings allocating car parking spaces for shared cars only
- Number of cars using park and share facilities e.g. village hall car parks
- Establishment of a car club in dense urban areas
- Percentage area of inner city and town centres pedestrianised

Box T6. Measuring success for behavioural change / smarter choices

- Percentage of regional population using public transport on a weekly basis
- Percentage of journeys made on foot or bike
- Number of schools and public sector buildings with an adopted travel plan
- Number of tourist destinations with an operational travel plan
- Creation of a regional smarter choices team
- Number of households targeted through individualised travel marketing
- Number of people commuting to work through a bike bus project
- Number of children travelling to school with a walking or cycling bus
- Number of visitors to an established bike buddy website
- Availability of eco driver training within the region

Box T8. Measuring success for reducing emissions from freight

- Percentage of food producers within the region marketing and selling their produce locally
- Establishment of freight consolidation centres serving city centres
- Number of people attending eco driver training courses for LGV and HGV drivers within the region
- Number of freight operatives trialling low carbon fuels such as biofuel
- Number of freight miles transferred to rail or water

Measures of Success for the Rural Land Use and Food Sectors

Box RLU3. Measuring success for emissions from agricultural practices

- Number of farmers within the region accessing CLA's carbon accounting tool or CALU's energy auditing manual
- Number of farmers engaged in a project to improved livestock and crop management for green house gas emission reductions
- Research is commissioned to look into reducing methane and nitrogen compound emissions from livestock, increasing nitrogen uptake from feed and breed selection

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Box RLU5. Measuring success for non-renewable energy and fuel use on farm

- A partnership and subsequent programme of action is developed with NFU or equivalent farm advisory organisation to increase energy / fuel efficiency and promote renewable energy on farm
- Capacity of on farm renewable energy within the region
- Number of farms with community scale renewable generation units
- Number of farmers managing woodlands and growing dedicated biomass crops to provide feedstock for biomass and biofuel plants either on farm or commercially
- Any ESCO, energy partnership or revolving funds established for energy efficiency or decentralised energy, targets the agricultural sector as part of its remit
- Number of environmental co-operatives established

Box RLU7. Measuring success for local, seasonal food consumption

- Percentage of public sector food procured from within the region
- A partnership or partnerships are established to promote procurement of local, sustainable food in the private and third sectors
- A database of regional food producers is created and publicised
- A local diet programme is established and publicised
- Number of participants in local diet programme
- Area of land available within the region for community food growing
- Percentage of schools within the region with a vegetable garden providing produce for school meals
- Number of farms providing community supported agriculture opportunities
- Number of visitors to local farmers markets
- Percentage of new residential and educational developments with land provided for food growing
- Area of allotment land

Box RLU9. Measuring success for conserving and enhancing carbon stores

- Soil carbon / land use maps are collated and used to guide projects and development
- A partnership is established to promote soil carbon aware land management in agricultural and forestry practices
- Percentage of all high carbon soils under protection
- Area of soil in carbon restoration projects
- Area of woodland planted on low carbon soils
- Soil carbon sequestration trials e.g. biochar are underway in conjunction with a research institution
- Number of timber frame buildings in the region
- Number of local authorities utilising local renewable timber frames in new developments on their own estates

Measures of Success for the Waste Sector

Box W2. Measuring success for waste prevention and minimisation

- Volume / weight of municipal waste sent to landfill
- A framework for the sustainable use of natural resources is set at a regional level
- Volume of Welsh recyclate used in manufacturing within the region
- An initiative is established to promote low impact packaging and waste minimisation across the food sector
- Targets are set for waste reduction and the incorporation of recycled content for all public sector funded construction projects
- Percentage of developments with Site Waste Management Plans
- Volume of public sector waste is reduced through procurement for waste minimisation
- Number of industrial units participating in industrial symbiosis

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Box W4. Measuring success for reuse

- **National Strategic Indicator 14 WMT/001:**
  The percentage of municipal waste (i) Reused and/or recycled

- **Core Indicator Set WMT/007:**
  The percentage of municipal waste received at all household waste amenity sites that is reused, recycle or composted

- Percentage of furniture items procured on public sector estates which is reused furniture
- Percentage of furniture provided for social housing tenants which is reused furniture
- Number of freecycle networks within the region and number of users
- Establishment of a regional reusable nappy scheme alongside provision of educational material on their use

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Box W6. Measuring success for increasing recycling

- **National Strategic Indicator 14 WMT/001:**
  The percentage of municipal waste (i) reused and/or **recycled**

- **Core Indicator Set WMT/007:**
  The percentage of municipal waste received at all household waste amenity sites that is reused**, recycled** or composted

- Number of local authorities within the region operating source segregated or twin stream collection systems
- Number of local authorities within the region operating closed loop recycling systems
- Reduction in mileage travelled by waste collection through route optimisation
- Establishment of a regional trade waste recycling centre

Box W8. Measuring success for increasing composting

- **National Strategic Indicator 14 WMT/001:**
  The percentage of municipal waste (ii) Composted or treated biologically in another way

- **National Strategic Indicator 15 WMT/002:**
  The percentage of biodegradable municipal waste sent to landfill

- **Core Indicator Set WMT/007:**
  The percentage of municipal waste received at all household waste amenity sites that is reused, recycled or **composted**

- Establishment of an anaerobic digestion facility in each local authority

Box W10. Measuring success for collection and treatment

- **Core Indicator Set WMT/005**
  The percentage of municipal waste used to recover heat and power

- Establishment of an anaerobic digestion facility in each local authority
- Volume of landfill methane captured and converted into biomethane as a replacement for transport fuel

Box W12. Measuring success for delivery through partnerships

- Number of public sector organisations with waste minimisation champions
- A waste awareness campaign is implemented across Spatial Plan regions
- Cross-boundary working on waste collection is underway
- Major retailers have / are supplementing local recycling infrastructure