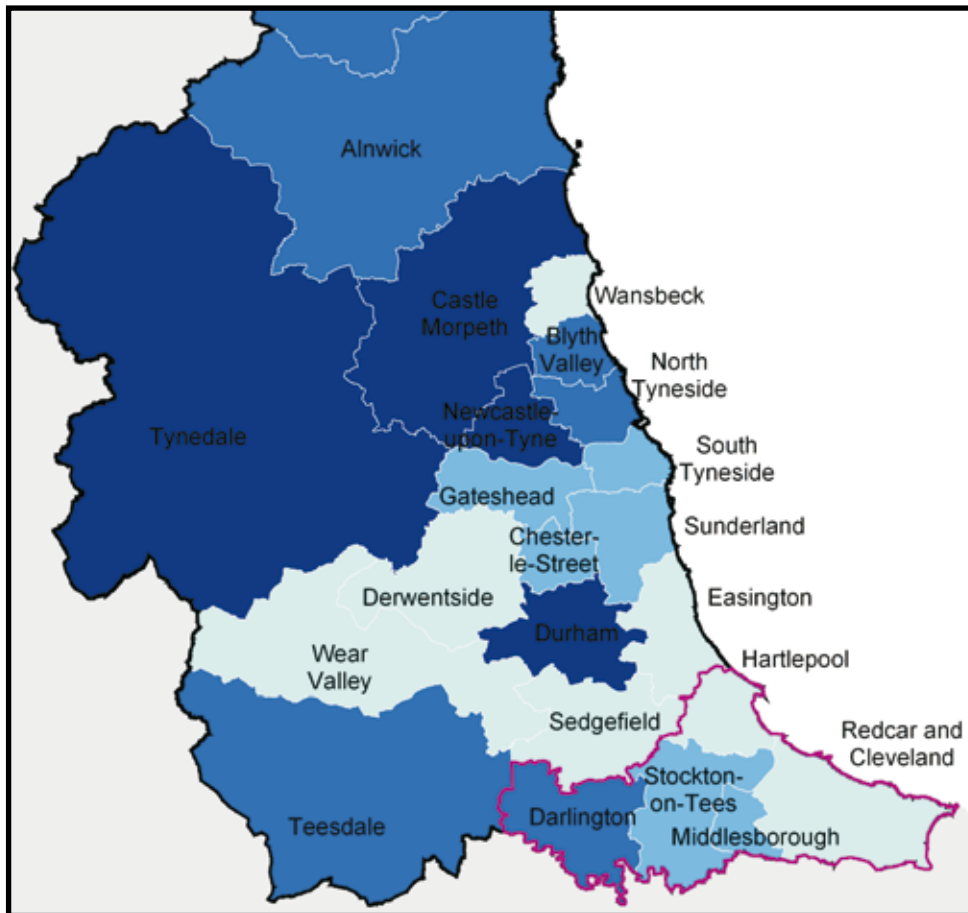


# The Tees Valley Footprint Report

Alistair Paul



# The Tees Valley Footprint Report

Alistair Paul

## **Stockholm Environment Institute**

Kräftriket 2B  
106 91 Stockholm  
Sweden  
Tel: +46 8 674 7070  
Fax: +46 8 674 7020  
E-mail: [postmaster@sei.se](mailto:postmaster@sei.se)  
Web: [www.sei.se](http://www.sei.se)

Communications Manager: Anh Nguyen  
Publications Manager: Erik Willis  
Web Manager: Howard Cambridge  
Layout: Richard Clay

Copyright © 2007 by the Stockholm Environment Institute

*This publication may be reproduced in whole or in part and in any form for educational or non-profit purposes, without special permission from the copyright holder(s) provided acknowledgement of the source is made. No use of this publication may be made for resale or other commercial purpose, without the written permission of the copyright holder(s).*

Published in the United Kingdom, July 2007

<b>1</b>	<b>The Tees Valley Footprint</b>	<b>1</b>
1.1	The Global context	1
1.2	The national context	2
1.3	The local context	3
<b>2</b>	<b>Challenges for the Tees Valley</b>	<b>7</b>
2.1	Building sustainable communities	7
2.1.1	Carbon Footprint of Housing 2006-2026	
2.1.2	Action on Housing	
2.2	Improving connectivity	10
2.2.1	Carbon Footprint of Transport 2006-2026	
2.2.2	Action on Transport	
<b>3</b>	<b>Leading by example</b>	<b>14</b>
	Annex A: What makes up our footprint?	15
	Annex B: Housing scenario details	15
	Annex C: Transport scenario details	16
	Annex D: The REAP model explained	17

In Autumn 2006 the Environment Agency approached the Stockholm Environment Institute (SEI), to discuss how Footprint Analysis could be used to provide an environmental perspective to regeneration in the Tees Valley.

It was agreed that any work looking at the Footprint of the Tees Valley should aim to develop the capacity of professionals to use Footprint Analysis in the future. A project was conceived to:

- Measure the Tees Valley Footprint
- Build the modelling and scenario building capacity of the Environment Agency and local government professionals using the REAP model
- Work with local government professionals to investigate how policy scenarios may change the Footprint in the Tees Valley

This report documents the outputs of this project with a particular focus on housing and transport in the Tees Valley. Over two days in January 2007 staff from the Environment Agency, NERIP, the Tees Valley Joint Strategy Unit and each of the Tees Valley Unitary Authorities attended REAP training sessions and tested out a range of housing and transport scenarios in REAP. The results of the scenarios are presented here alongside baseline results to demonstrate the ways Footprint Analysis could be used in Tees Valley in the future.

The Author would like to thank Anne Owen, Mike McNulty, Annie Zijlstra, Malcolm Steele and all workshop participants who took part in this project.



## Executive Summary

This report looks at the environmental impacts associated with the way people live in the Tees Valley; the energy people use in the home and the way they travel; and the food and lifestyle products they consume. In doing so it demonstrates how local decision makers can consider and take meaningful action on climate change and pressing environmental issues using Footprint Analysis.

Translating the effect of policy decisions on individual and collective behaviour is difficult. Quantifying the impact of resident's behaviour change on the environment can be more complicated still. This report documents how this can be done at the local or regional scale using Footprint Analysis.

Footprint Analysis is a 'catch-all' term that encompasses the application to decision making of the Ecological Footprint and the Carbon Footprint. The Ecological Footprint is an indicator of resource efficiency; it helps us understand the amount of resources and energy we use to support our quality of life. The Carbon Footprint focuses on carbon dioxide emissions and enables us to focus on the increasingly prominent issue of climate change. Both indicators can be used to understand the link between localised activities and globally important environmental issues:

Local authorities can influence the choices people make in their every day lives through service provision and community leadership. With major regeneration projects for the Tees Valley planned, there are opportunities to improve the region but every road built and every house constructed locks people into a way of living for many years. Whether existing and new initiatives will encourage people to make greener choices will be an important measure of their success.

The findings presented here show:

- The Tees Valley Ecological Footprint is over twice the size of the world average at 5.12 global hectares per person. To support the lifestyle of an average person in the Tees Valley places a demand on the earth's

resources which is not sustainable in the long term.

- The Tees Valley Carbon Footprint is 10.85 tonnes per person. This needs to be reduced to near 4 tonnes if everyone in the Tees Valley is to 'do their bit' to reduce their carbon dioxide emissions by 60% by 2050<sup>1</sup>.
- The Tees Valley has one of the highest Food Footprints of any area in the UK. Other components of the Tees Valley Footprint – housing, transport, spending on consumables – are lower than the UK average.
- Existing trends and local policies are unlikely to reduce the Carbon Footprint of the Tees Valley in line with proposed Government targets for carbon dioxide emissions. Carbon dioxide emissions from housing may increase by 5.5% per person over the next 20 years. Carbon dioxide emissions from transport may increase by 8.7% per person over the next twenty years.

The trend projections are based on an initial analysis of housing, transport, population and energy policies and trends only. Even so these projections are of concern; a failure to design in mechanisms to encourage greener behaviour now may make it more costly to do so in the future.

Over two days in January 2007 staff from the Environment Agency, NERIP, the Tees Valley Joint Strategy Unit and each of the Tees Valley Unitary Authorities tested out a range of alternative futures for housing and transport policies in the Tees Valley. The results represent the ideas of workshop participants not the views of the organisations they represent but they do demonstrate the ways Footprint Analysis could be used in the Tees Valley in the future. They also provide an indication of the type of action

---

<sup>1</sup> This is the proposed target for the UK set out in the draft climate change bill

needed by people in the Tees Valley if they are to live well and have a smaller Footprint. The Workshop results showed:

- There are opportunities for introducing further practical measures to reduce the Carbon Footprint associated with housing by at least 10% over the next 20 years.
- It is possible to bring about significant reductions in the Carbon Footprint associated with housing without changing demolition rates or new build projections for the Tees Valley. The most effective scenarios combined measures to increase renewable energy, roll out energy efficiency measures in existing homes and improve the energy performance requirements of new homes
- Small scale transport initiatives introduced in isolation are highly unlikely to bring about a reduction in the Carbon Footprint of transport in the Tees Valley

- To bring about a reduction in the Carbon Footprint associated with Transport will require a combination of policies which target car use and influence the entire Tees Valley population overall.

All the analysis contained in this report is based on the REAP software tool which can be used by decision makers as part of the policy making process.

The Tees Valley Joint Strategy Unit now have a licence to use REAP. The next stage is for the Tees Valley to develop its capacity to use Footprint Analysis in an informed and practical way.

Footprint Analysis may be used in local area agreements and community strategies developed by Local Strategic Partnerships. It has a role to play in informing local transport and housing planning. Primary Care Trusts (PCTs) may also use it or refer to it in their local delivery plans and annual public health reports. The potential to take action is huge; use this report as your starting point.

#### **What does Footprint Analysis tell us?**

Traditional methods of accounting for the impacts associated with human activities focus on 'on-site' or direct impacts only; in Tees Valley the discharge of waste into the River Tees is monitored and controlled and in the UK we have a long history of regulating polluting industries and conserving natural areas. At the same time, many of the goods and services the average Tees Valley resident buys are sourced from outside the UK and the pressures they place on the environment are often global in nature.

The Ecological Footprint and Carbon Footprint account for these pressures and tell us how the decisions people make in their every day lives impact on the global environment.

- The Ecological Footprint is an indicator of the amount of productive land required to support the energy and materials people use (our consumption activities).
- The Carbon Footprint is an indicator of the volume of carbon dioxide emissions associated with our consumption activities.

#### **Why is Footprint Analysis useful?**

The choices people make in their every-day lives are driven by a range of factors including local policy decisions; planning guidelines, transport plans, housing allocations all have an influence on the impact of resident's activities on the environment. Footprint Analysis is useful because it helps decision makers make links between policy initiatives, people's actions and the ultimate impacts of this on the global environment. There is a clear role for Footprint Analysis in policy assessment, development, and appraisal using the REAP software tool. At the assessment stage it is possible to identify the areas of people's lifestyles which create the greatest pressures on the environment. At the development stage REAP can be used to test the potential of different policy instruments in mitigating these pressures. By monitoring the impact of policy decisions on people's behaviour the baseline information in REAP can be updated to understand how successful policy decisions have been over time.

# 1 The Tees Valley Footprint

The Tees Valley has historically been associated with world class steel, chemical and engineering industries but has also experienced environmental problems and economic and social deprivation. Building on its industrial heritage, the area comprising five unitary authority areas (Darlington, Hartlepool, Middlesbrough, Redcar & Cleveland, and Stockton), is now a focus for renewal, regeneration and positive change but what does this mean from an environmental perspective?

## 1.1 THE GLOBAL CONTEXT

Just as the Tees Valley's Industrial base contributes to the North East economy, so its use of materials and energy has an impact on the environment far beyond the region's boundaries.

The average Tees Valley resident has a Carbon Footprint of 10.85 tonnes; equivalent to the weight of two African Elephants. If every person was to 'do their bit' in reducing carbon dioxide emissions by 60% by 2050, the Carbon Footprint of the Tees Valley needs to be reduced to nearer 4 tonnes per person over the next 40 years.

The average Tees Valley resident has an Ecological Footprint of 5.12 global hectares (gha<sup>2</sup>); this is equivalent to every person using an area the size of five football pitches to support their way of life<sup>3</sup>.

These figures are understood best by taking a global perspective; some countries are able to

provide a high quality of life more efficiently than others placing less demand on the earth's resources: Italy's Ecological Footprint is smaller than that of the Tees Valley and less than half the size of that of Australia and the USA. Figure 1 below shows the Ecological Footprint calculated for selected countries by the Global Footprint Network in WWF's Living Planet Report 2004.

The average Ecological Footprint for the world population as a whole is 2.2 gha/cap but global variation is marked; in some countries people do not have access to enough resources to meet their every-day needs, in others people take for granted the large volume of materials and energy used to provide food, travel and lifestyle needs. If all the productive land and sea resources on earth were to be divided equally amongst the world's population, each person would have access to only 1.8 gha. This means that the world population consumes in one year what it takes the earth's life-supporting ecosystems 14 months to supply. Some countries are consuming far more than their fair share of natural resources. At the same time some people do not have the resources available to meet their basic needs.

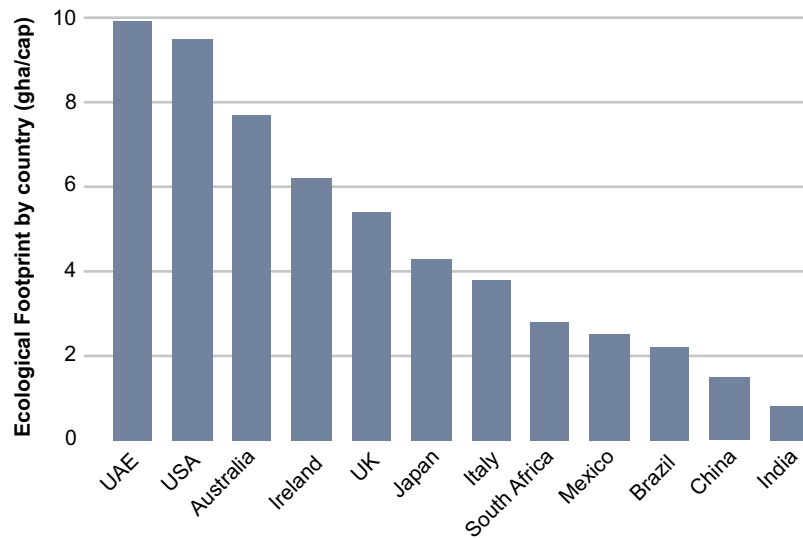
The Tees Valley Ecological Footprint is over twice the size of the world average. If everyone in the world lived like an average person in the Tees Valley it would take the earth over 3 years to produce the material and energy resources required in one year. Another way of describing this is to say that people in the Tees Valley live a three planet lifestyle. This is clearly unsustainable in the long term.

---

<sup>2</sup> A global hectare is the same size as a standard hectare but with a biological productivity equal to the global average

<sup>3</sup> Footprint results use a 2001 baseline.

Figure 1: Ecological Footprint by country



(Living Planet Report 2004)

## 1.2 THE NATIONAL CONTEXT

The average UK Carbon Footprint is 11.87 tonnes per person; over a tonne per person higher than in the Tees Valley. Three of the lowest twenty Carbon Footprints in the UK belong to Tees Valley local authorities (Hartlepool: 10.61t/cap, Redcar & Cleveland: 10.79t/cap and Middlesbrough: 10.82t/cap). Stockton-on-tees is close behind with a Carbon Footprint of 10.88t/cap and Darlington (11.12t/cap) is just over the North East average (11.04t/cap).

The Tees Valley has a relatively low Ecological Footprint compared to the rest of the UK (5.45gha per person). In broad terms the size of both the Ecological Footprint and Carbon Footprint of an area corresponds to the wealth of people that live there and the way they choose to spend their money. In the Tees Valley gross disposable income is 15% lower than the UK average<sup>4</sup> and it is therefore not surprising that it's footprint is low compared to many other areas.

The fact that the Tees Valley's footprint is relatively high in global terms does not mean that economic progress and regeneration should be stifled. There are ways of ensuring that economic regeneration comes hand in hand with a consideration of people's consumption of materials and energy.

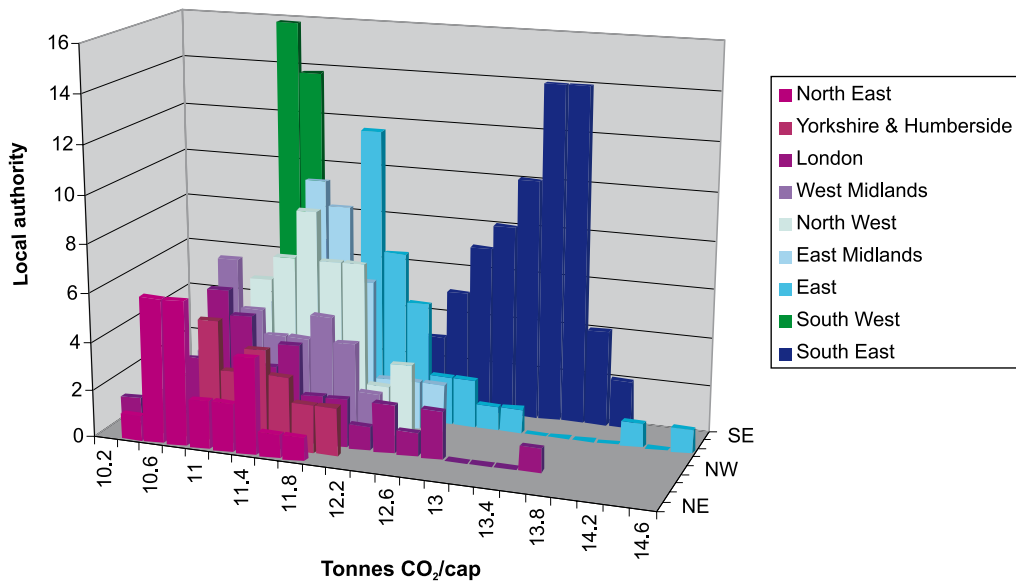
In a low footprint Tees Valley people would live in warm, desirable homes that are highly energy efficient. Planning decisions would ensure more homes would be located close to work, shopping, schools and leisure facilities; so reducing the need to travel. Natural resources would be harnessed so that existing and new industries would be able to tap in to the considerable renewable energy potential of the North East.

Most local plans and strategies have been trying to achieve this for some years but local authorities always face budgetary, and historical infrastructure constraints and often it can be difficult to make choices which are attractive and affordable from an environmental, social and economic perspective.

<sup>4</sup> <http://www.teesvalley-jsu.gov.uk/old/reports/i&f/atinform3%20-%20November%202006%20Edition.doc>



Figure 2: Comparison of local authority Carbon Footprints



The chart compares local authority Carbon Footprints in the North East (pink) to other English Regions. It shows the number of local authorities in each region (y axis), that fall into a particular carbon Footprint range (x axis).

### 1.3 THE LOCAL CONTEXT

In 2001 the Joseph Rowntree Foundation released a report “Rainforests are a long way from here”. The title was based on comments by a member of the public who thought of the environment as a distant problem compared to issues closer to home<sup>5</sup>. Today there are concerted efforts to change this perception<sup>6</sup> but research suggests people still find it hard to think about issues such as energy use in the

home and make a natural connection between this and the environment.

The Energy Saving Trust’s Green Barometer recently found that 80% of people believe that climate change is having an impact on the UK right now and yet 40 per cent of us are doing nothing to reduce our energy use<sup>7</sup>. Increasingly people understand the link between energy use in the home and climate change but it is more difficult for people to understand the links with other areas of our lifestyles.

5 Burningham, K., Thrush, D., 2001

<http://www.jrf.org.uk/bookshop/details.asp?pubID=382>

6 The Energy Saving Trust’s ‘Save your 20%’ campaign is a recent example:

<http://www.energysavingtrust.org.uk/commit/>

7 [http://www.energysavingtrust.org.uk/uploads/documents/aboutest/Green-Barometer-Web\(spread\).pdf](http://www.energysavingtrust.org.uk/uploads/documents/aboutest/Green-Barometer-Web(spread).pdf)

Tees Valley residents have amongst the lowest Carbon Footprints associated with spending on consumables (TVs, clothes, music, household appliances etc.) in the UK but amongst the highest Carbon Footprints associated with food consumption

The low consumables footprint may be associated with the lower amount of disposable income available to residents in the Tees Valley compared to the rest of the UK. Over time the economic regeneration may generate better incomes and the capacity for people to spend money on consumer items that meet their aspirations. However people choose to spend their money in the future there is merit in identifying ways of encouraging people to 'buy cleverly'. This means encouraging people to consider energy performance when buying electrical appliances and communicating the long term benefits of buying quality items that last. Many of the levers to help people do this lie with business and national government but in some case local authorities can help provide people with the right information when they need it. With the likely introduction of Home Information Packs it may be possible to consider

providing information on green goods and services to prospective and new home buyers. Existing guidelines allow for 'information which identifies services or features local to the property, but not including any advertising or marketing information about them'.

In contrast to the consumables Footprint, the Carbon Footprint of food in the Tees Valley is amongst the highest in the UK. This is an area where relatively small changes in lifestyle choices could have a large impact on the Footprint of an average resident. Initial research by SEI indicates that more nutritionally balanced diets also have lower Footprints. Studies commissioned by WRAP have also found that on a national level we waste 15 pence of every pound we spend on food items<sup>8</sup>. The box, below, shows the cumulative impact of changing diets and minimising food waste on the Ecological Footprint of food consumption in the home.

<sup>8</sup> [http://www.wrap.org.uk/downloads/FoodWasteResearchSummaryFINALADP29\\_3\\_07\\_25a4c08b.69e70046.pdf](http://www.wrap.org.uk/downloads/FoodWasteResearchSummaryFINALADP29_3_07_25a4c08b.69e70046.pdf)

#### **Cumulative impact of measures to reduce Ecological Footprint of food consumption**

Average Tees Valley diet = 0.69gha<sup>1</sup>

- Introduction of nutritionally balanced healthy diet reduces Footprint by 15-25%
- Introduction of nutritionally balanced vegetarian healthy diet reduces Footprint by further 15%
- Minimisation of food waste through planning of meals reduced Ecological Footprint by up to 15%

A cumulative reduction in Food Footprint of 45% is possible. Further reductions may be possible through the consumption of seasonal, locally produced or organic food. For more information see Frey & Barrett, 2006<sup>2</sup>

<sup>1</sup> for food consumption in the home only. Excluding alcoholic beverages and eating out

<sup>2</sup> [http://www.scotlandsfoprint.org/pdfs/Footprint\\_Scotland\\_Diet.pdf](http://www.scotlandsfoprint.org/pdfs/Footprint_Scotland_Diet.pdf)

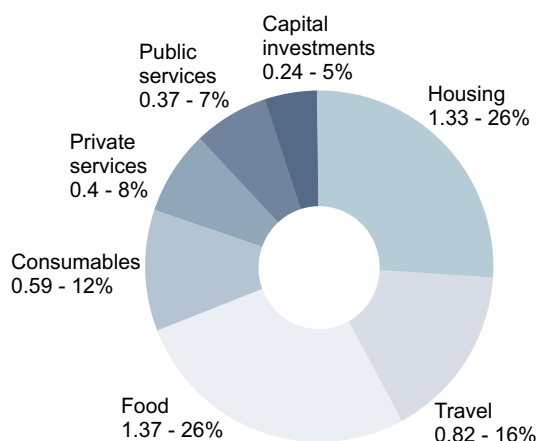
## 2001 BASELINE FOOTPRINT FOR THE TEES VALLEY

### The Carbon Footprint and Ecological Footprint

The Carbon Footprint and Ecological Footprint results provided by SEI can be broken down into over 90 individual consumption categories. For the purposes of this report they have been grouped in the following themes:

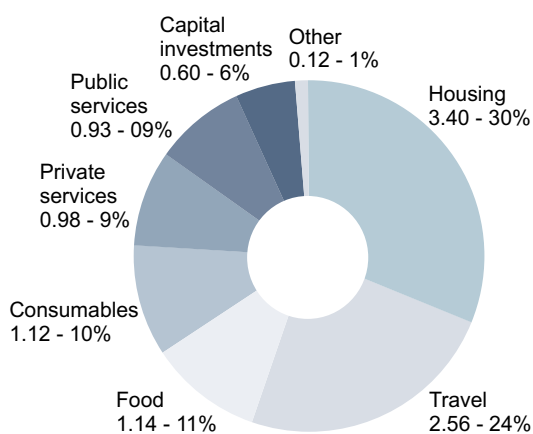
- Housing covers gas, electricity and fuel use in the home but also includes construction, rental and maintenance of dwellings
- Transport incorporates car use and maintenance, as well that of other private vehicles and public transport.
- Food covers spending by government and households on food and drink including catering, eating out and alcoholic beverages.
- Consumables covers annual expenditure on 17 categories of household consumption item including clothing, tobacco, newspapers and household appliances
- Private Services covers annual expenditure on 13 categories of service from insurance to financial advice to private education
- Public services covers the remainder of spending by government not addressed by the above themes. This includes spending on public administration, health and education

Figure 3: Footprint (gha/cap)



2001 Ecological Footprint, by category (gha/cap), of the Tees Valley produced using REAP 0.963

Figure 4: Footprint (CO2/cap)



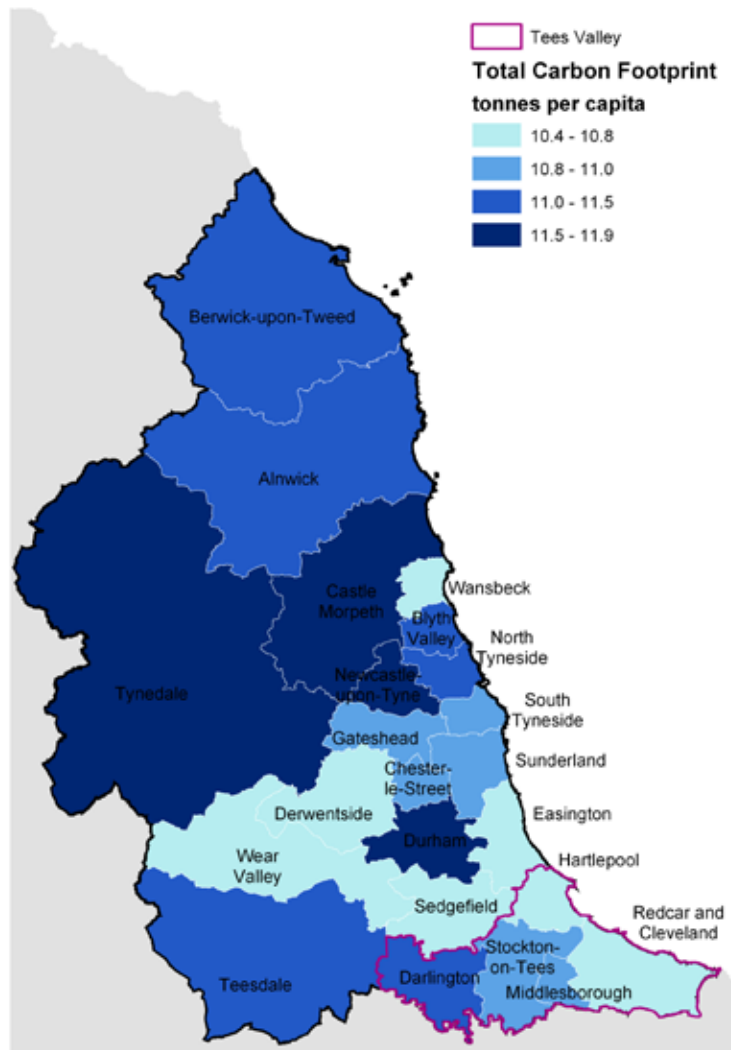
2001 Carbon Footprint, by category (CO2/cap), of the Tees Valley produced using REAP 0.963

The breakdown of the Footprint by local authority in the Tees Valley is uniform; each local authority's Footprint breakdown closely reflects the Tees Valley average.

Activities which involve a high degree of fuel use contribute most to the Carbon Footprint of the Tees Valley, energy use in the home comes top followed by transport.

Food consumption contributes the most to the Ecological Footprint (26%) followed by housing (also 26%) and then transport (16%). Food takes up such a large proportion of the Ecological Footprint because agriculture accounts for a large amount of land use

## COMPARING THE CARBON FOOTPRINT OF THE TEES VALLEY AND THE NORTH EAST



Hartlepool has the 3rd lowest Ecological Footprint in the North East and one of the lowest in the UK (5.02gha/cap). Within the North East only Darlington (5.23gha/cap) has a higher Ecological Footprint than the regional average (5.19gha/cap).

## 2 Challenges for the Tees Valley

Accessibility and housing market regeneration are both important to the future development of the Tees Valley but the way each issue is addressed will also have an impact on the Tees Valley Footprint.

To get a flavour of the challenges facing the Tees Valley, SEI has developed a set of 'business as usual' (BAU), scenarios focusing on the key areas of housing and transport.

Each BAU scenario sets out what could happen to the Tees Valley Carbon Footprint based on existing trends and planned policies in the region.

Over two days in January 2007 staff from the Environment Agency, NERIP, the Tees Valley Joint Strategy Unit and each of the Tees Valley Unitary Authorities tested out a range of alternative futures to the BAU scenarios created by SEI. The results represent the ideas of workshop participants not the views of the organisations they represent but they do demonstrate the ways Footprint Analysis could be used in the Tees Valley in the future. They also provide an indication of the type of action needed by people in the Tees Valley if they are to live well and have a smaller Footprint

To create a 'Business as Usual' scenario for the Tees Valley, SEI looked at housing and transport issues in turn and matched them to existing plans and targets in the Tees Valley and the North East. The results describe what may happen based on a limited number of assumptions, not what will happen. Nevertheless they do provide an indication of the scale of the challenge in the Tees Valley. The assumptions taken for the Business As Usual scenario are described in the Appendix.

Provided with the 'Business as Usual' results, workshop participants were asked to create alternative scenarios for transport and housing in the Tees Valley. First they had to agree an approach; they could set out to develop policies which they thought would be politically acceptable, would meet the aspirations of the public, would meet national carbon dioxide emission targets or manage a combination of the three.

The workshop participants worked in groups to create their own approach to housing and transport in the Tees Valley. The resulting outcomes and results are detailed in the following sections.

### What are scenarios?

Scenarios can be used to help us compare the potential impacts of existing and alternative trends. Scenarios created in REAP can suggest what environmental impact policy makers could expect from different policies based on the way they influence consumer behaviour (energy use or travel behaviour for example).

Scenarios are inherently uncertain, given the large number of variables possible and the interaction of different dynamics such as population, economics and cultural change. Even so, scenarios do have real, deliberative value and can be used to offer insight into the potential impact of policies during the decision making process.

## 2.1 BUILDING SUSTAINABLE COMMUNITIES

Housing market renewal is key to regeneration and progress in the Tees Valley. Population decline and market failure in the area is in part due to an imbalance between the aspirations of residents and available stock. The 2004 housing market assessment showed that much of the housing stock in the Tees Valley is outdated in terms of both standards and amenity and there is a limit to which 'patch and mend' policies can be continued with old Victorian housing.

Progressive renewal of the housing stock brings with it opportunities to provide a desirable and affordable mix of housing, stabilise the population, stimulate local economies and improve the energy performance of the housing stock. Housing in the Tees Valley has a low Carbon Footprint relative to the rest of the UK but the generation of electricity for households and fuel use in the home still accounts for almost a third of emissions. The challenge for the Tees Valley, in this context, can be summed up by asking:

- What do we do with existing housing stock?
- What do we do with new housing stock?
- Where are the environmental, social and economic opportunities?

The REAP software tool is designed to help decision makers look at these questions from an environmental perspective. REAP allows users to model the change in Footprint in the Tees Valley associated with the average kwh of electricity and fuel use in the home. It can also take into account the impact of spending on housing construction, changes in population and household occupancy and changes in the energy mix used by the national grid. These variables can be linked directly to a number of policy considerations for the Tees Valley. Using Excel based support spreadsheets we can ask the following questions and translate answers into data for REAP:

- How many houses should be knocked down and replaced – and what type?
- How many additional houses should be built – and what type?
- What can be done to improve the energy performance of existing homes?

- What standards should be put in place for the energy performance of new homes?
- How should energy be generated for the housing stock?

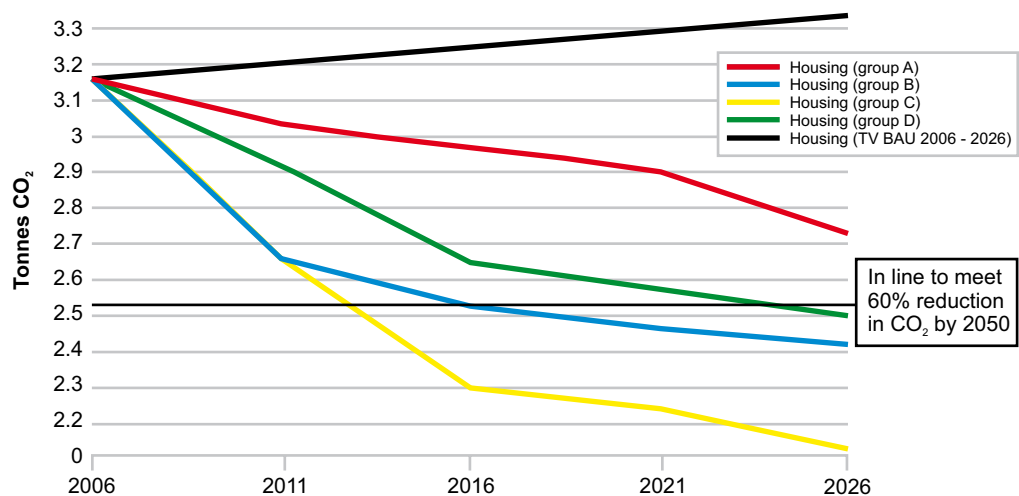
The SEI generated Business as Usual Scenario suggests that there may be a 1.8% increase in carbon dioxide emissions from housing over the next 20 years. Because of projected population decline this works out as a 5.5% increase per person over the same period.

The alternative scenarios created by workshop participants showed that there are opportunities for introducing further practical measures to reduce the Carbon Footprint associated with housing by at least 10% over the next 20 years.

They also indicate that It is possible to bring about significant reductions in the Carbon Footprint associated with housing without changing demolition rates or new build projections for the Tees Valley. The most effective scenarios combined measures to increase renewable energy, roll out energy efficiency measures in existing homes and improve the energy performance requirements of new homes

### 2.1.1 Carbon Footprint of Housing 2006-2026

Figure 5 : Group scenarios for housing



Summary of group scenarios for housing. Annual and overall change shown in per capita figures. Tees Valley 2006-2026

**Figure 6: Summary of group scenarios for housing. Annual and overall change shown in per capita figures. Tees Valley 2006-2026**

Group	Approach	Demolition	New Build	Retrofit	Energy Mix	Annual change	Overall change
<b>BAU</b>	Based on existing trends and policies	1168 houses a year	2510 houses a year, no ecohomes or best practice	No retrofit programme in place	14% renewables by 2026 (DTI projections)	<b>1.80%</b>	<b>5.5%</b>
<b>A</b>	Focus on meeting national climate change targets	Large scale demolition programme – all ‘at risk’ houses demolished	New build above rate of BAU – reflecting trends in household occupancy. All houses built to best practice energy efficiency standards	Energy efficiency of existing housing improves with technological advancements	Renewables boosted by inclusion of clean coal technologies	<b>0.69%</b>	<b>-13.7%</b>
<b>D</b>	RSS based with focus on retrofit	Similar rate to BAU but 75% demolitions are Terraced housing	Bias toward detached new build. 30% homes built to Ecohome Excellent standards 10% built to ‘Best practice standards by 2026	Energy efficiency of housing stock improves by 40% over the period	Energy policies reverse recent trends. Renewables generate 20% of electricity by 2026	<b>-1.04%</b>	<b>-20.8%</b>
<b>B</b>	Housing market restructure	Demolitions 1400 a year until 2011 then decline to below BAU levels	New build rates peak in 2016. 50% of new build built to Ecohome or ‘best practice’ standards	50% of houses retrofitted to minimum standards	Nuclear prominent (25%), Renewables 20%	<b>-1.18%</b>	<b>- 23.6%</b>
<b>C</b>	Realistic housing figures balanced with strong emphasis on retrofit and renewables	Realistic rates based on funding and future forecasts	All houses built to ‘best practice’ standards by 2016	High emphasis as most of existing stock will remain	Steady reduction in gas and coal. Renewables 43% by 2026	<b>-1.63%</b>	<b>-32.6%</b>

### 2.1.2 Action on Housing

Housing is increasingly the focus of action and initiatives to reduce carbon dioxide emissions at the national level. At the local level it still remains to be seen whether resources will be available to encourage a joined-up approach to reducing the Carbon Footprint. Staying with RSS projections for housing demolition and new build rates it is possible to envisage a combination of measures that would reduce the Tees Valley Carbon Footprint in line with national targets:

**Action 1:** Introduce higher energy standards for new homes

All new homes built from 2011 onwards are built to best practice standards equivalent to the

highest level of the new Code for Sustainable Homes.

**Action 2:** Improved energy standards in existing homes

By building a coalition between local government, housing developers, housing associations and energy providers, the Tees Valley declares itself the UK’s first ‘Energy Offset Region’. For every house built, funds are made available for two existing houses to be retrofitted.

The Sustainable Development Commission suggests the average home could halve its demand for energy using existing technologies such as insulation, improved heating systems and energy efficient equipment.

**Action 3:** Contribute to the renewable energy revolution

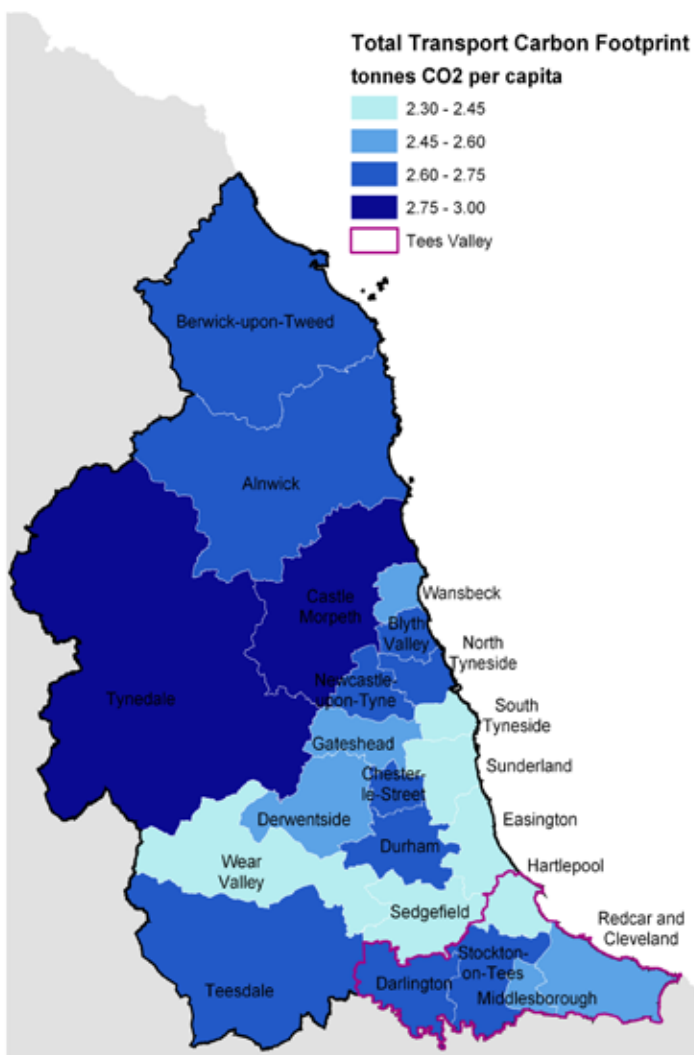
Moves to relax planning guidance for renewable energy installations improve the North East's

ability to meet Regional Renewable Energy Strategy projections. At a national level 15% of energy is generated by renewable energy sources.

## 2.2 IMPROVING CONNECTIVITY

The Tees Valley is essentially polycentric in nature with no single dominant centre of commercial activity. The dispersed nature of development results in journey patterns that often cross borough boundaries and creates a strong reliance on the use of private cars for many trips.

The Tees Valley Joint Strategy Unit (to check) describes the promotion of modal switch to more sustainable modes of transport as 'the cornerstone' of the 2006-11 Transport plans in the Tees Valley. Even so, previous reports have described the transport system as closer to the car based 'Los Angeles' model than that of public transport based European models.



### Tees Valley Transport Facts

- Transport accounts for almost a quarter of the Tees Valley's Carbon Footprint.
- The Carbon Footprint for transport in the Tees Valley is 10% lower than that for the UK.
- The average person in Tees Valley travelled 6439kms by car in 2001: This is equivalent to driving to Berlin and back 3 times
- Transport associated with private households in Tees Valley breaks down as follows:
  - 59% is associated with car use
  - 34% with public transport
  - 7% with holidays by plane.

The Tees Valley Demand Management Framework is targeting car use in the form of:

- single occupant commuting cars travelling at peak times and parking all day
- journeys to school by car
- short journeys under two miles, including short distance shopping trips



The REAP software model is not a transport model in itself but it can be used to model changes in an area's footprint based on modal shift, fuel efficiency improvements, occupancy rate and distance travelled by mode.

To create a 'Business as usual' scenario for transport in the Tees Valley over the next 20 years, SEI collected local, regional and national data on transport trends and devised a simple model to investigate how different types of transport intervention could affect these trends over time and so affect the Carbon Footprint of the Tees Valley.

Underlying trends are created to model the projected changes in transport technology, infrastructure and behaviour for the entire Tees Valley population. The transport appendix describes the approach SEI took to create the underlying trends.

SEI chose to test four policy interventions to see their potential influence on transport behaviour in the Tees Valley. Information was collected to model the potential effect of each intervention based on the number of people it successfully targeted. Excel support sheets were used to model this effect and translate behaviour change into information that could be entered into REAP. The transport

interventions created covered car sharing initiatives, car clubs, marketing techniques and large scale infrastructure interventions. Details of these interventions are provided in the Transport appendix.

### 2.2.1 Carbon Footprint of Transport 2006-2026

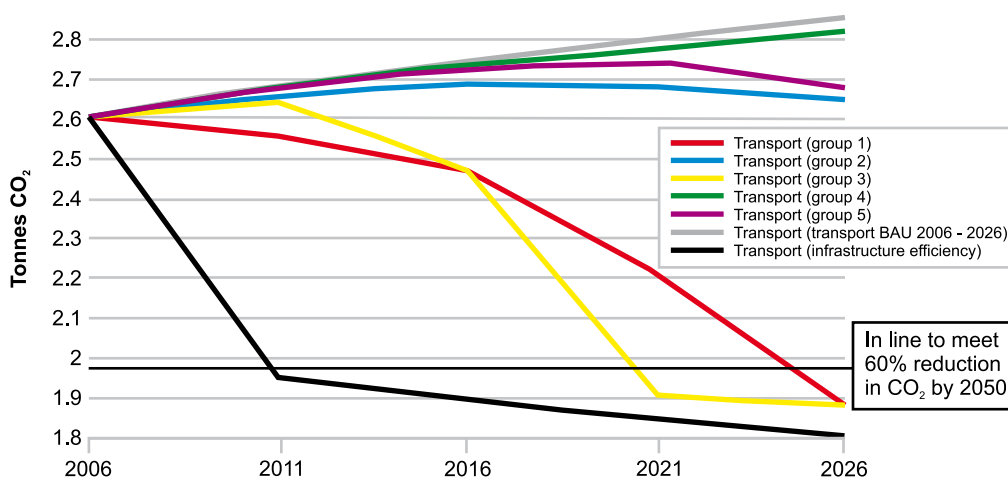
In the 'Business as Usual' Scenario for the Tees Valley the limited nature of existing policy interventions are not enough to override the projected trends in transport demand and use.

REAP calculates that the business as usual scenario may produce a 5.2% increase in carbon dioxide emissions from transport over the next 20 years. Because of projected population decline this works out as an 8.7% increase per person over the same period.

The workshop participants worked in groups and adapted the transport policies introduced in Tees Valley over time. The resulting alternative scenarios are shown in below.

The Business as Usual Scenario is shown in grey, SEI also set a radical 'infrastructure efficiency' scenario (in black). Groups 2, 5 and 4 set out policies which they believed were realistic or achievable. They illustrate the range of projections that can be associated

Figure 7: Footprint for transport



Carbon Footprint projections for transport in per capita figures. Tees Valley 2006-2026

**Figure 8: Summary of group scenarios for transport. Annual and overall change shown in per capita figures. Tees Valley 2006-2026**

Group	Approach	Car share	Car club	Marketing	Structural shift	Annual change	Overall change
<b>BAU</b>	Based on existing trends and policies	2000 members a year	100 car club members in the Tees Valley	3000 people successfully targeted	Transforms travel behaviour of 5% of the population	<b>0.47%</b>	<b>8.7%</b>
<b>4</b>	Politically acceptable, realistic and achievable	8000 extra people car sharing by 2026	1 car club in each TV local authority	3000 extra people successfully targeted in each 5 year period	Parking spaces decreased, increase in home working + increase in internet shopping change transport habits of 1000 people every 5 years.	<b>0.41%</b>	<b>8.09%</b>
<b>5</b>	Changes to working practices reduce commuting traffic	2.4% inc from 2006	No change from BAU	3.5% increase from 2006	1162km per person reduction in annual distance travelled	<b>0.14%</b>	<b>2.74%</b>
<b>2</b>	Based on coarse analysis of existing trends in the Tees Valley & knowledge of proposed initiatives	Low potential for increase in formal car sharing without significant external factors	Low potential in short term but proposed high density developments could provide the basis for establishment in the long term	Significant impact with some socio-economic groups	Phased introduction of Tees Valley-wide public transport infrastructure improvements supported by 'soft' measures such as improved ticketing information	<b>0.08%</b>	<b>1.56%</b>
<b>3</b>	'Ambitious and visionary' using a range of policy options	Covers 8.4% of commuters by 2026 (1400% inc from 2006)	One car club every 5 years with 5000 members – 3.3% of commuters by 2026	Highly effective – effecting 60% of commuters	Targeted 3.2% by 2026 switching 1000km per person per annum from car to bus	<b>-1.41%</b>	<b>-28.02%</b>
<b>1</b>	Significant but achievable targets set and climate change made number 1 political priority. Assumes major infrastructure schemes and action by national government	Covers 20% of commuting population by 2026	10% increase on baseline with tax break to companies who donate cars to scheme	Interactive user points, Individual journey planners & Direct door stepping introduced.	Includes Tees Valley Metro and increase in car parking costs	<b>-1.41%</b>	<b>-28.18%</b>

with a simple analysis of existing trends. This range suggests the 'Business as Usual' scenario for the Tees Valley will see an increase in the Carbon Footprint from transport of less than 1% a year.

Some policies were introduced that on the face of it might make a difference: Group 4 modelled the impact of introducing a car club in each local authority, successfully targeting 9% of the commuting population with car share initiatives and changing the transport behaviour of 4000 people every 5 years. These

are all initiatives that sound good but in this model they didn't impact on a large enough proportion of the population to reverse the increase in carbon dioxide emissions.

Groups 3 and 1 took approaches which were described as 'ambitious and visionary' and assumed climate change would become the number 1 political priority. Both achieved what they set out to do and were in line with reducing carbon dioxide emissions by 60% by 2050 (see figure 7).

### 2.2.2 Action on Transport

A number of the alternative transport scenarios created by workshop participants showed an increase in Carbon Footprint. These reflect the fact that this is an area that requires a large number of people to change their behaviour significantly. By any measure persuading people to drive less is going to be difficult to achieve especially given the existing transport infrastructure in the Tees Valley. Small-scale targeted initiatives, though attractive in principle will not make a difference.

Though traditionally the North East has had lower car ownership and use rates than other regions in the UK there is an expectation that these will rise more quickly than the UK

average over the next 10-15 years. If the Tees Valley infrastructure continues to be biased towards the car it will continue to be people's preferred mode of transport. The harsh truth is that improvements to alternative modes of transport need to be combined with measures that make it less attractive to use the car.

The transport support spreadsheets used to create the transport scenarios would need to be further improved if they were to be used in a real policy making context. For transport in particular it is also unwise to suggest specific actions for the Tees Valley without further analysis. An overview of measures to encourage modal shift from car to public transport, walking and cycling is provided in the box below.

#### **Bridges to Modal Shift**

Measures to encourage modal shift from car to public transport walking and cycling include improvements to alternatives and making car travel less attractive.

##### *Improvements to alternatives*

Although time and cost factors are important in ensuring that public transport, walking and cycling become more attractive, other factors can be more important in achieving modal shift. Top priorities highlighted in public surveys include:

- The quality of the waiting environment at bus stops and rail stations.
- Improved security with CCTV and reduced vandalism
- Electronic and printed information at bus stops.
- Larger station car parks
- Enforcement of bus lanes to improve bus travel times.
- Reallocation of road space to give more priority to pedestrians.
- Better integration between modes covering physical interchanges, timetables, information and ticketing.

##### *Making car travel less attractive*

This is the side to travel policy often avoided at the local, regional and national level. Parking restraint can be a major determinant of choice of mode of transport whilst direct charges on motorists may be accepted if offset by reductions in other motoring costs

Adapted from 'Barriers to modal shift' 2003. Scottish Executive

### 3 Leading by example

*'People, business and government each occupy a corner in a triangle of change. No one, or even two groups, can lead on sustainable consumption alone. Different corners lead at different times by doing what they can do best. Until now this has often been accidental. The change might be profound if it were coordinated'*  
I will if you will, Sustainable Consumption Roundtable, 2006

The scenarios created in this report illustrate the impact a handful of policy interventions could have on the Carbon Footprint of the Tees Valley over the next 20 years. A selection of the policy interventions require very little in the way of changing peoples aspirations but still require partnerships between local government and partners to make them happen. To guide coordination at a local level decision makers in the Tees Valley need evidence that can help them take into account the full range of policies and initiatives at their disposal.

The Sustainable Consumption and Production Network<sup>9</sup> (SCP-NET), has identified 3 stages

<sup>9</sup> SCP-NET is a network created and funded by a partnership of the Regional Development Agencies, the Regional Assemblies, the Environment Agency and WWF

the regions go through on the way to becoming confident and capable users of the SCP evidence base, including REAP. One of the aims of this project was to help move the Tees Valley from stage 1 in the process to stage 2. Now that NERIP, the Environment Agency and the Tees Valley Strategy Unit have licences to use REAP, potential users in local authorities need to consider what kind of evidence base will be useful for the creation of future Tees Valley documents and policies.

REAP and Footprint Analysis could be applied in the Tees Valley to local area agreements and community strategies developed by Local Strategic Partnerships. It has a role to play in informing local transport and housing planning. Primary Care Trusts (PCTs) may also use it or refer to it in their local delivery plans and annual public health reports.

The local government white paper makes it clear that climate change is a national priority and that the new performance framework for local government will provide a stronger mechanism for ensuring it is a local priority. Footprint Analysis may also be used to compliment any information local authorities may need to collect in relation to CO<sub>2</sub> reduction in the community and as part of the new local government reporting requirements.

#### **Becoming a Confidently capable region**

##### *Stage 1: Aware*

Tees Valley is aware of the need to use SCP data and evidence, has cautious policy users, and sometimes frustrated technical users; it contracts out the use of the evidence base in assessment of key regional documents and is still considering the home for the SCP evidence base in the region.

##### *Stage 2: Stepping Forward*

Tees Valley is Stepping Forward to use SCP data and evidence if assisted, has policy users who understand how to translate policy goals into evidenced measures, technical users who attempt to provide that evidence (with some external support), and is starting to produce an evidence base that influences the development of key regional documents. In this region, there is a clear home for the SCP evidence base.

##### *Stage 3: Confidently Capable*

The confidently capable region has policy users who can frame their ideas in terms of questions to ask of the evidence base, and technical users who drive the development of new tools and techniques that enable them to answer those questions.

The scope of SCP in the confidently capable region includes impacts elsewhere in the world, not just within the region's administrative boundaries.

Adapted from SCP-NET <http://www.wwflearning.org.uk/scpnet/>

---

## ANNEX A: WHAT MAKES UP OUR FOOTPRINT?

The Carbon Footprint and Ecological Footprint results provided by SEI can be broken down in three ways:

### By top level final demand categories

- Household spending
- Government spending
- Capital investment (spending on fixed assets such as land and buildings)

### By policy theme

- ‘Food’ covers spending by government and households on food and drink including catering, eating out and alcoholic beverages.
- ‘Housing’ covers gas, electricity and fuel use in the home but also includes construction, rental and maintenance of dwellings
- ‘Transport’ incorporates car use and maintenance, as well that of other private vehicles and public transport.
- ‘Consumables’ covers annual expenditure on 17 categories of household consumption

item including clothing, tobacco, newspapers and household appliances

- ‘Private Services’ covers annual expenditure on 13 categories of service from insurance to financial advice to private education
- ‘Public services’ covers the remainder of spending by government not addressed by the above themes. This includes public administration, health and education
- Capital Investment covers the remainder of capital spending not addressed by the above themes

### By detailed consumption category

The total footprint can be split down in detail by COICOP category. COICOP stands for ‘Classification of Individual Consumption According to Purpose’. It covers everything people spend money on; this also includes expenditure on services. COICOP was jointly developed by the statistical office of the OECD and Eurostat and was first published in 1999. It is a widely used United Nations statistical classification. In some areas (specifically transport services), the categories have been broken down still further. This further breakdown is not part of the official COICOP Classification.

---

## ANNEX B: HOUSING SCENARIO DETAILS

### Population

For all SEI’s scenarios in the Tees Valley the population is projected to decline at a rate of 0.17% a year. This is in line with the TV JSU’s projection of a 3% decrease in population between 2003 and 2021 though many policies in the region are set towards stabilising and increasing the population.

### Renewal and regeneration

Birmingham University’s CURS Report identified 57,000 houses in the Tees Valley that can be described as ‘at risk’ – unhealthy, in disrepair, in need of modernization or

providing insufficient thermal comfort. Demolition and replacement with better, more energy efficient housing represents one part of the approach to Housing Market Renewal in the region but it has been recognized that the wholesale removal of properties in the short term is ‘prohibitively expensive’<sup>10</sup>. Based on Tees Valley Living figures, 566 houses are demolished per annum between 2001 and 2006. From 2006, demolition rates increase to 1168 houses per year.

Since the January workshops demolition rates for the Tees Valley have been revised and it is now anticipated that the annual average rate will be in the order of 700 dwellings between

---

<sup>10</sup> ‘Building Sustainable Communities in the Tees Valley’. Tees Valley Living submission to former ODPM

2004 and 2021, although this may be as high as 900 per annum up to 2011.

The Submission Draft Regional Spatial Strategy for the North East states that Local Development Frameworks should make provision for 2,510 new houses a year between 2004 and 2021, this provision is assumed to continue until 2026 however the Secretary of State's proposed changes to the RSS suggest that a higher rate of housing provision may be appropriate.

### **Meeting aspirations**

The mix of replacement and new build housing in the Tees Valley is assumed to replicate the existing make-up of house types in the Tees Valley. The reality may turn out to be quite different as the 2004 Housing Market Assessment highlights the mismatch between availability of terraced dwellings and public aspirations for semi-detached and detached housing. The modelling used to create this aspect of the scenario for report took into account house types but was not able to distinguish between housing ages. This may affect the accuracy of modelling for the Tees Valley because terraced housing is assumed to be more energy efficient than detached and semi-detached housing. In reality the age of the Victorian terraces may mean that they are less energy efficient than assumed.

The new Code for Sustainable Homes and Government proposals to make all new homes carbon neutral by 2016 had not been unveiled at the time of the Tees Valley workshops. These initiatives make it more likely that housing developments will incorporate increasingly stringent energy performance standards but existing requirements in the North East do not specify an EcoHome level and are worded vaguely. The Business as Usual scenario assumes no new houses are built to EcoHome Excellent or 'Best practice' standards (these are roughly equivalent to Beddington Zero Energy Development standards).

No large scale interventions to improve the energy efficiency of existing housing are introduced in the Business as Usual Scenario.

### **National energy policy**

The North East Regional Renewable Energy Strategy suggests 8% of electricity produced in the region will come from renewable energy sources by 2011 and 10% by 2021. DTI national energy projections suggest 14% of electricity provided by the national grid will be produced from renewable energy sources by 2021. The DTI projections are used here with the remainder of the national grid's electricity in 2026 being produced by coal (15%), gas (60%), nuclear (7%), and other (4%).

---

## **ANNEX C: TRANSPORT SCENARIO DETAILS**

### **Car Sharing**

Car Sharing is promoted in the Tees Valley through the Two Plus car sharing Scheme. Two Plus is for anyone that lives, works or travels in the Tees Valley but for the purposes of the scenarios this intervention is targeted at the 174,040 people who travel to work in the Tees Valley as a driver or passenger<sup>11</sup>. Each person who joins a car sharing scheme increases their car occupancy rate to 2 people per car. No further shift in mode of transport or distance travelled is assumed.

Two Plus travel has 1000 members registered online. The Business as usual scenario doubles this membership so that 2000 people a year are members of a car club. This is equivalent to just over 1% of the commuting population.

### **Car Clubs**

Car clubs are still not widely established in the UK but may provide small-scale localised travel solutions in some areas. Car clubs have an average 13 members in the UK but the impact of joining a car club on individual travel behaviour can be marked. SEI assumed that each member of a car club, on average, reduces the distance they travel in a year by 30%. For every 13 people who join a car club it is assumed that 4 less cars are bought a year.

---

11 2001 Census. Table KS017

## Underlying Transport trends in the Tees Valley

### *Transport demand management:*

The number of trips made by individuals and the average length of those trips is increasing in the UK. This continued demand for travel is placing pressure on all modes of transport. SEI have assumed that the average passenger kms travelled by a Tees Valley resident increase by 2.2% a year by car, 1.76% a year by bus and 1.68% a year by train.

Car occupancy rates amongst commuters (1.2 people per car) are lower than amongst non-commuters (1.7 people per car). In the 1960s car occupancy rates in the UK were 2 people per car. It has been estimated that returning to this level of car occupancy in the UK would save about 60 billion vehicle kms but national trends are going in the opposite direction. Based on national trends the occupancy rate of all car users in the Tees Valley is assumed to reduce from 1.52 people per car to 1.39 per car between 2006 and 2026. Car ownership rates per 1000 people are assumed to stay stable in the underlying trend. In reality Tees Valley car ownership is lower than the UK average but the gap is expected to close considerably over the next 15 years.

Bus and train passenger numbers in the Tees Valley have declined historically, but the baseline occupancy rates in REAP are already low. These have not been changed for the purposes of this project but would need to be taken into account in a more detailed modelling exercise.

### *Transport fuel efficiency*

The fuel efficiency of cars and buses is projected to improve over next 20 yrs, the underlying trend SEI created assumes car fuel efficiency will improve by 1.43% a year.

### *Population*

For all SEI's scenarios in the Tees Valley the population is projected to decline at a rate of 0.17% a year. This is in line with the TV Joint Strategy Unit's projection of a 3% decrease in population between 2003 and 2021.

Because there are no nationally recognised car clubs in the North East or the Tees Valley the 'Business as Usual' Scenario assumes only 100 people in the Tees Valley are members of car clubs in 2006 with no increase over the 20 year period.

Car clubs work most effectively when the transport and housing infrastructure of an area makes individual car ownership less attractive and a range of different transport modes more attractive. Carplus suggests that car club facilities are designed in to residential developments from the outset as 'people find it much easier to change their travel habits at the same time as making other lifestyle changes such as moving home or job'.

## Individualised Marketing

Also known as 'personalised travel planning', individualised marketing targets groups

of people in specific geographical areas to encourage a move towards more sustainable travel behaviour. It is based partly on the premise that many people use cars because of their negative perception of other modes of transport or lack of awareness on how to use it. Pilot projects in the UK have had varying results, the most successful SEI is aware of being the Intelligent travel project in York.

For the purposes of these scenarios the Individualised marketing intervention is assumed to bring about a modal shift in transport use. For each person successfully targeted, car trips reduce by 10% a year and bus trips increase by 5% a year. The average person in the UK makes 674 car trips a year and 65 bus trips a year.

In the Business as Usual Scenario SEI have assumed that the introduction of the Tees Valley Bus Information Scheme and the National

Free Concessionary Travel Scheme in 2006 are successful in limited areas. In 2006, 3000 people (0.5% of the population), have been successfully targeted by the scheme and this reach continues over the next 25 years.

### Structural Intervention

The structural intervention created by SEI is undefined both in its reach and its impact. Workshop participants were invited to define how the intervention brought about modal shift

and changed the average distance travelled by car, train and bus as well as the number of people targeted.

For the Business As usual Scenario SEI looked at proposals for the optimisation of the current bus networks set out in the Tees Valley Bus Network Review. Based on this, bus use increased by 16% by 2026 and car used declined amongst 5% of the Tees Valley population.

---

## ANNEX D: THE REAP MODEL EXPLAINED

*“All models are wrong but some models are useful”* William Deming

**R**EAP provides a simplification of the complex interactions that take place in the economy. It should not be used as the sole source of information when developing policy or making decisions. It provides standardized, quantified results that have many applications to policy but it does not provide the last word. There is no difference here between REAP and any econometric model used by policy makers to understand population, housing or changes in GDP; no model can provide a complete picture of real life

The strength of REAP is that it uses the best available methods and applies them at a greater level of detail than has been done before. This means it is possible to use REAP to calculate all greenhouse gas emissions and the Ecological Footprint by:

- Economic sector (agriculture, food processing, textiles etc.)
- Final demand category (private household, central government etc.)
- Consumption category by household (food, clothing, transport etc.)
- National, regional and local area
- Socioeconomic group

The basic methodology underpinning REAP combines existing Material Flow Accounts (MFA), National Environment Accounts and National Footprint Accounts (NFA) with input-output analysis. Environmental input-output analysis is a well established approach that makes it possible to track and assign intermediate resource flows to consumption categories. This is important because industries trade resources with each other in the process of producing goods and services and we need to be able to track these ‘indirect’ or ‘offsite’ impacts as well as those associated by the ‘direct’ or ‘onsite’ use of resources. The total impact of the resources used can then be assigned to a product or service and, ultimately, to the consumer. Within REAP Material flows (MF), Greenhouse Gasses and Ecological Footprints (EF) are allocated to detailed household consumption activities using the United Nations COICOP classification system and detailed household expenditure data.

This approach makes it possible to address production and consumption processes and their underlying technical, social and behavioural drivers simultaneously. The indicators that REAP produces illustrate the impacts associated with our consumption activities but the methodology used makes it possible to track product groups through every stage of their lifecycle.

At present REAP runs on the assumption that all imported goods consumed by UK residents are produced with world-average carbon dioxide intensities. This means that REAP cannot distinguish between products from different origins. This approach can only be



improved by building a multi-regional input-output model for the world economy. SEI are currently undertaking the first stages of this work for Defra with the objective of further developing an indicator of embedded carbon dioxide emissions.

The Ecological Footprint and Carbon Footprint results in this report should not be used for performance appraisal or to create a 'league table' of local authorities. In general the more a person spends the higher their Ecological Footprint tends to be (though the pattern of spending – what people spend their money on – is also important). As a consequence local authorities with wealthier populations will tend to have higher Ecological Footprints. Local Authorities cannot be held to account for the wealth of residents in their area especially as many of the powers they hold do not directly target household consumption activities.

For a technical overview of the REAP methodology see REAP Technical Report 2 - The Use of Input-Output Analysis in REAP to Allocate Ecological Footprints to Final Consumption

### Data Sources

REAP uses expenditure data to overcome the problems associated with the collection of inconsistent local data and ensure the Ecological Footprint and Carbon Footprint can be used to track progress over time. The results provided by REAP are directly comparable with National Footprint figures provided by Global Footprint Network and with those provide by the Stockholm Environment Institute for every local authority and government region in the UK.

Starting in 2008 REAP data will be updated annually to create a year-on-year time series for each English Region including London. If the REAP methodology is improved at any stage, updated results will be back-cast to 2001 so that it is still possible to compare the Ecological Footprint and Carbon Footprint for the entire period.

REAP is an econometric model that uses national average prices and establishes the average impact associated with each consumption activity from buying a sandwich to renting a house. In reality a product or

service can be provided in different ways and have different levels of environmental impact associated with it but REAP is not able to pick this level of detail up when modelling the entire economy.

Data for the flow of basic materials and products for each economic sector were obtained using data sources covering the period from 1997 to 2004. The main data source is PRODCOM – detailed national trade and expenditure data used by the Office of National Statistics (ONS), and harmonized across the European Union. This is complemented by household expenditure data by local authority area and ACORN type.

REAP combines top-down national accounting data and locally specific consumption data. A break down of data sources is provided at the bottom of this page. The Regional data used in REAP is based on the 'Family Spending Survey', this is updated annually but does not provide data at the local authority level. To provide data at this level socio-demographic profiles for each local authority area are generated using ACORN data. The 2001 baseline in REAP is not directly sensitive to local and regional policy interventions. Separate data on the effect of policy interventions over time can be directly programmed and measured using REAP with population and household data being the easiest to change. Transport data sometimes needs translation; in REAP it is possible to model modal shift and change the average distance travelled by each mode<sup>12</sup>. The latter is measured in 'passenger kms' and models resident's journeys. If policy makers have data on changes on traffic flows only it is not immediately straightforward to translate these into figures that can be used in REAP. SEI is working to overcome this by producing a number of 'support spreadsheets' which help policy makers undertake this translation work but the baseline and projections in this report do not take into account the impacts of policies since 2001.

ACORN stands for 'A classification of Residential Neighbourhoods' and has been developed by CACI Ltd., a data marketing firm. The classification system defines socio-

---

<sup>12</sup> as well as changes in fuel efficiency, vehicle occupancy and car ownership

economic groups within the UK, fitting the population into 17 distinct groups which contain a further 55 'typical' types. For instance:

**Group 1:** Wealthy achievers, suburban areas

Type 1: Wealthy suburbs, Large Detached Houses

**Group 17:** People in Multi-Ethnic, Low income areas

Type 54: Multi-Ethnic, High Unemployment, Overcrowding)

A host of data has been collected on each of the 54 ACORN types. This has been used to build profiles of household expenditure in each local authority area and covers everything from the types of holidays people go on to how many cars they own.

Further locally specific data has been collected for energy, transport and waste where possible. We recognise that some organisations may have more specific information for their area. To accommodate this REAP has an 'Update Data' function where this data can be entered at the touch of a button.

• The main data sources used in REAP break down as follows:

- National (economic) Accounts (Office for National Statistics),
- National Footprint Accounts (Global Footprint Network),
- National Environmental Accounts (Office for National Statistics),
- Household Expenditure Survey (Office for National Statistics),
- National Travel Survey (Department for Transport),
- National Food Survey (Office for National Statistics)
- household expenditure by ACORN' group (CACI Ltd.),
- composition of ACORN groups in LA areas (CACI Ltd.)

REAP measures the impacts associated with the consumption activities of residents of an area only. This means that Tees Valley results do not include the activities of commuters who work in the Tees Valley but live elsewhere. They also exclude the impact of tourists who may visit the area. The impacts of all visitors to the Tees Valley are taken into account at their place of residence.



# The Stockholm Environment Institute (SEI)

SEI is an independent, international research institute specializing in sustainable development and environment issues. It works at local, national, regional and global policy levels. The SEI research programmes aim to clarify the requirements, strategies and policies for a transition to sustainability. These goals are linked to the principles advocated in Agenda 21 and the Conventions such as Climate Change, Ozone Layer Protection and Biological Diversity. SEI along with its predecessor, the Beijer Institute, has been engaged in major environment and development issues for a quarter of a century.

## Mission

*SEI's mission is to support decision-making and induce change towards sustainable development around the world by providing integrative knowledge that bridges science and policy in the field of environment and development.*

The SEI mission developed from the insights gained at the 1972 UN Conference on the Human Environment in Stockholm (after which the Institute derives its name), the work of the (Brundtland) World Commission for Environment and Development and the 1992 UN Conference on Environment and Development. The Institute was established in 1989 following an initiative by the Swedish Government to develop an international environment/development research organisation.



## Future Sustainability

The Future Sustainability Programme aims to explore the current state, future prospects and intervention strategies of socio-ecological systems at various spatial scales. With its emphasis on whole systems, integration and the future, it complements the thematic foci of SEI's other programmes and projects.

Since the mid-1990s, SEI has developed a series of global and regional scenarios that shed light on the scale of the sustainability challenge and helped assess various development pathways that could address this challenge. More recently, the Programme has been examining the issue of sustainable consumption and production, lifestyle and behavioural change.

## Stockholm Environment Institute

Stockholm Centre  
Director: J. Rockström  
Kräftriket 2B  
SE -106 91 Stockholm  
**Sweden**  
Tel+46 8 674 7070

U.S. Centre  
Director: C. Heaps (acting)  
Tufts University  
11 Curtis Avenue  
Somerville, MA 02144-1224  
**USA**  
Tel+1 617 627-3786

Tallinn Centre  
Director: V. Lahtvee  
Lai 34, Box 160  
EE-10502, Tallinn  
**Estonia**  
Tel+372 6 276 100

York Centre  
Director: J.C.I. Kuylenstierna  
University of York  
Heslington, York YO10 5DD  
**UK**  
Tel+44 1904 43 2897

Asia Centre  
Director: M. T. Chadwick (acting)  
9th Floor, Park Place Building  
231, Sarasin Road, Lumpinee,  
Pathumwan, Bangkok,  
**Thailand**  
Tel+66 (0) 2 254 2260

**www.sei.se**