

SCP Issues around Sustainable Economic Growth in the North West

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Executive Summary

The Northwest Regional Economic Strategy (RES) identifies sustainable consumption and production (SCP) as one of seven key factors required to achieve the vision for the region of “ a ***dynamic, sustainable international economy*** which competes on the basis of knowledge, advanced technology and an excellent quality of life for all where productivity and enterprise are high, in a ***low carbon economy***, driven by innovation, leadership excellence and high skills”.

It is inevitable within the sphere of sustainable consumption and production (SCP) that there will be potentially conflicting aims and objectives, as can be illustrated with some of the current objectives in the strategies for the North West:

- RES target to achieve a growth in GVA above the average for England
- RES target to reduce CO₂ emissions per unit (£) of GVA
- Regional Waste Strategy target to achieve & retain zero growth rate in commercial and industrial waste arisings.

It is generally recognised that current patterns of consumption and production (SCP) are unsustainable and that any route to SCP must be based on a better understanding of the relationships between the consumption activities of the population, the production activities associated with the economy and their combined impact on the environment, when used as a source of resources and a sink for waste.

SCPnet¹ was created by the English Regions to provide a robust, consistent economic-environment evidence base, rationale and mechanisms to help determine region-specific roadmaps to SCP through policies and interventions.

As the prospect of a Single Regional Strategy moves ever closer, SCPnet has been requested by NWDA to provide this overview, as an integral part of the new evidence base, to highlight some of the challenges and opportunities facing the region in terms of SCP, based on the:

- Annual GVA and population growth assumptions in the long-term economic forecast produced by the North West Regional Economic Forecasting Panel
- Implications of a “business-as-usual” projection of current trends to 2020.

In particular it looks at the implications for a number of key sectors in the region in relation to two key targets contained in the current regional strategies, which are to:

- Reduce CO₂ emissions per unit (£) of GVA
- Achieve & retain a 0% growth rate in commercial and industrial waste arisings

¹ SCPnet, a partnership between the Environment Agency, RDAs, Regional Assemblies & WWF; www.scpnet.org.uk

The Challenges

Chemicals & Pharmaceuticals Sectors

The North West still has a highly productive manufacturing sector compared to the English average. It is one of only three regions to contribute positively to the UK balance of trade, with exports dominated by organic chemicals and pharmaceuticals².

The chemicals sector is one of the region's most intensive sectors in terms of CO₂ emissions per unit (£) GVA, however the projections indicate that this is likely to decline by 2020 and hence is unlikely to represent any significant risk to the achieving the RES target.

In contrast, the total emissions from the pharmaceuticals sector projected to increase by around 50% between now and 2020, primarily due to the anticipated growth in the sector. Further investigation may be required to determine if this could pose a risk to the longer term RES target of reducing emissions to 12.5% below 1990 levels by 2012.

In terms of commercial and industrial hazardous waste, the pharmaceutical sector also generates the largest contribution to the hazardous waste arisings in the region, representing 35% of the region's total. The analysis would indicate that this could rise by as much as 50% by 2020, which could challenge the region's target of zero C & I waste growth in relation to hazardous waste. However further work is needed to reconcile the arisings with the different materials from this sector entering the waste management system.

Construction Sector

The construction industry in England uses around 400 million tonnes of materials every year and generates around 90 million tonnes of construction, demolition and excavation (CD&E) inert waste, of which half is recycled as aggregates. However the total amount of CD&E waste estimated as being disposed of to landfill in England, is still in excess of 25 million tonnes a year³. In the North West, arisings amount to over 11 million tonnes and are projected to rise to over 15 million tonnes by 2020.

National statistics would indicate that much CD&E waste is already recycled, e.g. 84% of the biodegradable component. However further research is necessary to ascertain whether or not the increase in arisings is sufficiently offset by recycling not to challenge achievement of the regional target of zero growth in waste, which in this case is taken to mean waste for disposal. More comprehensive information on both the composition and disposal routes for construction waste is also required to enable a more detailed analysis can be carried out.

² North West Regional Economic Strategy 2006

³ Strategy for Sustainable Construction BERR June 2008

Food & Drink Sector

However it also contains a large number of SMEs and is a key component of the rural economy in the region. In terms of SCP, it:

- Ranks second in terms of waste intensity per £GVA
- Ranks third in biodegradable waste arisings.

Whilst not posing any immediate challenge to the CO₂ intensity target for the region, it presents an on-going challenge to the region's zero C & I waste growth target and is recognised in the Food North West Action Plan⁴.

Retail Sector

The retail sector has particular links with the food and drink sector in the Northwest, where it is home to regional retailers, such as the food store, Booths, which operates over 25 supermarkets across the region and 25% of the food is produced locally.

In terms of waste arisings, it generates 25% of the total C & I biodegradable waste arisings with a nine percent growth is indicated by 2020. Depending on the amount recycled, this may pose a challenge the regional waste target and the national target of reducing biodegradable waste to landfill.

Road Transport

Collectively, road transport is identified in the analysis as a major contributor to regional CO₂ emissions, of which freight accounts for 12% in terms of vehicle kilometres in the region. This is projected to grow by around 14% by 2020. A better understanding of freight logistics within the region could be used to set a framework for regional action to improve this area. As this is not allocated to one specific sector, it is not possible to assess the impact on emission intensity per unit of GVA. However it may challenge the region's CO₂ emission reduction target.

Textiles, Clothing & Leather Sector

The textiles industry in the Northwest is one of the region's most established sectors, spanning 1000 companies, with 450 companies involved in the technical supply chain and employing over 38,000 people⁵.

This sector is not highly energy intensive and therefore does not rank highly in items of CO₂ emission intensity per £GVA. It does not generate a large volume of waste and just falls within the top six sectors in terms of hazardous waste. However this projected to show a significant decline by 2020 and thus this sector is unlikely to present a serious challenge to the achievement of the waste target.

⁴ http://www.foodnw.co.uk/documents/our_action_plan/

⁵ <http://www.nwtexnet.co.uk/>

The Opportunities

Energy & Energy-Efficient Technologies

If the region is to achieve a low carbon economy, consideration needs to be given to how best to help the more energy-intensive sectors to further reduce their carbon footprint. Some further sector-specific research could help make this more focused, perhaps using the Environment Agency's PPC data, together with input from the relevant trade association. Potential areas for further research include:

- Alternative forms of energy that may be suitable for a particular sector but are less CO₂ intensive
- Evidence of clustering, where CHP on an industrial site-by-site basis, similar to that used by Advantage West Midlands, could reduce collective CO₂ emissions and intensity.

The research could help develop a framework to support the development of energy and environmental businesses and technologies in the region. Business Link could provide a suitable delivery mechanism, acting as broker.

The region also has some experience in anaerobic digestion, with the plant installed in Shrewsbury. This technology has obvious application to generate heat and power from biodegradable waste from the food and drink and retail sectors.

Another opportunity could be the expansion of the region's existing prominence in the application of anaerobic digestion techniques to recover energy from biodegradable waste, with particular reference to the food and drink and retail sectors.

Other Environmental Technologies

Although relatively low in volume compared to other waste streams at around a million tonnes, the region's hazardous waste offers a potential source of high value materials, if recovered.

The Industrial Symbiosis Programme, NISP, would appear to have had a degree of success in Yorkshire and Humber, identifying synergies between companies relating to the supply and use of chemicals that would otherwise have become hazardous waste. This type of solution may be suitable for application to the region's pharmaceutical waste and could encourage innovation to develop new methods of clean-up and extraction.

A potential opportunity may exist for the export of water to other regions, where water stress is already a reality, either through an existing the existing network of distribution companies or through a new water provision company, a concept which is already being consideration in some areas.

Freight Transport

Analysis of possible future freight efficiency scenarios in the South West identified that road freight within a region could be reduced in a number of ways:

- Increased local sourcing, reducing the need for imports
- Reducing the number of empty return loads

The analysis indicated that for the South West region, a combination of 20% reduction in vehicle kilometres by achieving possible efficiency savings in both of these areas could potentially cancel out the increase in CO2 emissions anticipated in the region between now and 2020.

This approach epitomises the concept of sustainability in terms of supporting local businesses and reducing the embedded emissions associated with the transport of the goods consumed and should perhaps be considered in future scenarios for the North West.

Sustainable Procurement

The public sector remains the dominant force within the UK construction industry, with a total spend of approximately £40 billion per annum. It is therefore an area with great potential to influence building design and stimulate the market for recycled material. Sustainable procurement is already highlighted in the Regional Economic Strategy as a key driver to achieving sustainable consumption and production. An increased use of recycled CD&E material could be further promoted in the next round of the regional strategy.

Introduction

1.1 Purpose

This report has been produced by SCPnet for the North West Development Agency to compliment the Environmental Considerations of Economic Growth (ECOSEG) study being carried out by SQW Consulting. The aim of this particular report is to analyse some of the current environmental pressures associated with human consumption and production activities in the region.

1.2 Objectives & Scope of Study

The objective of the study is to create an inventory of the following environmental pressures, arising from regional economic production activities, based on current data and to assess the implications for 2020 under a “business-as-usual” scenario:

- Energy consumption
- Water consumption
- Air emissions
- Waste arisings

The implications relating to the domestic consumption activities related to energy use in the home and travel are not included within the scope of the study but are recognised as an important component of consumption and production in the region. Section 4 highlights possible areas for future work in this area.

1.3 Scope of Study

The scope of the study is to:

- Analyse the regional economic-environmental accounts for the North West and identify those sectors which make the most significant contribution to air emissions, energy consumption, waste arisings and water consumption;
- Carry out scenario modelling, using the Regional Economy-Environment Input-Output (REEIO) model, to assessing the implications for the region looking forward to 2020, based on the GVA and population growth assumptions in the long-term economic forecast produced by the North West Regional Economic Forecasting Panel (REFFP);
- Identify any implications for the chemicals, textiles, retail, tourism, construction & demolition sectors.

1.4 Policy Context

The concept of Sustainable Consumption and Production (SCP) is not new, going back as far as the United Nations Conference on Environment and Development in Rio de Janeiro in 1992, and reinforced then years later at the Johannesburg World Summit on Sustainable Development.

SCP has again risen up the agenda more recently in Europe, with the publication of the EU *Sustainable Consumption & Production and Sustainable Industrial Policy Action Plan*⁶ (SCP & SIP Action Plan) in July 2008. This forms an integral part of the EU Sustainable Development Strategy and is also designed to compliment existing EU policies on climate change, energy, resource use and waste management.

The UK Government is considered by many to be leading the field in this area, with SCP identified as one of five key drivers in the UK's sustainable development strategy, *Securing the Future*. Defra's SCP Evidence Team has executed a considerable amount of research in this area to better inform policy development in the UK.

At a regional level, SCPnet, a partnership between the Environment Agency, the Regional development agencies and WWF, was established in 2005 as the principal point of reference for SCP in the regions, including the provision of the necessary regional evidence base and analytical tools to help inform regional policy determination.

In the Northwest of England, the principles of sustainability already form a core part of the Regional Economic and Spatial Strategies and will form the basis of the proposed new Single Regional Strategy (SRS). However, it is recognised that there are critical environmental constraints and considerations that will need to be addressed to ensure that future growth within the region is indeed truly sustainable. Many of these are directly linked to and affected by the regional patterns of consumption and production.

This study explores these issues, to try and expand current understanding of some of the more significant links between economic activity and environmental pressures. This work, together with the ECOSEG study, provides the first building blocks towards the development of an Integrated Evidence Base for the forthcoming SRS.

1.5 Sources of Information

The regional economic-environmental accounts referred to in this study, are those produced by SCPnet for all of the English regions, dis-aggregated from a number of national sources.

- (i) Air emission and energy consumption data are based on the UK National Air Emissions Inventory (NAEI) for 2005 and have been produced by AEA Energy & Environment;
- (ii) Waste arisings data are based on the Environment Agency survey of 2003
- (iii) Water consumption data are based on the Envirowise survey of 1999-2000.

The energy and air emissions data is currently being used by the Committee on Climate Change Shadow Secretariat to inform their development of carbon budgets for the UK.

⁶ http://ec.europa.eu/enterprise/environment/sip_en.htm

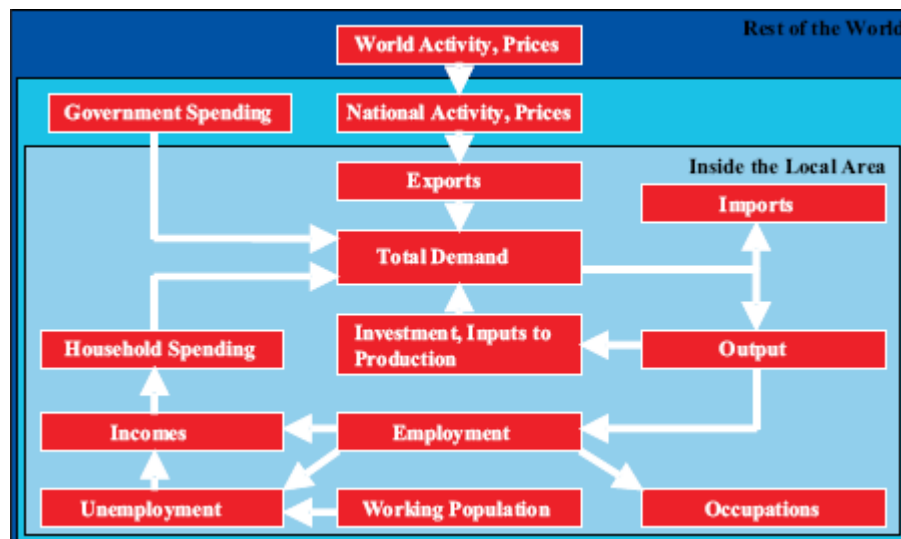
1.6 Methodology

The scenario modelling work has been carried out using the Regional Economy-Environment Input-Output model, REEIO (version 3.0), originally developed by Cambridge Econometrics and the Environment Agency as part of the Reward project, a partnership led by the Environment Agency with the participation of Regional Development Agencies and the National Assembly for Wales. More recently REEIO has been supported by SCPnet. In addition to its use by the regions, REEIO was used by Defra as part of the analysis supporting the Waste Strategy for England 2007.

REEIO is a software-based, scenario-modelling toolkit designed to assist policy makers in analysing regional policies and programmes with regard to the economy and environment, based on common methodology and data consistent with the national accounts. It provides a firm basis for sustainability appraisal, strategic environmental assessment and benchmarks for the resource productivity of businesses and sectors, enabling the user to consider the potential impact of the economy on a number of key environmental pressures, waste, energy, emissions to air and demand for water, under various alternative assumptions.

The model comprises an econometric model in the form of the Local Economy Forecasting Model (LEFM) (illustrated below) developed by Cambridge Econometrics and the Warwick Institute for Employment Research, and an environmental model.

The econometric model analyses the extent to which regional output and employment by detailed industry depend on spending within the local area, or on markets outside the local area, based on estimates of a full flow matrix of expenditure components for the region.



REEIO identifies the regional economy in considerable detail, distinguishing 42 employment activities, six types of employment, and 25 occupations. It follows the conventional System of National Accounts accounting structure, distinguishing consumers' expenditure, investment, government consumption, intermediate purchases by industries and trade flows on the basis of information available regionally. Further detail on the classifications used is provided in Appendix A.

Production output is then linked to the four environmental pressures, as outlined below, where the baseline is based on the SCPnet regional economic-environmental accounts.

Energy Use: The use of energy by fuel type is determined on the basis of the scale of activity (level of output, for industry sectors) of the fuel user and the relative price of fuels. The energy demands from power generation in the region is considered by explicit assumptions regarding specific plant capacities and utilisation.

Air Emissions: The projections for air emissions are determined in two parts. The energy-related emissions are determined on the basis of energy use by user and fuel. Emissions that are not energy-related are determined by an appropriate activity indicator.

Waste Arisings & Management: Production of industrial and commercial waste is projected on the basis of each industry's purchases of input products. Household waste is projected on the basis of population growth and the rate of growth in per capita household waste arisings. In the current version of the model, this is assumed to be zero. Associated projections for waste entering the various management routes are produced from the waste arising projections.

Water Consumption: Water use is determined by modelling different components of overall demand separately. Non-household demand is determined by indicators of economic activity in particular industries that allow for the different water-using characteristics of the different sectors. Household demand for water is determined using a 'micro-components' approach which uses assumptions for the penetration, use and water-using characteristics of different appliances and activities.

The impact on the key environmental pressures being considered is modelled using economic inputs, such as change in GVA, population, etc.

1.7 Structure of Report

Chapter 2 analyses the baseline data from the regional accounts and the projections from a "business-as-usual" scenario modelling run of REEIO, using the forecast GVA and population growth identified in the long-term economic forecast produced by the REFP:

- 2.15% growth in GVA per annum
- 0.3% growth in population per annum.

Chapter 3 provides an overview of the implications in relation to certain key sectors in the region, as identified by NWDA.

Chapter 4 identifies the challenges, risks and opportunities presented by the above analysis.

2.0 Sustainable Consumption & Production Issues

As this report is based on analysis of the territorial environmental pressures covered by the REEIO model, it focuses primarily on the consumption issues, associated with economic production activities as they affect the local environment and does not cover the global environmental aspects embedded in imported products consumed in the region.

This is not to say that the global impacts are not important. However in terms of regional strategies, policies to increase economic growth can have a direct and potentially significant impact on particular environmental pressures at the regional level. This is particularly relevant for regional economic policy, which is likely to have a stronger influence over territorial environmental / regional pressures than global pressures.

The global environmental pressures associated with the consumption of the residents in the region can be modelled using the Resource and Energy Analysis Programme (REAP⁷), which is based on similar input-output methodology to REEIO but covers indirect as well as direct impacts. This is made available to the regions through SCPnet and is used by many regions for this purpose. Whilst this is outside the scope of this study, it is recommended that some analysis be made of these consumption issues to support this aspect of policy development in the SRS for the North West, perhaps as part of the next stage in developing the evidence base.

2.1 Energy Use & Air Emissions

As stated in the ECOSEG report, energy is and will remain one of the most significant cross-cutting issues in terms of regional economic and social development, particularly in the North West, where the energy sector plays an important role within the region's economic structure.

Energy consumption and energy-related emissions can be analysed in a number of different ways, depending on the degree to which all sectors in the economy (e.g. power generation, fuel processing / refining, utilities) and domestic use are included and whether or not electricity consumption is included. There is no right or wrong answer; what is important is that any differences in boundary definition are fully understood when attempting to compare and contrast different projections.

As stated above, REEIO is designed to model the territorial emissions and includes all elements of the regional economy, including power generation and fuel processing, which are important aspects of the regional economy.

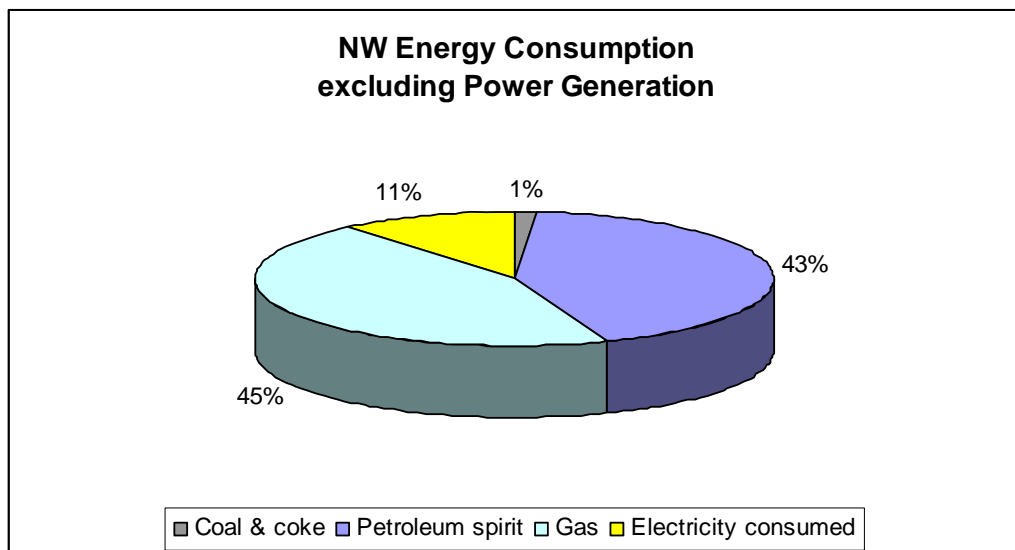
However, if the user wishes to take a regional consumption perspective, for example excluding power generation and replace it with electricity consumed in the region, the results tables in REEIO are presented in a manner that will facilitate this.

⁷ <http://www.sei.se/reap/>

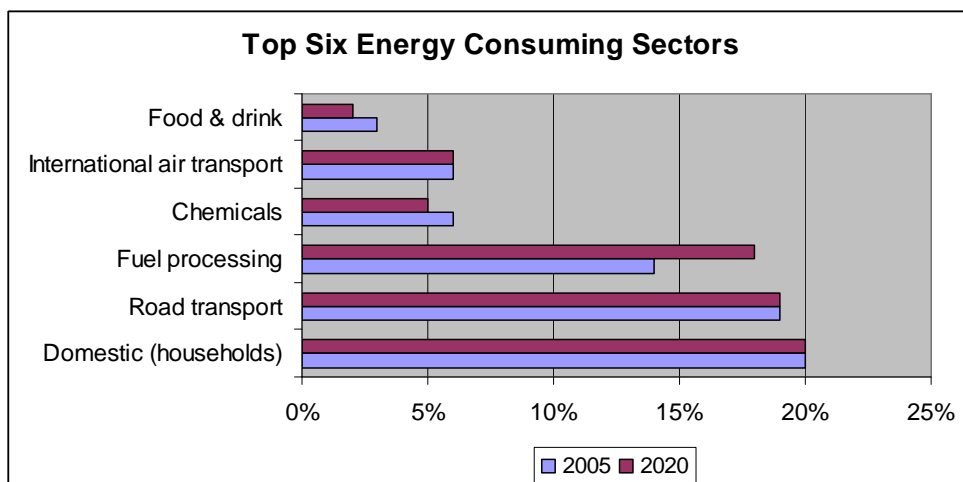
2.1.1 Energy Use

In terms of power generation, which accounts for 6% of energy consumption in the region, the region consumes some 3.5 million tonnes of oil equivalent (mtoe), compared with the regional consumption of electricity of 3.2 mtoe. However fossil fuels provide only 54% of the region's power generation capacity, a further 44% coming from nuclear generation. Excluding power generation, the chart below shows how relative contribution to regional energy consumption among the top six sectors in 2005 and how that might change by 2020.

For the purposes of this analysis, fuel use for power generation has been excluded. On this basis, the primary energy fuels consumed in the region are gas and petroleum-based derivatives, as indicated below.



Looking ahead to 2020, although REEIO indicates a 9% drop in energy consumption, with a 45% drop in coal and coke, a 16% drop in gas and a 2% increase in the use of petroleum-based fuels.



Together these six sectors amount for over 70% of the total energy consumption in the region, both now and in 2020. From this analysis it is evident that if reduction in energy consumption is to form a part of any emissions reduction strategy, the three key areas to be addressed are:

- Domestic energy consumption and road transport, which although showing a 2% decrease in overall total, remain the two largest contributors, and
- The fuel processing sector, where a significant increase is indicated by 202, due to the anticipated growth in activity in this sector.

Not surprisingly, all of these sectors feature also in the top six carbon dioxide emitters, albeit in a different order, due to different fuel mixes in the consumption of each sector.

2.1.2 Carbon Dioxide Emissions

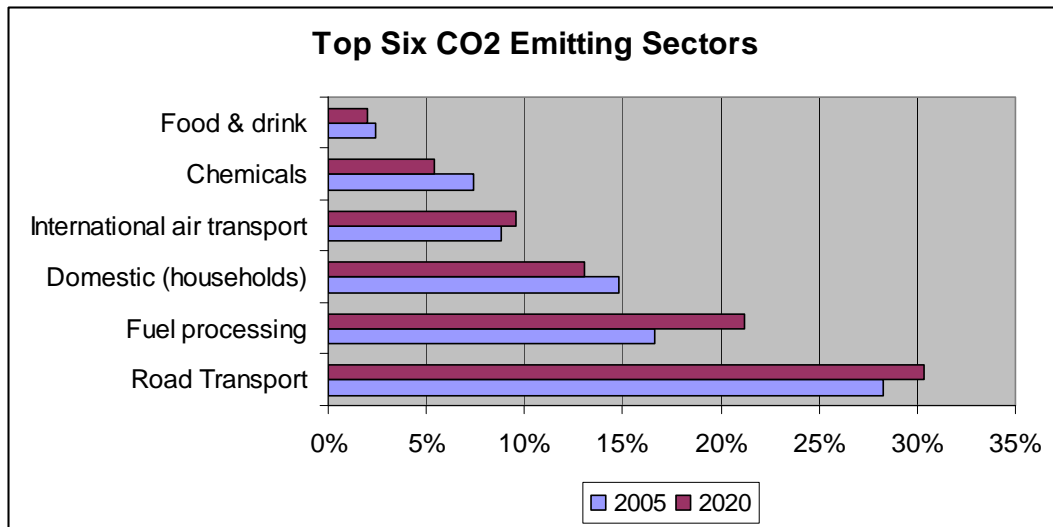
REEIO is designed to simulate all territorial emissions, i.e. they occur within the regional atmosphere, including emissions from power generation and fuel processing. However these are itemised separately and thus can be abstracted from the total emissions projections, if required. It also facilitates analysis of the emissions associated with electricity consumed within the region.

Emissions from power generation within the region currently amount to 19% of the territorial emissions within the region. Any attempt at prediction in this area must be heavily qualified due to the number of unknowns, including the location of new generation capacity.

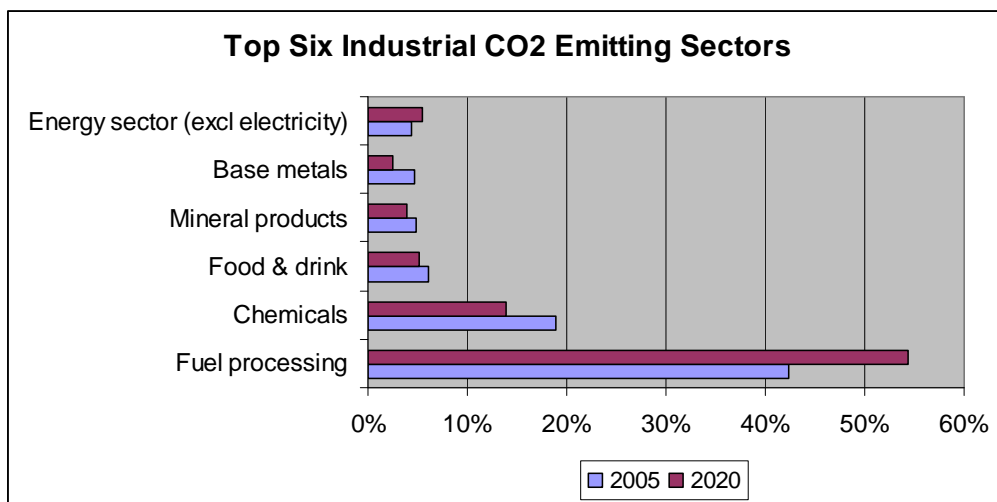
The baseline scenario in REEIO assumes a progressive drop in generating capacity within the region over time as the power stations reach their end of life, resulting in a sharp drop over time. No assumption is made in terms of the likely location of any new, replacement generation. However this issue should perhaps be investigated further with regards to security of supply.

The effects in terms of emissions can then be assessed through further scenario modelling, which could be used to compare the effects on the regions territorial emissions of different fuel types, including biomass.

The sectoral split in terms of CO₂ emissions is similar to energy use, with the same top sectors, albeit with some minor changes, due primarily to the different fuel mix in each sector. The chart below shows the relative contributions from these sectors, excluding power generation, and the expected trend towards 2020.



The main focus of this section is an assessment of the varying contributions made by the different industrial and commercial sectors. Industrial emissions make up 88% of the total industrial and commercial emissions, i.e. all emissions less power generation, construction & demolition, transport, utilities and households. The table below indicates the top six industrial sectors in terms of emissions and their position in 2020.

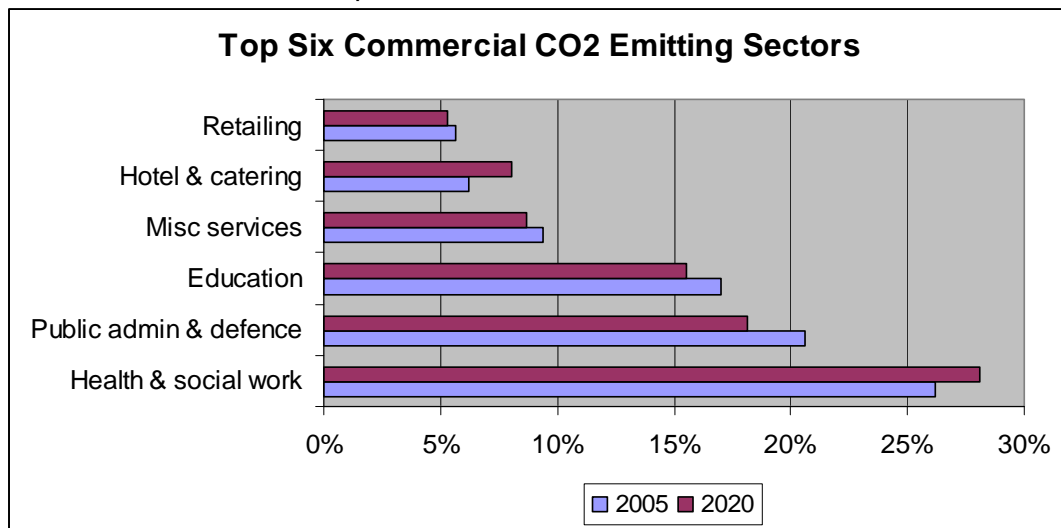


In all cases the changes indicated reflect current trends in energy intensities and the structure and growth of the regional economy. Hence, whilst the emissions for most industrial sectors are indicated as declining, others are showing a continuing growth in emissions, as indicated in the table below.

Sectoral Growth in Industrial Emissions

Sector	Change
Industrial emissions	-8%
Pharmaceuticals	33%
Electronics	22%
Other energy transformation	17%
Energy industries (excl electricity)	14%

The chart below indicates the top six commercial sectors in terms of emissions.



As with the industrial sectors, most are showing a decline over the period to 2020, with some exceptions, highlighted in the table below.

Sectoral Growth in Commercial Emissions

Sector	Change
Average commercial emissions	-16%
Professional services	17%
Communications	15%
Computing services	13%
Hotel & catering	8%

2.2 Waste Generation

The 2006 NW waste survey carried out by Urban Mines⁸ found that the region generated just over 7.5 million tonnes of commercial and industrial (C & I) waste. The default scenario in REEIO indicates a total on 7.7million tonnes in 2006, which is within 3% and as such is considered reasonable within the uncertainties of the available data. (For further comparison of the two datasets, see Appendix B). The business-as-usual scenario would indicate that this could increase by as much as 20% by 2020.

This C & I waste stream in the region includes:

- 27% non-metallic waste
- 24% mixed waste
- 19% chemical waste.

Of this around 70% is biodegradable, with a further 12% hazardous, both of which are likely to increase significantly by 2020, where a 14% growth is indicated in biodegradable waste and 50% in hazardous waste.

However it is important to establish how much of this is likely to actually enter the waste stream, based on historical data. The REEIO default scenario indicates that 40% (3.09 million tonnes) is likely to be recycled or treated for energy recovery, with the remaining 60% (4.563 million tonnes) being landfilled. However these figures are likely to change with increasing pressure to reduce waste to landfill.

This section analyses in more detail biodegradable and hazardous waste arisings by sector.

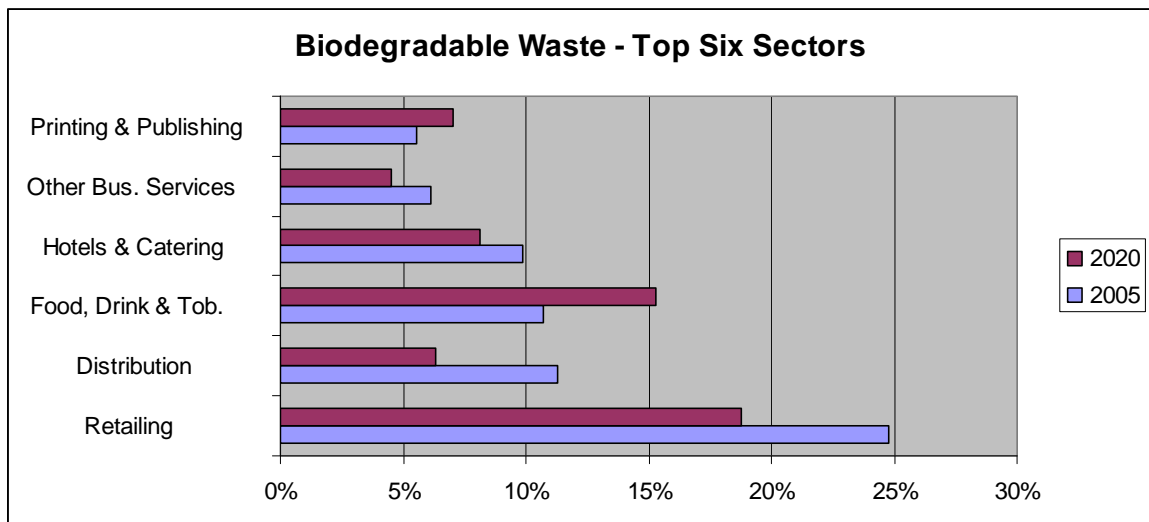
2.2.1 Biodegradable Waste

The industrial, commercial, and construction & demolition sectors in the region generate 6.25 million tonnes of biodegradable waste, of which 59% is commercial, 41% is industrial and 2% construction and demolition waste. By 2020 this is indicated as rising to just over 10 million tonnes, with 40% of industrial and 45% of commercial arisings being recycled or recovered.

Within this 40% of the industrial waste and 45% of the commercial waste arisings are recycled. If these figures are to be increased, it is important to ascertain the scale and identity of those sectors which make the most significant contribution in terms of arisings.

The top six sectors are indicated in the chart below, together with the relative change anticipated by 2020.

⁸ Study to fill Evidence Gaps for Commercial & Industrial Waste Streams in the North West Region of England



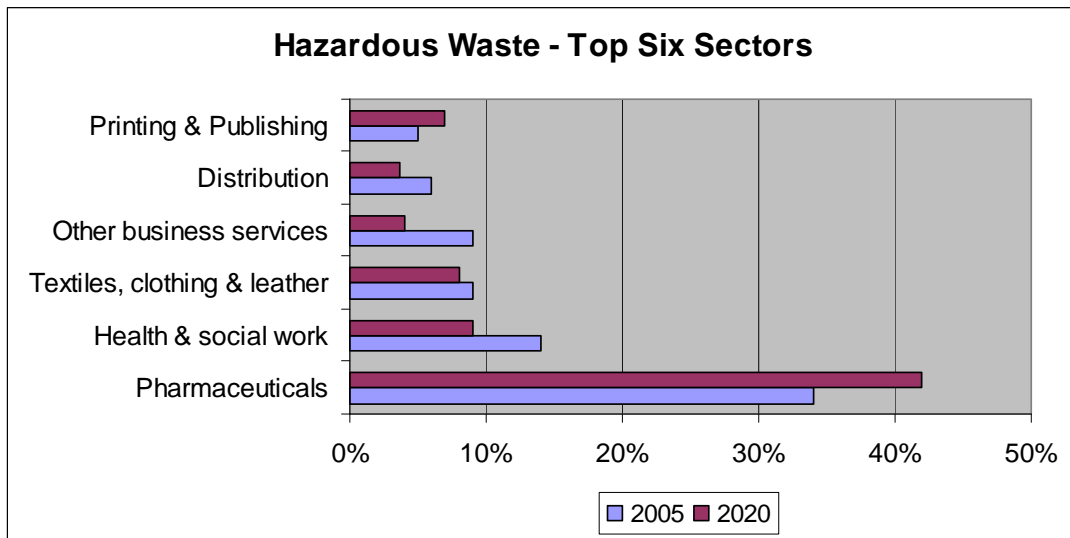
Within the top ten, a significant increase is also indicated by 2020 from the health & social work (55%), education (32%) and professional services (115%) sectors.

2.2.2 Hazardous Waste

The North West currently generates around 1 million tonnes of hazardous waste; the REEIO “business-as-usual” scenario shows this increasing by 2020 to over 1.5 million tonnes, the breakdown of which is indicated in the table below.

Sector	2005	2020
Industrial	72%	74%
Commercial	23%	22%
Household MSW	4%	3%

The largest single contribution comes from the pharmaceutical sector, at 35%, followed by health and social work at 9%, printing and publishing at 5%. All other sectors are 4% or less. The chart below shows the top six sectors in 2005 and their position in 2020.



Analysis of the Environment Agency's PPC data for the total chemicals and pharmaceuticals sector would indicate that only about 20% of this goes for some form of recovery with 80% going to land fill. Although relatively low in volume compared to the other waste streams, this potentially comprises high value materials, if recoverable.

Within the top ten, the professional services sector is also showing a significant growth in hazardous waste arisings, increasing by over 100%, due to the growth of the sector and issues such as the replacement of ICT equipment.

2.3 Water Consumption

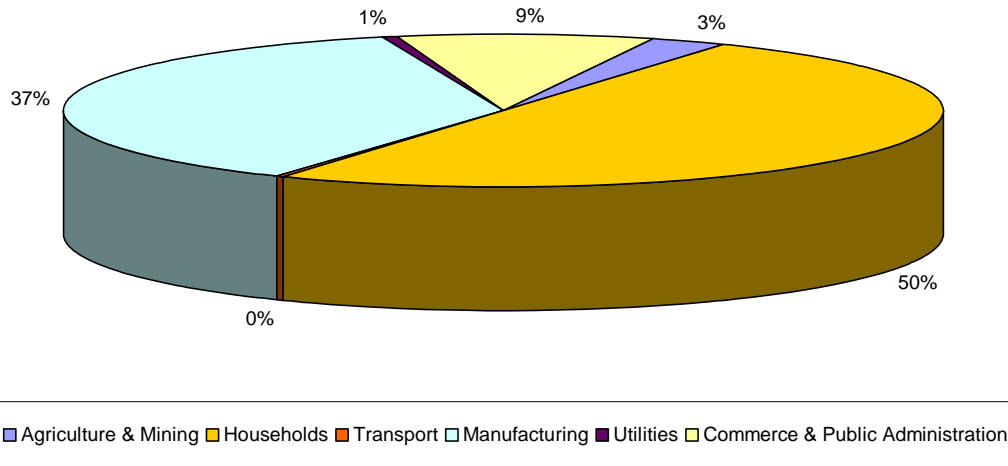
It should be noted that the water data in the regional accounts has a high level of uncertainty, for various reasons, the main ones being:

- Differences between water company and regional boundaries
- Lack of availability of data from the water companies due to commercial confidentiality
- Lack of consistent breakdown of sectoral demand between different water companies, where data is available.

In the North West, it is understood that the boundaries of United Utilities offer a reasonable match to those of the region. It is therefore possible that the two sets of data could be compared and projections reviewed, subject to agreement with United Utilities.

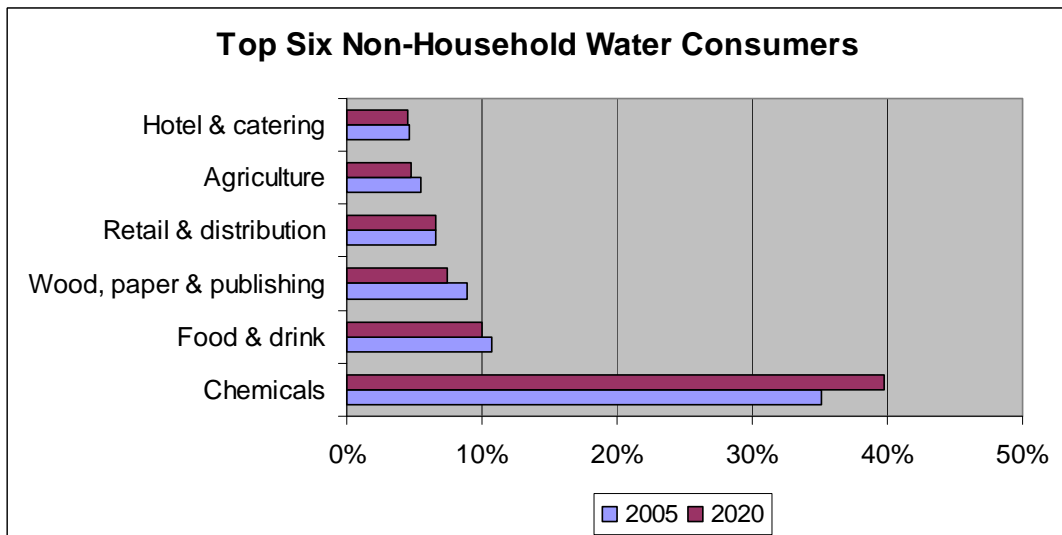
The current data is based on the 1999-2000 Envirowise survey, which was at that time the best available with consistent coverage across the English regions. This indicates that fifty percent of water consumed in the region is used by domestic households, with the second largest consumed being the manufacturing sector at 37%, as can be seen from the pie chart below.

NW Water Consumption



The REEIO “business-as-usual” scenario indicates total consumption decreasing by 11% by 2020, with little change in the distribution between sectors, manufacturing remaining the same, household consumption falling by 1%, with agriculture, mining, commercial and public administration sectors up by 1%.

Excluding household consumption, the top six consumers are identified in the chart below.



Between now and 2020 there is a general decline in water usage indicated across all sectors, with one or two minor exceptions which, with the exception of the chemicals sector (indicated above), fall among the lower end of consumption levels.

The ECOSEG Report highlights marked regional variations in water supply and demand. The concentration of the above sectors should also be examined in relation to these anticipated trends.

3.0 Key Sectors

The North West has identified the following key sectors, for which the implications of the above analysis is described in greater detail:

- Chemicals
- Construction & demolition
- Food & Drink
- Retail
- Textiles

Chemicals and food and drink are both among the top six sectors identified in the above analysis, in terms of energy and water consumption and emissions and waste arisings. If the region is to continue to encourage the development and growth of these sectors, the associated increase in production impacts may need further investigation.

In terms of energy intensity per £ GVA, the fuel processing and chemicals sector rank second and third.

Food and drink, textiles and retailing are among the top four most intensive sectors in relation biodegradable waste arisings per £GVA generated, with pharmaceuticals being the most intensive in terms of hazardous waste.

None of these key sectors feature to any great degree when it comes to intensity of water use per £GVA, with the possible exception of retailing which is ranked seventh. The most water intensive sector would appear to be the oil and gas industry, with an intensity of around ten times its nearest rival, air transport. These are not sectors one might normally consider to be highly water intensive.

3.1 Chemicals

The North West is one of only three regions to contribute positively to the UK balance of trade, with exports dominated by organic chemicals and pharmaceuticals⁹. It is therefore perhaps not surprising that this sector features among the top six in terms of energy consumption, CO₂ emissions, hazardous waste and water consumption.

Although overall energy consumption and emissions in the chemicals sector is indicated as in decline, the same cannot be said for the pharmaceutical sector, which is indicated as rising by 33% due to the anticipated growth in the sector.

⁹ North West Regional Economic Strategy 2006

The pharmaceuticals sector is also responsible for 34% of the region's hazardous waste arisings, and this is indicated as growing to over 400,000 tonnes (42%) by 2020. Whilst this is a relatively small quantity of waste it is high value both in terms of disposal costs and potential return if it could be cleaned up and re-used.

NISP has already completed several successful synergies in this area with hazardous chemicals in Yorkshire and Humber. There may be scope for further promoting this type of solution with the pharmaceutical sector and NISP in the North West to identify potential users for this waste.

3.2 Construction & Demolition

In terms of the four environmental pressures investigated in this report, the construction and demolition sector really only makes a significant production impact in terms of waste arisings, where it accounts for 37% of the total waste arisings.

The construction industry in England uses around 400 million tonnes of materials every year. Around 90 million tonnes of construction, demolition and excavation (CD&E) inert waste is produced, with half of this recycled as aggregates, including at the site of production. Estimates suggest at least a further 20 million tonnes of non-inert and mixed CD&E waste is also produced annually. It is estimated that the total amount of CD&E waste being disposed of via landfill, is over 25 million tonnes a year in England¹⁰.

However much construction and demolition waste is already recycled, for example 84% of the C& D biodegradable waste is recycled.

However this sector has a much more marked influence on regional consumption impacts through the standards and components of construction adopted or used.

The public sector remains the dominant force within the UK construction industry, with a total spend of approximately £40 billion per annum. It is therefore an area with great potential to influence building design and thereby the occupier towards more sustainable consumption patterns.

3.3 Food & Drink

The food and drink sector is worth over £9.5 billion to the Northwest economy. Together with agriculture it provides 12% of the region's income and employs 103,000 people. The Northwest has more local food manufacturing enterprises than any other. According to the Promar Study for NWFA it is the largest region in England and Wales in terms of food and drink manufacturing and processing, being home to some of the industry's biggest names, including Nestle, Heinz, Kellogg's and Patak foods.¹¹

¹⁰ Strategy for Sustainable Construction BERR June 2008

¹¹ www.nwda.co.uk/areas-of-work/business/key-sectors/food-and-drink.aspx

This sector features among the top six energy and water consuming and CO₂ emitting sectors. In relation to biodegradable waste, it ranks third in terms of the overall volume generated waste generating sectors and second in terms of intensity per £GVA.

3.4 Retail

This sector has particular links with the food and drink sector in the Northwest, where it is home to regional retailers, such as the food store, Booths, which operates over 25 supermarkets across the region and 25% of the food is produced locally.

The main area of production impact identified for this sector in the above analysis is in biodegradable waste generation, where it generates 25% of the total arisings and is ranked fourth in biodegradable waste intensity per £GVA.

3.5 Textiles

The textiles industry in the Northwest is one of the region's most established sectors, spanning 1000 companies, with 450 companies involved in the technical supply chain and employing over 38,000 people¹².

This sector, like the chemicals sector, is highly energy intensive, ranking second in energy intensity per £GVA and top in CO₂ emissions, after the oil and gas, water transport and coal sectors.

In terms of waste intensity per £GVA, it also ranks fifth in biodegradable waste and second in hazardous waste.

¹² <http://www.nwtexnet.co.uk/>

4.0 Risks, Solutions & Opportunities

The Northwest Regional Economic Strategy identifies sustainable consumption and production as one of seven key factors required to achieve the vision for the region of “ *a dynamic, sustainable international economy which competes on the basis of knowledge, advanced technology and an excellent quality of life for all*”.

The Action plan for achieving this is divided under three key headings:

- Business resource efficiency
- Climate change
- Sustainable procurement

The section summarises the findings and identifies potential risks and opportunities within a framework of policy questions which broadly cover these headings.

4.1 How can the region achieve the GVA growth above the average for England within the context of a low carbon economy?

If the region is to achieve a low carbon economy, consideration needs to be given to how best to help the more energy-intensive sectors to further reduce their carbon footprint. Some further sector-specific research could help make this more focused, perhaps using the Environment Agency’s PPC data, together with input from the relevant trade association. Potential areas for further research include:

- Alternative forms of energy that may be suitable for a particular sector but are less CO₂ intensive
- Evidence of clustering, where CHP on an industrial site-by-site basis, similar to that used by Advantage West Midlands, could reduce collective CO₂ emissions and intensity.

The research could help develop a framework to support the development of energy and environmental businesses and technologies in the region. Business Link could provide a suitable delivery mechanism, acting as broker.

Road transport, of which freight transport is a significant component, has also been highlighted as a major contributor to regional CO₂ emissions. A better understanding of freight logistics within the region would help set a framework for action to improve this area.

Analysis of possible future freight efficiency scenarios carried out by the South West RDA using REEIO, identified that road freight within a region could be reduced in a number of ways:

- Increased local sourcing, reducing the need for imports
- Reducing the number of empty return loads

The analysis indicated that for the South West, a combination of 20% reduction in vehicle kilometres by achieving possible efficiency savings in both of these areas could potentially cancel out the increase in CO₂ emissions anticipated in the region between now and 2020.

This approach epitomises the concept of sustainability in terms of supporting local businesses and reducing the embedded emissions associated with the transport of the goods consumed and should perhaps be considered in future scenarios for the North West.

4.2 What can be done to help achieve the Waste Strategy goal of achieving and retaining a 0% growth in the amount of commercial and industrial wastes produced?

In terms of biodegradable waste, the key sectors where significant growth is anticipated in the arisings are food and drink and printing and publishing. This could provide a valuable feed material for anaerobic digestion in the region, with the potential to recover energy.

The region already has some experience in anaerobic digestion, with the plant installed in Shrewsbury. This technology has obvious application to generate heat and power from biodegradable waste from the food and drink and retail sectors.

Although relatively low in volume compared to other waste streams at around a million tonnes, the region's hazardous waste offers a potential source of high value materials, if recovered.

The Industrial Symbiosis Programme, NISP, would appear to have had a degree of success in Yorkshire and Humber, identifying synergies between companies relating to the supply and use of chemicals that would otherwise have become hazardous waste. This type of solution may be suitable for application to the region's pharmaceutical waste and could encourage innovation to develop new methods of clean-up and extraction.

In terms of construction and demolition waste, the public sector remains the dominant force within the construction industry the UK, with a total spend of approximately £40 billion per annum. It is therefore an area with great potential to influence building design and stimulate the market for recycled material. Sustainable procurement is already highlighted in the Regional Economic Strategy as a key driver to achieving sustainable consumption and production. An increased use of recycled CD&E material could be further promoted in the next round of the regional strategy.

4.3 How can the region further improve business resource efficiency?

The SCP data indicates which sectors are the most resource intensive in terms of energy and water consumption and waste arisings. If this analysis can be matched up with an analysis of the data held by some of the region's business resource efficiency delivery bodies, such as NISP and ENWORKS, it should be possible to develop a *roadmap to resource efficiency* for the different sectors.

The roadmap would indicate which measures are most appropriate and which have been demonstrated to work best for each sector, and the scale of potential savings that can be achieved. This could then be built in to Business Link's delivery mechanism, when acting as broker to business on resource efficiency.