One Planet Wales

Pathways towards a sustainable future

Report Annex

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Technical Annex

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1 Methodology

1.1.1 One Planet Economy Regional Assessment method

The methodology for One Planet Wales is based broadly on the One Planet Economy Regional Assessment (OPERA), recently developed on behalf of SEEDA with DEFRA sponsorship.

However the limited resources for this present study meant that it was not possible to follow the method to completion. In addition some of the technical aspects regarding the use of modelling tools such as REAP, will not be completed until 2008.

In this current phase, therefore, the main attention has been on the use of the 'Resource Analysis Framework', a structured analysis of the supply chain and resource flows in each of the key sectors. This is complemented with basic scenario modelling wherever possible.

1.1.2 Outline

The basic framework is simple: 4 main stages, each with a 'baseline' (present) and a 'prospective' (futures) component.

- ***Agenda setting***: this is about defining the problem and setting clear boundaries for the present and the future.
- ***Technical issues***: this includes the technology, infrastructure, with environmental and spatial impacts, and the opportunities for change.
- ***Economic issues***: focus on the 'wider economy' system - flows of capital and human value, on the production and consumption sides, in public and private sectors.
- ***Policy issues***: this focuses on the organizations in public, private and civic sectors, and the opportunities for new kinds of policy.

There is a baseline component for each of these, followed by a 'prospective' (future opportunities) component. This should then be taken to an 'extended analysis', in order to look more closely at cross linkages. It should then be taken to an 'evaluation' stage which digests the results and provides feedback to users.

The arrows shown are suggested only for guidance. We would recommend starting at the top left with the 'problem definition'. Beyond that, each type of issue or policy question would generate its own logical path through the various stages. (as shown by the case demonstrations in the main report.)

If the methodology is working, then it will generate more questions – so having got to the end of the evaluation (bottom right corner), the next step would be to start again, and revisit the problem definition (subject to time and resources).

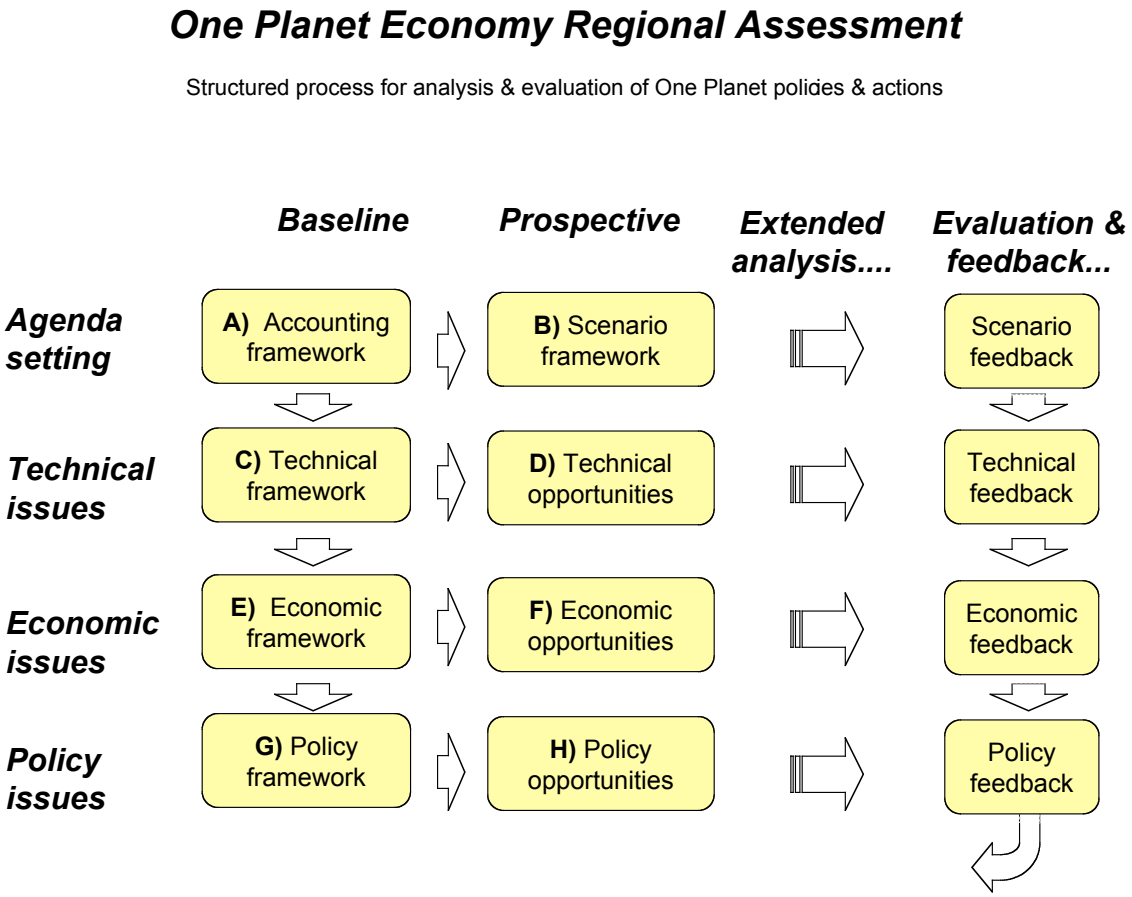
1.1.3 Step by step guide

a) Baseline framework

This focuses on the choice of boundaries in space and time, and the metrics and benchmarks for resource flow issues, and their policy levers. The first and foremost questions are those of local vs global, and production impacts vs consumption impacts. There are more technical questions about the difference between ecological footprint, carbon footprint, carbon emissions etc, which will then inform the accounts and accounting framework. Surrounding this is a wider question of 'problem definition' – whose problem? At which level? Etc.

b) Scenario Framework

This explores the scope & boundaries of the futures studies in each of the components to follow. There are basic decisions in terms of the relevance to policy, research, campaigns or other applications – long or short term horizons: change from within or without: policy driven or market driven: more technical / quantitative, or more social / qualitative, etc.



c) Technical baseline

This takes a more technical approach and model-based approach to the physical systems, including:

- Environmental flows and impacts
- Physical infrastructure and stocks, such as houses or vehicles
- Technology and engineering, such as energy systems etc.
- Spatial effects and spatial development issues, such as congestion or accessibility.

d) Technical opportunities

This investigates the potential opportunities for change and innovation, in each of the above areas. These include both engineering based, and / or more policy based themes:

- increasing resource or energy efficiency
- investment in infrastructure and capital stocks
- improving supply chains through demand side management
- transforming product efficiency and life cycles
- spatial development or spatial distribution policy

e) Economic baseline

This looks at the summary of the economics of the sector or project, in terms of cash flow / value added, investment / return, trade balance, fiscal returns, employment, profit/loss and balance sheet, and so on. As far as possible it would also look more widely at the social / environmental cost-benefit, using a triple-bottom-line economics approach to social / human capital, community enterprise, environmental capital and so on.

f) Economic opportunities

The opportunities for innovation in business models, trading systems, fiscal policy and so on, is where it gets really interesting. A short list of potential cross-cutting policy themes would include:

- direct fiscal taxation / subsidy
- public investment or procurement
- new forms of value trading and shadow markets
- integrated asset management and life cycle costing
- corporate responsibility and stewardship
- partnerships, mutuals, consortiums
- social trading / stakeholder enterprise
- human resource development

There are many detailed economic models which deal with such issues on a narrow economic basis. But there are few models which can look beyond, at the institutional or evolutionary perspectives. So for this component and beyond, we have to combine bits of available evidence, with causal path analysis, amidst shades of uncertainty.

g) Policy framework

This baseline looks at existing organizations, agencies, networks, partnerships and so on, who are involved in the problem / agenda. The general context is that of 'multi-level / multi-lateral' governance, i.e. that the way policy works in the UK / EU is with negotiation and coordination, (rather than military dictatorship). This component would also look as far as possible beyond 'policy' at other human factors, such as:

- Skills, professions, organizations
- Cultural influences such as media, sport
- Behaviour, incentives
- Ethical and moral issues
- Cultural and psychological identity issues

- Conflict, competition, expropriation issues.

h) Policy opportunities
The final component explores directly the 'how' and 'who' questions which lie behind the opportunities from previous steps. This is another wide ranging set of possibilities such as:

- - new forms of multi-level and multi-lateral governance
- - new forms of management & planning
- - new forms of equity and redistribution
- - new forms of citizenship, responsibility and stewardship
- - new forms of partnership and networking.

1.1.4 Scenario modelling outline

The next phase of this project is proposed to apply the scenario modelling process now being developed for the One Planet Pathways at the UK level. This brings together a range of components: some are standard, others are unique and state of the art (diagram below).

a) ***Scenario framework***: basically this sets out the One Planet targets with 4 'pathways' to achieve them, depending on 4 versions of the future socio-political context. A baseline scenario is included for comparison, based on the UK Energy White Paper.

b) ***Impacts & accounting framework:*** provides the global context, trend factors and accounting boundaries, focusing on the relationship between carbon emissions / footprint, landuse climate impacts / footprint, etc.

c) ***Energy technology modelling***: UK model of energy supply pathways to meet the scenario targets, based on the LEAP system, with additional accounts / models as needed.

d) ***Energy demand modelling***: UK supply chain / component analysis of pathways to meet the scenario targets, based on the REAP model & data system, with additional accounts / models as needed.

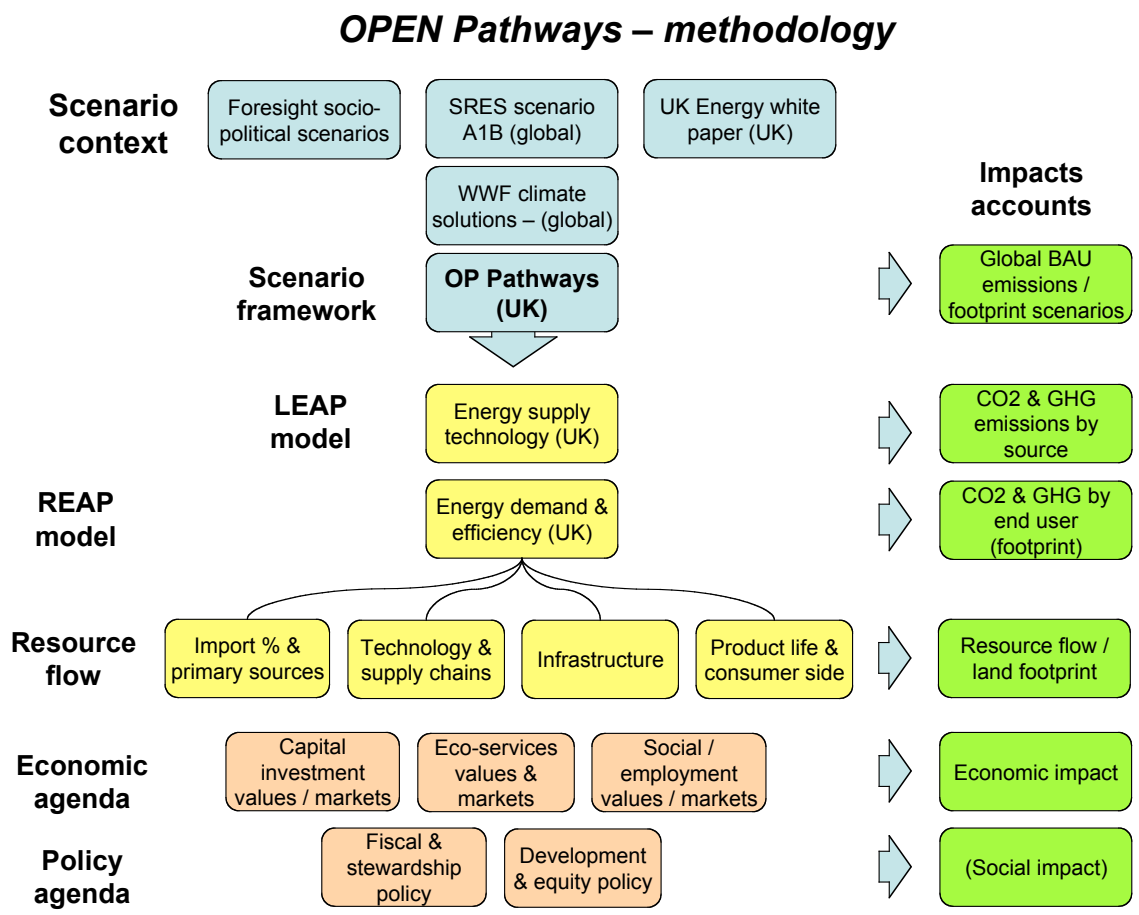
e) ***Resource Analysis Framework:*** UK supply chain analysis, with focus on key sectors. This follows the OPEN Resource Analysis Framework and templates - primary, secondary, tertiary, infrastructure, demand side and externalities. Resources may be physical or other forms of value / capital.

f) ***Economic - fiscal agenda***: provides demonstration modelling / other assessment, as far as possible within limited assumptions, of the issues for public fiscal policy, MBIs, macro-economic balances, shadow values etc. (this is to be confirmed, depending on possible contributions from economic consultancy).

g) ***Policy institutional agenda***: looks at wider aspects of CSR / PSR / citizenship, development & equity issues, supply chain & infrastructure issues, local economy & social enterprise etc.

h) ***Cross linking & sensitivity testing***: provides some analytic techniques for comparing, benchmarking and priority testing for the technical, economic and policy issues from one scenario to another.

i) ***One Planet 'strategic programmes'***: puts all the above together for a combined practical 'bottom up' action plan demonstration for key sectors.



1.1.5 General background to the method

The OPERA method is based on the idea of the inter-dependence of environmental, social and economic factors. To explore this, we find most useful the combination of 'causal path analysis' charts: together with a series of analytic matrices. These matrices are based on the 'resource analysis framework' (RAF):

- Supply side: sources, manufacturing, infrastructure, service sectors
- Demand side: utilization, mode, product operation
- External impacts: environmental, social, economic

Each step component is shown with one of the 'resource analysis framework' charts, a more detailed version each line of the summary chart below. These can be cross-linked to the causal path analysis.

RESOURCE FLOW FRAMEWORK - SUMMARY			
	supply side	***demand side***	***external impacts***
agenda setting			
technical issues & opportunities			
economic issues & opportunities			
policy issues & opportunities			

1.1.6 Managing uncertainty and complexity

This framework is only a guide. Many of the boxes will be hard to fill with actual data, and being up front about the many shades of uncertainty will be more useful than pointless precision in numbers.

Each component in this method is a process of investigation, rather than a fixed 'answer'. Most real problems would focus on particular stages, repeated feedback loops, calls for further research and so on.

The method is partly geared to using technical 'models' such as REAP, REEIO, LEFM, TRANUS and so on. The models then determine what kind of 'indicators' and 'benchmarks' can be projected or analysed. The appendix shows the application of this method to the REAP and REEIO modelling systems.

Our experience is that such models often show only a fraction of the actual policy agenda. So while they can be essential, they need to be taken as part of a bigger picture. This bigger picture is crucial to the challenges of transformation and the One Planet concept, and includes all the scientific challenges of sustainability –

- Alternative boundary settings in space and time
- complex and intangible factors which cannot be modelled or measured:
- multiple linkages between sectors, levels etc
- multiple shades of uncertainty, risk, responsibility etc.

Overall, the OPERA method is not a foolproof 'idiot's guide' which will provide simple answers by pressing buttons. Rather it is a tool for structured thinking and investigation of the sustainable development of cities and regions, and how policy can help to manage the complex challenges of the 21st century.

1.2 ONE PLANET ECONOMY PRINCIPLES

The One Planet Economy is measured ultimately by the resource flows and global impacts of its supply chains, from production to consumption.

However there is much more to an economy than material movements. There are flows of finance and credit: inputs of labour and skills: international trade and development issues, and so on. There is no single or complete way to represent such a wide range of issues, or to define a strategy which is guaranteed to achieve the One Planet target in resource flows and global impacts. But we can identify from experience, analysis and road-testing, the most significant principles. The pyramid diagram below shows how the principles overlay on the 'Resource Analysis Framework' (RAF).

a) ***Ecological budgeting***, as the over-arching goal of the One Planet Economy programme, which sets quantitative targets on a strategic basis to enable long term planning.
b) ***Fiscal policy*** - this assumes a pro-active role of stewardship by the public sector of common resources. This has implications for a wider range of instruments in taxation and spending, to be followed up in the CSR process.
c) ***Investment and partnership*** – on the basis that market transformation involves public-private-third sector partnerships, and that investment needs to combine entrepreneurial risk-taking with a long term view.
d) ***Trade and development*** – this looks at the other end of the supply chain, and the imperative for development and empowerment of developing nations.
e) ***Integrated supply chain*** – addresses the core business activity, and particularly the challenge of allocating responsibility and incentive along complex supply chains and product lives.

f) ***Infrastructure and asset management***: identifies the business case for strategic management and investment in assets such as national stocks of buildings, vehicles and so on.

g) ***Consumer and social enterprise***: at the demand side there is great potential in more sustainable consumption, enabled by community actions, networks, non-profit and other types of social market.

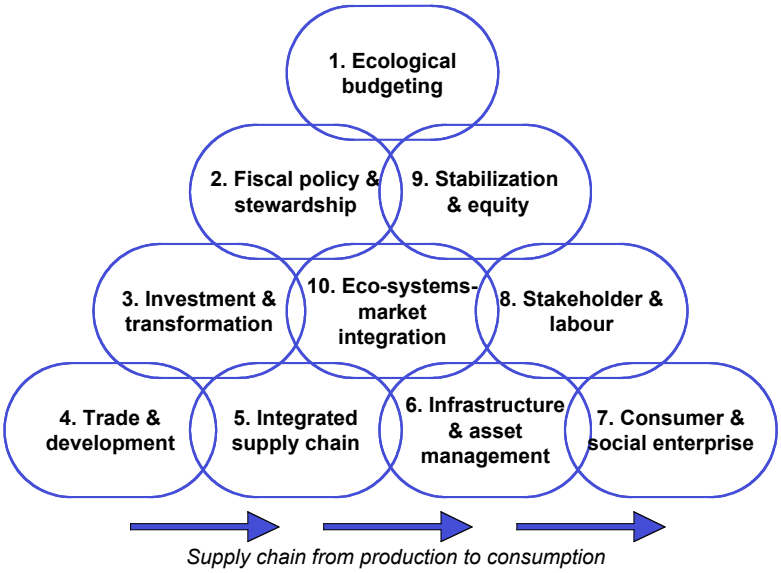
h) ***Stakeholding and labour***: surrounding every supply chain is a wider community of stakeholders who need to be engaged and mobilized. The most important of these are employees, and their stake in the enterprise and in their own skills, is paramount.

i) ***Stabilization and equity***: local and regional economies should be resilient to the impacts of economic change and polarization, and empowered to realize their own potential.

j) ***Eco-systems integration***: finally, the links between economic, social and environmental assets and flows need to be strong and responsive. These may be through enhanced eco-systems markets, other trading and investment systems, responsive planning, multi-level stewardship, and new technology to facilitate all this.

10 principles for a One Planet Economy

System-level principles to enable definition & benchmarking of a One Planet Economy



The key sector tables in the Main Report enlarge this composite view into more detail, covering the integrated supply chain from physical, economic and policy perspectives.

2 Interview programme

2.1.1 Interview structure

The aim of the interview programme was to seek the advice and views of experts and stakeholders for the ***One Planet Wales*** project, on behalf of WWF-Cymru.

One Planet Wales is focusing on the future prospects for Wales, to 2050. It looks at the potential for transformation across the board in each sector – transformation of markets, supply chains, investment, fiscal policy, social enterprise and so on. It will provide a route-map and signposts for policy, business, civic sectors, and further research.

The interviews were structured broadly by each of 8 key sectors, plus 2 cross-cutting themes (tourism and regeneration). In reality the agenda is set by the remit of the interviewee and their organization. We were particularly looking for insights into the specific 'Wales' agenda for each sector:

- existing policy set-up, for each sector
- future policy implications of the One Planet transformation
- examples of best (and worst) practice

2.1.2 Interview contributors

These were the main organizations covered, within the limited resources available.

- Welsh Assembly Government
- National Parks Authority, Wales
- Environment Agency Wales
- Centre for Alternative Technology, Wales
- Visit Wales,
- Enterprise and Innovation and Networks
- Cardiff University BRASS

2.2 GOVERNANCE ISSUES

2.2.1 One Wales –

A coalition government statement: 27/06/07
"Our joint commitment to the principles of social justice, sustainability and inclusivity - of the whole of Wales and for all its people - run throughout this programme. These principles underpin the programme and are fundamental to its success.
In devising this programme, we have explicitly recognised the diversity of Wales – geographically, socially, linguistically and culturally. We propose a comprehensive programme of government, for the full four year term, which covers the whole spectrum of policy and action.
We propose a programme which builds a strong and confident nation, which will create a healthy future, and which creates prosperity and jobs in living communities including measures to support the Welsh language.

We set out plans to ensure learning for life, to create a fair and just society and to ensure a sustainable environment. Finally, we aim for a rich and diverse culture, which promotes Wales as a bilingual and multicultural nation.
This programme for government is ambitious yet realistic. It is radical yet deliverable.
It makes best use of the powers and resources available to the government and puts on the agenda whether further changes are needed."

But – we need to look closely with the One Planet benchmarks in mind.

General picture as of mid 2007:

- New ministers
- New committee structures
- Review of policy areas

- Emphasis over the last 8 years has been on secondary legislation (in terms of scrutiny)
- This is anticipated to reduce considerably, with more emphasis on looking at primary legislation – with the ability to take Bills through the Assembly - a new area of work.

Issue: How's it going to work in terms of the overall UK situation? UK Gov has a key part in ensuring EU Directives are delivered and International agreements are delivered.

- How are devolved states going to assist in delivering the UK total? - with considerations to relationships between Whitehall and the devolved administrations
- Likely to be significant changes with new powers in Wales –
- How does it deliver in relation to rest of UK? – at an experimental stage for the new system.
- How Policy Departments and Assembly members identify areas for new Primary legislation specifically for Wales? Developing ideas for what is needed and wanted for Wales and its delivery.
- Now, a major learning process for Wales, with the former way of working heavily dependent on UK's situation, or England and Wales's primary legislation as frameworks.
- Decisions on how it works, factoring in local issues into the England and Wales's situation

2.3 SPATIAL PLANNING AND MANAGEMENT –

Looking at it in terms of regional needs, regional characteristics.

- WAG's current ***Spatial Plan*** – Introduction of 'fuzzy boundaries' – No stop/start point. The provision of services and priorities for areas gradates. Though spatial planning is in no way unique, Wales seems to be forefronting and pushing quite strongly.

Perceived as difficult in local government and other areas to challenge the thinking and working that exists within local government - to think beyond their **'well worn'** boundaries.

- Follow up policies from Spatial Plan work in form of the development of **Statutory Local Service Boards** to bring together LAs to review service provision and best practice in delivery. (eg. Could Social Services procure in partnership? etc)

Spatial Planning process - main priorities since 1999 – Looking at a holistic view of Wales, as opposed to the 22 local authorities. (**MAP** – source WAG site)

2.3.1 Physical characteristics for spatial development:

- Populations in the East Wales; Vale of Clwyd, Flyntshire etc. still looking very much to the east for their centres - Liverpool/Chester/Manchester
- Big problem in North Wales – geographic landscape means that communities east and northeast of mountain range travel to Chester.
- Same applies further south, with populations travelling east to Shrewsbury/Birmingham
- There is now a considerable commuting population.
- Gwynedd and Snowdonia are very much self-contained ('Fortress Gwynedd')
- Few economic initiatives/choice west of range. Pockets of low economy.
- Anglesey is again becoming a self-contained unit, with local business uptake of Gov initiatives on small scale.
- Anglesey has a history of self-sufficiency/independency; 'us and them' attitude still prevails. Huge challenge in changing attitudes to cross 'boundaries and 'think together'

2.3.2 Climate Change agenda in agriculture

Agri Environment Scheme, bio-diversity scheme. (For info., ref. Food & Agriculture)
Currently, nothing of its basis relates to climate change.

This is being reviewed as part of the Rural Development Plan. EU funded from 2007 to 2013.
Four key axis:
1. Food Production – how to improve efficiency
2. Agri Environment Schemes – and how to target.
3 & 4 .Rural Development and Social Development
In terms of climate change, 1 and 2 are relevant – improving efficiency of farming and land use.

Topical issues:

- CAP reform, higher level stewardship, single farm payments – is it working?
- Subsidized sheep vs marginal dairy or beef?
- Biodiversity & landscape protection vs production? National parks?
- Low-impact rural dwellings & livelihoods
- Integration of food processing & retail sector to UK / EU economy
- Food procurement, diet & public health strategy.

Generally, farming production has changed dramatically over 50 years with a drop in production. Subsidies are available for change. Main subsidies are available for protection, conservation and management of landscape, in particular hill farming.

> "*Farmers are heavily dependent on subsidies which can represent up to 98% of net farm income; monoculture and heavy grazing have contributed to loss in biodiversity; and the typical family farms are being transformed into either larger unit or smaller part time farms."* [1]

[1] WAG, 2007: 'Sustainable Farming & Agriculture: Action Towards 2020' Report to the Minister for Rural Affairs

National Park Authorities, local authorities and small farmers are generally in favour of valued form of diversification through small farm tourism – again, quality is important.

Management of key farming scheme: Additional Info. Agri-Environment Land Grant Schemes:

- Wales wide - Tir Cynnal Scheme provides farmers with small grants for Nutrient Management Plans, Bio-Diversity Plans, Wildlife Protection etc. Tir Gofal is equivalent to the England higher level scheme, which provides funds for land management, such as shelter belt, protecting hedges etc.
- Tir Gofal and Tir Cymen Schemes are no longer operated by NPA on behalf of CCW.

However there are problem issues in farming diversification:

- Lack of co-operative working. Farmers are more used to working independently and in competition with each other.
- Gaining a critical mass of productivity for guaranteed of delivery.
- Skills shortage in small farm product placing and marketing.

Varying methods are currently underway to address, including Agri Food Scheme, First set up by WDA, but there may be some confusion as to current situation. No evidence of a comprehensive, Wales-wide, collective partnership scheme.

Recent changes:

- More amalgamation of farms.
- Recent past saw a living made from 100 acres, now, expected acreage, min 300 acres. Some farms in North Wales have over 1000 acres, but often lower productivity.

Current weaknesses:

Re-occurring issue for Wales (and UK) – is funding (or more specifically, stop/start funding for initiatives)
Current position for Wales is that the Rural Development Plan has been stalled, due to critical issues in terms of funding. A current scheme, Tir Monas (GG. check spelling - Monies) benefits farmers in 'less favoured' areas – defined by landscapes, soil qualities, gradients of land etc. The majority core being mid/central Wales. Up to now, farmers have been given an agreed amount per year – now under review. Ways are being looked at to make changes to that current system. Under the current/former system there was no measure of what was being delivered, with no clear objectives re what was being delivered other than maintaining farming and prevention of land abandonment, but it hasn't achieved in terms of environmental deliverables.

- Recent problems in reaching agreements, with some political parties wanting to maintain the current 'old' system.
- Labour Assembly Government failed in getting agreement for change.
- A stalemate has been reached regarding **how** to move forward.
- Problems likely to arise if current scheme continues, with a major drop in funding.
- Opportunities exist for thorough reviews, conclusions and ways forward.

If the current scheme continues, there will be less funding available for moving forward with workable and deliverable agri-environment schemes and improvements to efficiency of food production, in terms of climate change and resource efficiency. Currently, there's the intention to review, particularly the Agri-Environment Scheme this year by Sustainable and Rural Development (formerly, and recently, Environment Planning and Countryside) in terms of what it could be targeted at.

Independent working group with WAG official members **Project '2020 Vision'** Countryside Policy dept. (lead - Rory O'Sullivan/ David Morris) – looking at longer term sustainability issues for Welsh farming. Which will feed into **Axis 2 Review Group,** looking at bio-mass, soil carbon, Water Frame work Directive compliance. Also, looking to move from existing Agri-Environment Schemes, which currently focus on individual farms as patchworks, to a move toward whole catchment thinking.
2 pilots in existence (Bala and Pembrokeshire) re. Catchment farming and cooperative approach.

2.3.3 Organic farming

There is funding available for organic farming (Wales wide) under the current agri-scheme umbrella. Though info. sketchy and lacking any specific detail.
There's a recognised need to look at land use, not just in terms of food production, but a change of land use as a whole,

- What are the options? – for example, for bio-energy, bio-fuels, bio-mass.
- What support is required? What incentives are needed to make it happen?
- What needs to be done - in terms of protecting soil carbon?
- What? - in terms of water quality and meeting Water Framework Directives.
- What? – regarding flood prevention and control
- What? – in regard to maintaining and encouraging bio-diversity.

2.3.4 Bio-mass agriculture

Government review currently being undertaken regarding bio-mass production, which should feed into the planned Wales Bio-mass Strategy (as yet, no evidence found of timescales.) inc:

- incentives
- facilitating supply
- processing facilities
- and to synchronise, enabling for markets

(As yet, no evidence of '**real incentives'** for change of land use for bio-mass/bio-fuel production. Though some may point to DEFRA grant scheme for farmers to grow bio-mass crops, though there appears to be queries as to how effective that scheme is. Grants are currently in the region of £1000 per hectare, with very little take-up in England. DEFRA hinting at needing to up incentives to £2,500 per hectare) England has seen some uptake from current incentives, but no markets.
Akin to conclusions arrived at by the UK Bio-mass Task Force.

2.4 NATIONAL PARKS

Extended interview with National Parks Authority, Snowdonia, North Wales

Background Info:

- Snowdonia has been a National Park Authority for 55 years.
- 1 of 3 National Park Authorities for Wales.
- 26,000 residents

- Covers 2,130 sq kms (823 sq miles), second largest area of any Local Plan in Wales or England.

The Eryri Local Plan, in conjunction with the Gwynedd Structure Plan, is the adopted development plan for the National Park. The Plan has three statutory purposes:

- To develop the policies of the Gwynedd Structure Plan where they relate to the National Park and the purposes of the NPA.
- To provide a detailed and consistent basis for the determination of development proposals that require planning consent.
- To involve local people and those with an interest in Snowdonia in current and future planning issues.

Statutory purposes/ responsibilities relating to OPE Wales key sector areas:

- Tourism
- Agriculture
- Infrastructure/Construction
- Transport/Communication
- Public Services
- Planning.

Responsibilities for Manufacturing lie only in terms of Statutory Planning.
As a Gov Environmental organisation, NPA impinges, again, through Planning systems on
Energy, Waste and Water.

- NPA has few powers to enforce (key power in Planning issues),
- Section 62 of Environment Act – all Public Authorities and bodies have a statutory duty to have regard to National Park purposes when pursuing activities.
- Highly effective as a partnership working authority. (Views itself as 'head of the game' in partnership working in Wales - for effective delivery)
- Key influencer of environmental issues and future policy developments.
- Powerful partner persuader

(Though evidence points to occasional lack of regard Section 62. The Environment Act
NPA held a conference this year, as a reminder of Sct 62)
Main issues that separate/join the 3 NPAs:

Key partners include:

- Countryside Council For Wales, National Trust, Local Authorities, Transport Consortia.
- NPA attempt a holistic view of management, not solely the landscaping. Promotion, communication, protection and economic wellbeing are integral to each project. Sustainability hasn't come as a shock to NPA as it has to many bodies.

Funding NPA (Snowdonia):

- 3/4 direct from WAG
- 1/4 levy from 2 Local Authority budgets (ringfenced from WAG)
- Net £5 million
- Gross budget £9.5 million
- Income generation from grants (eg. £1million per yr for footpath schemes) and sales (eg. £200K from car parks, £90K Visitor Centres)

Problem - 'How do we get out of our silos, in terms of working – and fit into the bigger scheme with a wider way of thinking?' - Not just in terms of statutory planning, but also in terms of regional management of resources.
Making the Connections Process – Local authorities, statutory bodies working together in terms of efficiencies and economies, whilst thinking in more wider terms re. Impact on provisions of services, health, children's services etc.

- Challenge the working practices of local authorities. To see beyond the 22 authorities – steep learning process.
- Working better in mid Wales than the North, due to mid Wales better tendency for LA's partnership working – a more co-operative feel.
- Maybe due to geography – there is more cohesion in mid Wales.
- Mid Wales dominated by one authority (Powys) – with satellite authorities.

Planning:
National Parks Authority is a statutory planning authority. Local councils have no formal influence in planning within the NP.

2.4.1 Farming in the National Park

Farming production has changed dramatically over 50 years with a drop in production. Subsidies are available for change. Main subsidies are available and there for protection, conservation and management of landscape, in particular hill farming.

"*Farmers are heavily dependent on subsidies which represent up to 98% of net farm income; monoculture and heavy grazing have contributed to loss in biodiversity; and the typical family farms are being transformed into either larger unit or smaller part time farms*." (source WAG)

NPA Snowdonia, LAs and small farmers very much in favour of valued form of diversification through small farm tourism – again, quality important.

Additional Info. Agri-Environment Land Grant Schemes:

- Wales wide - Tir Cynnal Scheme provides farmers with small grants for Nutrient Management Plans, Bio-Diversity Plans, Wildlife Protection etc. Tir Gofal is equivalent to the England higher level scheme, which provides funds for land management, such as shelter belt, protecting hedges etc.
- Tir Gofal and Tir Cymen Schemes are no longer operated by NPA on behalf of CCW.
- CCW act as Gov agent for farming practice schemes.

- Currently, as of recently, WAG directly operates Tir Gofal – agr-environment scheme for Wales, aimed at promoting conservation and management on a whole farm basis.
- Rhaglen Tir Eryri. EU funded, under Objective One: Looks to supplement farm incomes by filling in the gaps that fall short of the Tior Gofal scheme.
- In the main, 10 year scheme agreements. Monitored by CCW and NPA.
- NPA now operates and administers a new Snowdonia Land Program scheme,

Examples of Work Programmes:

- Mid 1970's Upland Management Experiment
- 1987-1997 Part Farm Management Agreements
- 1989 - 1997 Conservation Top-up Grants
- 1997- 2001 5b Gogledd Eryri (EAGGF) - £1.2 million

- 1992 - 2006 Tir Cymen Delivery
- 1999 - 2006 Tir Gofal Delivery
- 2000 - 2002 Eryri Landscape and Features (Objective One) - £1.7 million
- 2002 - 2003 Farming Connect Facilitation
- 2003 - 2008 Rhaglen Tir Eryri (Objective One) - £4.8 million
- 2005 - 2007 - Environmental Opportunities Review
- 2005 - 2007 Catchment Sensitive Farming

Issues raised:

- Second homes are a major issue, with the added political issue of the Welsh language and Cultural element of Welsh language.
-
- Caravan Parks are governed by the Statutory Planning process.
- NPA Snowdonia sees a shortage of high quality camping facilities. There is a need to promote a range of accommodation options, but emphasis **now** is clearly on quality.
- Visit Wales are promoting quality gradings.
- No new large caravan parks to be developed.
- NPA promoting better landscaping
- Issue of colour – sympathetic/aesthetic
- Difficulty in promoting a landscaping of current parks that doesn't involve regimented rows (proprietor maintenance issues)

2.4.2 Forestry in the national park:

NPA has its own foresters, working closely with landowners and farmers and Welsh Woodlands Organisation - CC

- Planting – grants available through CC
- Advice on management
- Promoting broadleaf woodlands
- Major scheme. Landscape scale – Interconnectivity – Connecting protected areas for wildlife corridors throughout Wales.

Organic Farming:

- No existing policies.
- Branding and niche markets – opportunity for new asset for Wales.
- Diversification – a slow (but sure) change of attitude in farming communities

2.4.3 Issues in farming diversification:

- Lack of co-operative working. Farmers used to working independently and in competition with each other.
- Gaining a critical mass of productivity for guaranteed of delivery.
- Skills shortage in small farm product placing and marketing.
-
- Varying methods currently underway to address, including Agri Food Scheme, (ref. Pg no.) First set up by WDA, but confusion as to current situation. No evidence of a comprehensive, Wales-wide, collective partnership scheme.

Recent changes:

- More amalgamation of farms.
- Recent past saw a living made from 100 acres, now, expected acreage, min 300 acres. Some farms in North Wales have over 1000 acres, but low productivity due to landscape.

Conflicts of interest:

2.4.3.1.1.1.1 Environmental factors/Road transport Improvements

Levels of consultation between Government agencies and departments have seen improvements over last two years. Marginal consultations take place, in terms of line; environmental impacts; materials (ie. road signs); cutting of verges and choice of boundaries.

Examples:

- Local authorities (Gwynedd) now adopting system of (h)edging.
- WAG road improvements over Ffestiniog to Betws-y-Coed now include slate walling.

Bigger questions of wider environmental impacts need to be asked and answered.

- NPA is currently being consulted at an early stage on two improvements A470.
- One scheme recently withdrawn because of objection from NPA (issues of lighting and major roundabout – under Section 62)

In a climate of increasing uncertainty, the powers that are currently invested in local Government agencies, can now be amended by the new Welsh Assembly Government. A keen awareness of that uncertainty regarding future governance seems to prevail.

- Though NPA are local authorities, they differ in terms of non-elected members.
- There 18 members of the authority, 3 of which elected by Conway County Borough, 6 nominated by WAG. (Access organisational map). www.eryi-npa.co.uk)

2.4.4 Waste & minerals in the national park

- The NPA assumed responsibility for minerals and waste planning 1996.
- The NPA contributed to the North Wales Regional Waste Plan, a blueprint for developing a network of facilities in order to ensure sustainable waste management in the region.
-

Minerals in the national park

- The NP is endowed with mineral resources such as slate, hard rock and a variety of metals, including gold.
- Demand needs to be balanced against the need to protect from mining and quarrying that would cause long-term harm to the landscape character and environment
- Policy reflects national guidance proposals for mineral extraction to be subject to rigorous examination.

Additional notes:
NPA – has a 'foot in both camps', both local Gov and WAG use NPA as a 'test bed' - especially WAG in sustainability issues and grant systems.

In terms of size, quite small, therefore nimble – and without the huge cog of bureaucracy and with a degree of autonomy, achievements tend to realise at a more rapid rate.

2.5 HOUSING

2.5.1 One Wales policies

- We will provide local authorities with the ability to secure 100% affordable housing on development sites to meet local needs in areas of high housing pressure.
- We will, in the on-going review of TAN 6, extend the current agricultural and forestry worker dwelling category to a rural enterprise worker category for essential dwellings in the countryside.
- We will allow local authorities greater freedom to designate non-development sites for the sole purpose of affordable housing, taking into account the principles of adjacency and sustainability.
- We will promote the expansion of Community Land Trusts in Wales

General issues

- There has been a slow down in price growth which comes at the same time as a large increase in new instructions to sell. A rise in repossessions is predicted, along with worsening affordability of housing and accessibility for first time buyers. New affordable sustainable homes are needed in Wales in order to meet demands.
- WAG works in partnerships to develop housing policies, reflecting needs.
- An Action Plan has been put into place in a bid to ensure that the strategy is carried out.

2.5.2 Better Homes For Wales

- 1.3 million homes in Wales contribute significantly to the total impact on the local and global enviornment, particularly in carbon emissions and waste. Improving the environmental and energy performance of housing construction, occupation and maintenance is a key part of building a sustainable future for Wales.
- The number of owner occupied dwellings in 2004 totalled 955,000, 74 per cent of the total housing stock of 1.3 million.
- 80 per cent of households in Wales are private, either owner occupied or private rented.
- 20 per cent is social housing, either LAs or RSLs (housing associations)
- Local authority stock has fallen by almost half since 1981
- There were 162,.000 local authority properties in 2004.
- More than 30 per cent of the housing stock in Wales was built before 1919 and 12 per cent between the First and Second World Wars.
- This housing is classed as “hard to treat” in terms of refurbishment.

Wales is facing biggest housing challenge for a generation.

- There is a shortage of affordable housing
- Many existing homes are well below standard
- There is a growing number of officially homeless people.

- The report says there is “a need to concentrate on the link between strategy and delivery in the new National Housing Plan.”

The UK Govt and WAG have stressed the need for a link between planning and development and building codes and standards.

2.5.3 Building Regulations

- Building regulations in Wales are the same as in England
- New building regulations (2006) aim to reduce domestic energy emissions by 25%
- A minimum overall energy performance standard will be applied to all new homes.
- Carbon emissions can be further reduced to near zero through the integration of community heating and renewable
- Further amendments to building regulations are likely in 2010 and 2015.
- The existing housing stock in Wales uses the majority of energy.
- Wales has the oldest housing stock of any West European country much of it is in poor condition, especially in terms of energy efficiency.
- Partnership working on sustainability has been introduced by the national housing strategy and plan, this consults organisations such as CIH Cymru and FoE, as part of the action plan, regional and national housing networks and forums have been developed to work together and share ideas on sustainability, energy efficiency etc

2.5.4 Building Codes and Standards

- The target for moving to zero carbon emissions from energy use in homes has been set for 2016, with a notional 2011 in Wales. (although the Code for Sustainable Homes has not yet been formally adopted in Wales).
- Housebuilders, local authorities and other stakeholders have worked together to deliver the code, if followed it will lead to lower fuel bills and warmer homes.
- The code sets sustainability standards which can be applied to all homes
- The code rating also covers other environmental contributions such as the use of sustainable materials, the avilability of recycling facilities, bicycle spaces, home offices and a number of other objectives on waste and wider ecology issues.
- Voluntary assessment against the code for new homes starts 2007 . In April 2008 it is planned to introduce a mandatory code rating on the energy/carbon aspects of the code.
- During the voluntary period, the costs and benefits to new homes will be assessed.
- An Energy performance Certificate will b e introduced June 2007 and will contain key information re energy/carbon performance of homes.
- Eventually, the code rating and certificate will cover all homes.

2.5.5 Planning etc

- March 29 2007, First Minister Rhodri Morgan launched new WAG initiative aimed at increasing supply of land for affordable housing in Wales.
- WAG is considering how surplus land can be used to help implement WAG objectives and priorities for 1) delivery of affordable housing and 2) sustainable development.

- The new Protocol for the Dispersal of Surplus Land for Affordable Housing seeks to make best use of WAG assets for achieving housing priorities.

2.5.6 Social Housing

- LAs and RSLs are working towards raising standards, including energy efficiency and sustainability, in all homes.
- Working towards a target date of 2012 for acceptable level in all homes.
- Welsh Housing Quality Standard advises RSLs on how to achieve this. Regulatory Code for Housing Assns registered in Wales sets out fundamental obligations of RSLs on housing,
- WAG also produces good practice guide for RSLs. Grants and funding through WAG for work done by RSLs in housing renewal areas etc Social Housing Grant issued to RSLs which meet local needs and priorities identified by local authorities. Developments covered by Social Housing Grant, which comes from WAG, are part of an agreed programme of schemes – agreed by WAG, local authorities and consortiums of RSLs.

2.5.7 Private Housing

- WAG supports renovation of owner occupied properties, private rented and empty properties. Also regulates private rented properties.
- New Ideas initiative need to engage with private sector, local authorities should offer range of options, including financial support incentives to landlords and look at affordability, security and sustainability for tenants.
- LAs need to develop relationships with private landlords and provide a responsive service when problems arise if negative perceptions by private landlords about housing benefit claimants and people on low incomes are to be overcome.

2.5.8 Example of good practice:

- Camarthenshire seems to be at the forefront regarding moves toward implementing sustainability.
- Carmathenshire initiatives identified as being effective, they have developed a landlord forum, leasing schemes, partnership working, provision of bonds etc In private rented sector, major financial investment and support resources required to enable private rented sector to take up significant role in meeting housing needs in Wales.

2.5.9 Rural Housing

- In 2006, WAG changed planning policy guidance to increase quantity of affordable housing through the planning system in order to sustain both urban and rural communities. WAG also urges local authorities to use the Rural Exception Policy which allows land which would not otherwise be released to be used for affordable housing purposes.
- There is a particular problem with affordable rural housing in mid Wales where there are high house prices, high land costs and this has forced the outward migration of local people. In the last 10 years, there have been initiatives introduced in Ceredigion and Powys in particular to address the problem of affordable rural housing. Places such as Newtown and Aberystwyth have grown considerably with influx of people from rural areas. WAG, local authorities, housing assns, community councils, National Parks all working together to improve situation in rural areas and try to ensure basic housing need is met.

- Young people in Wales have difficulty buying, renting affordable housing, therefore have to live with parents/ families which means that in effect they are homeless. Lower wages in rural areas adds to problem. 2004 average price of home in Wales was £183,000, average income was £33,900, price to income multiplier over 5:1. in Jan 2007 (Land Registry info) house prices in Ceredigion averaged at £189,454 and in Powys the average was £165,000.
- Low cost home ownership schemes have been introduced but this does not help the out of work (Feb 2007 statistics showed 1,333 unemployed in Powys) who also find it difficult to get affordable rented homes. In 2005, there were over 20,000 homeless people in mid Wales,. many people are sleeping rough in places such as Aberystwyth. Shelter, Community Housing Cymru and Cymorth Cymru lobbied party political conferences in the spring of this year over number of homeless people in Wales and lack of affordable rural housing.
- WAG has introduced number of schemes. One of most successful has been Rural Enablers – four now in Wales, ideally should be increased to 12/13.
- Rural Enablers act as independent brokers in partnership with LAs, housing assns, National Parks, local communities in order to develop affordable rural housing solutions for village communities. Independent nature of Rural Enablers vital in order to liaise with different stakeholders and to reach outcomes which take into account unique characteristics of rural Wales.
- Rural Enablers in post only short time but have made big impact, says Community Housing Cymru, and expansion of the scheme would bring greater results

2.5.10 Energy / fuel in housing

- 130,000 households in Wales spend large amounts on heating bills, this particularly applies to people on low incomes and pensioners.
- Between 2001 and 2006 WAG gave assistance to improvements for 60,000 homes on low incomes. WAG is working towards eradicating fuel poverty from vulnerable households by 2010.
- The Fuel Poverty Commitment for Wales is the strategy being used to tackle fuel poverty.
- The Home Energy Efficiency scheme is the main mechanism being used to assist vulnerable households.
- WAG also supports National Energy Action initiatives on fuel poverty in Wales

2.6 TRANSPORT

2.6.1 One Wales policies

-
- We envisage a Wales where travelling between communities in different parts of Wales is both easy and sustainable. We are firmly committed to creating better transport links, both road and rail, between the North and the West of Wales and the South.
- Dramatic improvements to public transport will encourage people to reduce car use. This in turn will contribute to reducing Wales's carbon footprint.
- We will develop and implement a programme for improved North-South links, including travel by road and rail.
- We will reduce rail travel time between the North and South of Wales.

- We will create a new all-Wales Traws Cambria transport network integrating long distance rail and coach routes with electronic cross-ticketing by 2011.
- We will continue to improve the safety and quality of stations and platforms in all parts of Wales, introducing new trains and train services.
- We will support transport sustainability with investment in community transport, cycling, safe routes to school and 20 mph zones.

2.6.2 Additional notes

Environment
Little progress on introducing tougher public health assessments for new land use development by the end of 2005, as stated in Sustainable Development Action plan 2004-2007. However, at http://www.walesfootprint.org/pdf/20048WWFAllWaleEng.pdf negative trends are described: "farmers are heavily dependent on subsidies which represent up to 98% of net farm income; monoculture and heavy grazing have contributed to loss in biodiversity; and the typical family farms are being transformed into either larger unit or smaller part time farms. "

Education
Sustainable Development Scheme Action plan 2004-7 Identifies a long term vision for Wales and facilitating local support at all levels of education. No mention of sustainable development in education in update on curriculum strategy published 01/12/06 on WAG site

Defence/Policing
Barely any references to policing in relation to sustainability and none whatsoever in relation to the Defence industry.

2.7 ENERGY & CLIMATE

2.7.1 One Wales Policies

Tackling climate change

- Climate change is a major global threat. We are resolved that this government and the people of Wales will play the fullest possible part in reducing its CO_2 emissions. This cannot be a short-term project –

there must be radical changes in people's behaviour and their expectations which will require concerted action over the full four year term of the Assembly government.

- We will establish a Climate Change Commission for Wales. which will be chaired by the Minister for Sustainability and Rural Development. It will include members from all four political parties, businesses, local government and voluntary sector groups. The Commission will assist with the development of new policies and the creation of consensus on climate change. It will work in partnership with Wales' representative on the UK Sustainable Development Commission.
- We will aim to achieve annual carbon reduction-equivalent emissions reductions of 3% per year by 2011 in areas of devolved competence. We will set out specific sectoral targets in relation to residential, public and transport areas. We will work with the heavy industry/power generation industries to reduce emissions in those sectors.
- We will commit to targets on the carbon neutrality of public buildings.
- We will provide support for indigenous woodlands, including a tree for all new babies and adopted children, helping to create a Welsh National Forest of native trees to act as a carbon sink.
-
- We will pursue the devolution of building regulations to the Assembly.

2.7.2 Climate targets

- Ambitious targets are set for Wales in terms of 'Carbon Neutrality'
- 'Zero Carbon' only in terms of operational aspects, rather than energy contents and energy inputs from materials.

How? Issues Raised:

- Looking at local markets
- Promotion through procurement – L.A. buildings, schools, hospitals etc.

(Does the UK Target Strategy go far enough to **ensure** take-up? **How?** - in terms of facilitation and funding. The problems with 'strategies outlined and targets set', that ought to result in savings in carbon emissions; raises, repeatedly, the clear question of HOW? – numbers of installation etc.

We know What, Why, When. As yet, in real terms, we don't know, How? Dialogue between WAG and DEFRA currently open, regarding social science aspects – from incentives, to knowledge through to behaviour change. – No simple answers – very little evidence of real commitments. An approach of 'you will, if I will' currently being explored.

2.7.3 Cross Sector Climate Change Group

The ***Cross Sector Climate Change Group*** in Wales exists, with key task of communications. "Difficult to manage without being all pervading." There are numerous non-government organisations that are active, including The Energy Saving Trust and The Carbon Trust. Is the current independent way of working, reinforcing, or pulling in different angles? CCCSG Wales, will begin to map out what is being done, look at co-ordination and attempt to achieve a level of consistency.

Info: CSCC Group Strategic Aims for Energy:
'To support the mitigation of climate change by encouraging greater energy conservation and efficiency particularly by businesses and to address barriers to the development of renewable energy or to other'

(Web source) Oct 06. Work already under way includes:

- A series of pilots will be set up to evaluate the costs, benefits and potential contribution to tackling fuel poverty that can be made by renewable energy.
- The Assembly Government is committed to purchasing green energy and currently obtains approximately 90 per cent of its supplies from renewable sources. It is looking to make this 100 per cent by 2010.
- The Home Energy Efficiency Scheme has helped over 64,000 households since 2000. This year, £19.6 million is being spent on the Scheme.
- A two-year contract is in place for the supply of 100 per cent green energy for all Assembly street lighting.
- Local authorities have committed to a 12 per cent reduction in energy use and carbon emissions in the housing stock.
- NHS buildings have seen an increase of 11.7 per cent in the amount of electricity generated for combined heating and power on site. Green energy accounts for 90% of the electricity purchased by the NHS.

2.7.4 Bio-diversity and climate change impacts:

- Countryside Council Wales is currently looking at how SSSIs (Sites of Special Scientific Interest) and SACs (Special Areas of Conservation) can become more resilient to climate change.
- Green Networks Wales is an initiative to look at mobility and resiliencies of wildlife species and habitats in response to climate change.
- Not only in regard to designated sites, but **how** does the whole agricultural landscape around those sites need to be managed to protect and enhance resilience and mobility of wildlife?

2.7.5 One Wales policies

- Wales has long been a significant producer as well as a consumer of energy. We are committed to ensuring that Wales adapts to changing energy production in a sustainable way that brings benefits to Wales's people. We will:
- Draw up an Energy Route Map, which will be integrated with a planning framework, to include actions on energy efficiency, microgeneration, eco roofs, diversified renewable energy generation and biomass, an improved advisory service for citizens and communities, and support for a study on the proposed Severn Barrage, including its environmental impact.
- Continue to provide energy efficiency grants, including a non-means tested element within the context of a National Energy Efficiency and Savings Plan.
- We will, following production of an Energy Route Map and an Assembly government Energy Strategy, review TAN 8, revising upwards the targets for energy from renewables, drawn from a range of sources.
- We will promote research and development into renewable technologies including their application on-shore and off-shore.
- We will develop a support programme to promote energy efficiency and renewable energy production on-farm.
- We will explore the introduction of a grant scheme to convert to energy crops.

2.7.6 Energy supply strategy

Background Info:
1977 Alternative Energy Strategy – Britain's first alternative energy vision presented by Centre for Alternative Technology, Wales, to Government Ministry for Energy. The vision report engaged the interest of John Battle (former energy minister).

3 decades later – WAG has Energy Route Map; Micro-Generation Strategy; Spatial Planning – relating to energy strategies.

Where we need to be? - by When? and importantly, to work out a clear path to get there.

Climate change – Have we triggered the problem?

- IPPC – feedback from climate change. The warnings given by the scientists have been 'rounded off' - We must look at the science, rather than the political interpretation of the science.
- Runaway climate change will impact in economic devastation terms, as highlighted in Stern Review.

Is what we have in place strict or robust enough?

- Build a path in increments
- Set milestone targets as part of policy
- Legislate

2.7.7 Alternative Energies:

- Onshore wind farms not so much a problem for Wales or Britain, but a problem for elected representatives ('not in my backyard' syndrome) As, for example, selling rural homes for profit – effects how people vote.
- Alternative Energy Manufacturing finds Government 'stop/start' initiatives unhelpful.
- Confidence is lacking in alternative energy manufacturing industries to grow and develop.
- In danger of having to import technologies.
- The Danes have had technologies in place (especially onshore wind) since the 1980s, and a subsequent track record to establish markets; a result of steady, secure Government support mechanisms being in place. Germany also has had good growth results in onshore renewable energies.
- 'U.K. seen to be at risk of 'missing out on the benefits, and still having the problems.'

Requirements/Needs:

- Alternative energy manufacturing companies need to see a clear plan from Government.
- A transparent, steady and predictable financial framework, within which businesses can adapt.
- Efforts need to be made to challenge perceptions and for communities to accept the changes required in landscapes. ie. For windy areas to accept and take their fair share in the Nation's requirements of renewable energy sources. How?

Sustainable Science Symposium (scheduled July, Wales) saw a release of a 30year rethink of the original Energy Strategy (CAT – Also, at AGM of All Party Parliamentary Climate Change Group, London) which includes proposed plans for Wales – Though Wales cannot be viewed in isolation to the rest of UK - Interconnected through national pipelines, national grid, transport links etc.

To get Britain to where it 'ought' to be, in terms of climate change agenda, We need a massive rethink in our attitudes to energy.

Historically, back to the 1930s, energy was much cheaper. We had abundant amounts of energy within our land areas; terrestrial resources, essentially coal; oil and gas in the North Sea – we are left with a legacy of wasteful factors. A legacy still built in – eg. the way we still design and build shopping centres etc. to manufacturing catering to the 'market' demands of excessive needs.
Major changes have to be made – The emphasis still on well being… but using far less energy.

Key Steps:

- Targets - zero carbon neutral by 2012? – A bold and ambitious target for Wales.
- Much more than energy efficiency is required – **rethinking attitudes and our approach to energy**.
- When energy demand is reduced, we need to focus on renewables on a large scale - if targets are to be reached - and at levels we need to be at.
- Wales is reputed to have the best renewable resources in the EU
-
- If we were to take out the environmental degradation costs of the way we use energy, it isn't paid by the consumer, or the producer – but externalised – where short-life goods are 'accepted' and bought in at 'a much greater cost'.
- Do we build in to the market cost, the degradation to the environment through a tax system? Or introduce carbon 'rations'?
- Free-market capitalism has the ability to adapt
- Markets will automatically re-localise
- Incentives for durable, long-life goods

Contribution P.Allen C.A.T.: -

Diagram 3 circle overlap:

- Climate Change / Runaway Climate Change
- Peak Oil / Peak Gas
- Global atrophy

Central overlap section (solves all 3 problems):

- Massive Power-down of energy use - with focus on well being
- and, Powering up of Renewable energy and Sustainable indigenous energy resources.
-

How to persuade Gov to take real initiative for real difference in real time? (GG)
Contraction and Convergence model: Global Commons Institute

(A new model reducing our energy use for an example to others to follow.
For us to contract our massive carbon emissions to converge at some global fairshare at some point in the future.)

- Managed Transition to power down, within the market economy
- Stern indicated a small amount of GDP required
- Put forward a global plan for others to buy into

If we continue to promote a system whereby developed countries use excessive amounts of the world's energy resources, a danger of global unrest and breakdown of global relations.

Working together for municipal benefits.

2.8 RESOURCE MANAGEMENT

2.8.1 One Wales policies

- We will develop an all-Wales green jobs strategy.
- We will support the development of a Manufacturing Forum and Skills Academies in key manufacturing sectors.
- We will ensure that all projects seeking to benefit from public funding, including all structural funds, seek to meet sustainability criteria.
- We will, by working within the European legal framework, make it easier for small local firms in all parts of Wales to win government contracts. We will introduce an All-Wales Purchasing Code of Practice to support a progressive increase in the overall amount of public purchasing sourced from business in Wales.
- We will create a single investment fund for business support which includes provision for social enterprise and environmental incentives.
- We will increase support for farmers' markets.
-
- We will improve targets for recycling with legislation and support for better and more coordinated waste management.
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2.8.2 Expert Panel on Resources Management for Wales,

This was appointed 2004, through the Nolan Procedure by the Minister for Enterprise, Innovation and Networks.

EPRM recently published a Ten Year Plan (March 07) – to enable Wales to aspire to a position of leadership in terms of best practice regarding resources management. The Panel's vision is underpinned by 5 strategic solutions:

- **Leadership by government** - The creation of a cross-departmental working group 'Low Carbon Wales' - to facilitate communication and co-ordination.
- **Support Infrastructure** - The availability of suitable infrastructure to enable organisations to become resource efficient.
- **Effective education/training/R&D**, with access to the relevant skills base and knowledge.
- **Action by Public Sector** – To lead by example. Procurement budget, grant conditions etc.
- **Communications and Measurement** – positive economic impact of resource efficiency, commercial opportunities and single KPI (Key Performance Indicators).
-

2.8.3 Waste Strategy

Over the budget period an additional £33m for the waste strategy including £20m for capital projects and £13m for revenue expenditure has been committed. These substantial sums represent a significant increase over existing provision, in recognition of the increased targets for recycling and composting and the need to plan ahead for the 2010 Landfill Directive obligations.

Landfill Tax :
Local authorities and business will benefit from Landfill tax credits of £27.5m and will have an opportunity to utilise £18m over the budget period for reductions in the amount of waste sent to landfill, leading to environmental gains. £9.5 million is available to assist businesses in reducing and managing it in a way which contributes to sustainable development.

3 Policy tables

The following tables were developed as far as possible, within the very limited resources of this study. Ideally they would exist in an accessible form on the WAG website.

The main aim was to take a comprehensive view of the question ‘what can policy do’:

- WAG direct legislative powers
- Delegated / mandated powers and guidance
- Devolved agencies and public providers
- Direct financial powers e.g. taxation, subsidy, levies (if any): e.g. the Convergence programme
- Indirect financial powers and incentives (if any)

Each of these relates to a variety of governmental levels, principally:

- WAG
- 22 local authorities in Wales

3.1.1	**Public services:**	**primary legislation from WAG**	**guidance & enabling powers**	**devolved agencies & providers**	**Direct financial powers**	**indirect financial powers**	**other**
	There is little accessible information regarding direct / indirect financial powers. **Therefore most information about finance found, which is general, appears in the corresponding rows**	**The public sector** in Wales spends almost **£4billion** every year buying goods and services. *Govt of Wales Act 1998* established the office of Auditor General Wales and Audit arrangements. *Public Audit (Wales) Act 2004* sets out main statutory framework for Wales Audit Office (WAO) which will be single audit and inspection body covering all sectors of government except those reserved to UK Government. *Government of Wales Act 2006* legally separates the Welsh Assembly Government (WAG) and the National Assembly for Wales (NAW). *WAG* receives money from HM Treasury, some in the form of tax collected on behalf of the UK Government by the Chancellor of the Exchequer and some as an annual grant from the Secretary of State for Wales. *The NAW* is responsible for scrutinising WAG's decisions and holding Ministers to account and having the power to pass legislation on matters within its competence. Budgets are proposed, debated in the *Assembly Chamber and by Committees* before being agreed and formally confirmed or ratified. Draft budgets are published during October each year with accounts for the previous Financial year being laid before the Assembly during the same month. *Money is used by the staff of the Assembly and the public bodies which it sponsors and funds*, for example Local Government, the NHS in Wales or Assembly Sponsored Public Bodies. Some of the Assembly's money is made available by way of *grants to fund schemes and initiatives* that are in line with the Welsh Assembly Government's agenda. Each grant will have its own set of criteria which applicants must meet in order for applications to be considered. Some schemes will be restricted to specific applicants such as Local Authorities, businesses or voluntary organisations perhaps to manage waste in the community or encourage sustainable development. *Finance Department* set and monitor the budget, run the Assembly's Financial systems and account for every transaction that takes place. They do not administer any grant schemes themselves. Queries on particular grant schemes or applications should be directed to the appropriate team within the Assembly to whom applications aresubmitted.				

3.1.2 Health & social care

primary legislation from WAG	guidance & enabling powers	devolved agencies & providers	Direct financial powers	indirect financial powers
NAW 2000 Learning to live differently and *NAW 2001A Deciding to live differently*	Action to make communities strong and viable and people healthier			
Health and Social Care (community and Health Standards) Act 2003	Section 94 empowers NAW to review how LA's in Wales discharge social service functions	Carried out by SSIW on behalf of NAW		
Public Audit (Wales) Act 2004	To directly audit the NHS			
Sustainable Development Action Plan	From Jan 2005 all contracts for new/refurbished buildings procured by or for WAG have designs that achieve BREEAM v good or equiv standard			
Sustainable Development Action Plan: Nutrition strategy jointly dev by Education and Health Promotion in WAG	As they come up for renewal, all specs for contracts for school meals address food seasonality and health and nutrition			
Welsh Health Circular [WHC (2006)029] "Healthy Sustainable Wales: The NHS Contribution".	by March 2008, all NHS organisations adopt a clear policy statement on Sustainable Development (SD) and an Action Plan based on that Policy Statement.			

3.1.3 Environment

primary legislation from WAG	guidance & enabling powers	devolved agencies & providers	Direct financial powers	indirect financial powers
Govt of Wales Act 2006	Duty to promote sustainable development without sacrificing the environment			
NAW 2000 Learning to live differently and *NAW 2001A Deciding to live differently*	Environment is cherished and protected to remain healthy and biologically diverse			
Natural Environment and Rural Communities Act 2006	places a duty on local authorities and other public bodies and statutory undertakers to conserve biodiversity.			
Single Payment Scheme to Farmers	Payment subject to farmers meeting environmental goals	75% of farmers in Wales	Held by Ministry for Environment Planning and countryside. Paid out £110 million in 2005-6 and announced pay out of £134 million for 2006-7 until June 2007	
proposed Water Framework Directive Daughter Directive on priority substances and a partial Regulatory Impact Assessment (consultation Dec 06-March 07.)	For taking action on diffuse pollution as it relates to agriculture	Wales Water Framework Directive Stakeholder Group. Not a deciison making body: comprised of: CBI Wales; Consumer Council for Water; Countryside Council for Wales; Dwr Cymru; Dee Valley Water; Severn Trent Water; Environment Agency Wales Farmers Union of Wales; Federation of Small Businesses; etc	Held by Ministry for Environment Planning and countryside??? Still in development	

3.1.4 Woodlands & countryside

primary legislation from WAG	guidance & enabling powers	devolved agencies & providers	Direct financial powers	indirect financial powers
Woodlands Strategy countryside management.	To conserve and enhance the biodiversity of our woodlands; To conserve and enhance the landscapes of Wales; and To better integrate woodlands with other land management so that by 2023 50% of the National Assembly's Woodlands will have converted from clearfelling to continuous cover. Clear fell will be replanted with species appropriate to specific sites; taking account of local ecological objectives; the carbon balance and economic potential where that is appropriate; or be left to natural regeneration.	***Commission Wales acts as the Welsh Assembly Government's Department of Forestry***	funded by the Welsh Assembly.	Forestry Commission is directed by Welsh Ministers through a Board of commissioners and a National Committee for Wales,

3.1.5 Waste strategy

primary legislation from WAG	guidance & enabling powers	devolved agencies & providers	Direct financial powers	indirect financial powers
Wise About Waste: the National Waste Strategy for Wales' (2002) Endorsed a public sector waste minimisation campaign (2006).	To encourage sustainable use of resources and cost savings. It produced practical guidance in the form of the Wales Public Sector Sustainable Waste Management Guidance Manual. Resources – online pack for public sector groups and others to access for free; Training – different	Sustainable Development Sub Committee of the Assembly Government. Created a Waste Minimisation Steering Group for the Welsh public sector under the Wales Waste Forum		

	training events are being carried out throughout the year to help public sector employees have a better understanding of sustainable resource management; Recycling and waste minimisation equipment fund			

3.1.6 Education

primary legislation from WAG	guidance & enabling powers	devolved agencies & providers	Direct financial powers	indirect financial powers
WAG 2006 Sustainable Development indicators for Wales	% of people with NVQ level 2 or equivalent			
Sustainable Development Scheme Action plan 2004-7	Identify a long term vision for Wales and facilitating local support at all levels of education. No mention of sustainable development in education in update on curriculum strategy published 01/12/06 but The Centre for Alternative Technology has conducted footprinting workshops with children from Key Stage 2 (9-11 year olds) to Year 13 (16-18 year olds), as well as teachers. (www.walesfootprint.org)	Education for Sustainable Development and Global Citizenship Advisory panel (ESD&GC)	Administered £150,000 grant scheme in 2004-5	
LGH-14-00(p4 Annex 2) Preparing community strategies. Draft Guidance to LA's from WAG	3.20. The targets on education, proposed by local authorities for inclusion in the policy agreement and agreed with the Assembly should be adopted for the medium term objectives and targets of community strategies or the more detailed plans which support them.			

4 Modelling data

This section shows a wide range of quantitative data for the project, focusing on the resource flow agenda of energy, material flow, carbon and ecological footprint.

It is based on the REAP model and related system of accounts. These re-allocate from the economic production side of the national accounts to the consumption side, so enabling a clear and accurate calculation of the upstream 'footprint' of each consumption type. Further details of the methodology and data sources is available on www.ecologicalbudget.org.uk and www.sei.se/reap

The scenario modeling at this point (mid 2007) is in development in its detailed form. The results shown here are preliminary estimates based on the REAP key sector baselines, and factoring in aggregated estimates

- Baseline data: general with a 2003 baseline as in the REAP system
- Baseline (BAU) trends: based on the revised projections of the Energy White Paper of 2007. This has modest but significant climate emissions reduction targets, which are then recalculated as ecological footprint baseline projections.
- One Planet policy scenario: based on the general reduction of all resource impacts (climate emissions, carbon / ecological footprint) by approx 75% by 2050.

4.1 GENERAL DATA

4.1.1 Key social statistics for Wales

Source: ONS: Regional Trends 2006

	Wales	UK	Wales / UK index
Population, 2004[2] (thousands)	2,953	59,835	5%
Percentage aged under 16[2]	*19.4*	19.5	99%
Percentage pension age and over[2]	*20.4*	*18.6*	110%
Standardised Mortality Ratio (UK=100), 2003	103	100	103%
Infant mortality rate,[3] 2004	5.1	5.1	100%
Percentage of pupils achieving 5 or more grades A*-C at GCSE level or equivalent, 2003/04 [1]	*51.4*	*54.2*	95%
Economic activity rate[4], spring 2005 (percentages)	*74.6*	*78.5*	95%
Employment rate[4], spring 2005 (percentages)	*70.8*	*74.4*	95%
Unemployment rate[4], spring 2005 (percentages)	*4.5*	*4.7*	96%
Median gross weekly earnings: males in full-time employment, April 2005 (£)	433.2	471.5	92%
Median gross weekly earnings: females in full-time employment, April 2005 (£)	337.0	371.8	91%
Gross value added, 2004 (£ billion)	39.2	1,005.4	4%
Gross value added per head index, 2004 (UK=100)	79.1	100	79%
Total business sites[5], March 2004 (thousands)	116.7	2,573.1	5%
Average dwelling price[1], 2004 (£)	138,859	183,449	76%
Motor cars currently licensed,[1,6] 2003 (thousands)	1,305	26,240	5%
Fatal and serious accidents on roads,[1] 2004 (rates per 100,000 population)	44.1	51.1	86%
Recorded crime rate[1], 2004/05 (recorded offences per 100,000 population)	9,110	10,508	87%
Average gross weekly household income, 2001/02 to 2003/04[7] (£)	461	554	83%
Average weekly household expenditure, 2001/02 to 2003/04[7] (£)	348.60	406.20	86%
Households in receipt of Tax Credits,[1] 2003/04 (percentages)	*17*	*15*	113%

4.1.2 Household projections

Source: Regional Trends 2006

	1981	1991	2001	2006	2011	2016	2021	change 2006-2021	annual growth 2006-202
Great Britain	20.18	22.39	24.14	25.29	26.20	..	..		
North East	0.98	1.05	1.07	1.12	1.14	1.15	1.17	4.5%	0.29%
North West	2.55	2.72	2.82	2.93	3.00	3.06	3.11	6.1%	0.40%
Yorkshire & the Humber	1.83	1.99	2.09	2.20	2.26	2.32	2.37	7.7%	0.50%
East Midlands	1.41	1.60	1.74	1.83	1.90	1.97	2.03	10.9%	0.69%
West Midlands	1.86	2.04	2.16	2.24	2.30	2.35	2.40	7.1%	0.46%
East	1.76	2.04	2.26	2.39	2.49	2.60	2.70	13.0%	0.82%
London	2.64	2.84	3.17	3.25	3.38	3.52	3.65	12.3%	0.78%
South East	2.64	3.03	3.35	3.57	3.74	3.91	4.06	13.7%	0.86%
South West	1.64	1.90	2.10	2.21	2.32	2.42	2.52	14.0%	0.88%
England	17.31	19.21	20.75	21.73	22.52	23.31	24.00	10.4%	0.66%
Wales	**1.02**	**1.13**	**1.19**	**1.24**	**1.28**	**1.31**	**1.34**	**8.1%**	**0.52%**
Scotland	1.85	2.05	2.19	2.31	2.41	..	..		

4.1.3 Regional GVA by broad sector (Wales)

Source: Regional Trends 2006

	1996	1997	1998	1999	2000	2001	2002	2003[2]
Agriculture, hunting, forestry and fishing	568	458	537	477	477	467	507	589
Mining, quarrying of energy materials	103	70	48	44	41	46	39	35
Other mining and quarrying	85	94	148	120	135	106	81	94
Manufacturing	7,896	7,941	7,881	7,679	7,686	7,407	7,470	7,146
Electricity, gas and water supply	924	777	680	715	797	707	1,005	813
Construction	1,471	1,514	1,543	1,647	1,702	1,933	2,203	2,495
Wholesale and retail trade	2,617	2,933	3,180	3,266	3,616	3,695	3,878	4,101
Hotels and restaurants	925	1,031	1,091	1,201	1,216	1,225	1,282	1,301
Transport, storage and communication	1,369	1,495	1,544	1,566	1,767	2,010	2,173	2,449
Financial intermediation	932	942	986	959	955	963	1,249	1,426
Real estate & business activities	3,796	4,158	4,462	4,857	4,973	5,696	5,964	6,655
Public administration and defence[4]	1,911	1,746	1,727	1,799	1,808	1,959	2,106	2,378
Education	1,889	1,764	1,978	2,311	2,347	2,605	2,829	2,950
Health and social work	2,237	2,474	2,617	2,782	2,905	3,269	3,585	3,749
Other services	1,183	1,349	1,430	1,517	1,527	1,681	1,863	2,011
Adjustment for financial services (FISIM[5])	-408	-408	-462	-477	-564	-542	-613	-723
Total	27,498	28,339	29,391	30,463	31,388	33,227	35,620	37,471
Actual total								
Total growth year on year								

4.1.4 Industrial growth projections:

Source DTI 2006

	Food, drink & tobacco	Textiles, leather & clothing	Pulp, paper, printing & publishing	Chemicals & chemical products	Non-metallic minerals	Non-ferrous metals	Engineering & vehicles	Construction & other industry	Iron + Steel
2000	100	100	100	100	100	100	100	100	100
2005	104.8	69.5	96.8	111.2	106.5	113.4	94.2	110.8	87.6
2010	107.3	55.7	104.1	128.1	113.7	122.4	105.5	121.8	112.4
2015	111.2	45.6	110.7	148.3	119.9	126.2	112.8	130.4	113.7
2020	114.7	37.2	117.2	170.9	125.5	129.4	120.7	139.6	114.5
growth rate 2000 - 2020	0.7%	-4.8%	0.8%	2.7%	1.1%	1.3%	0.9%	1.7%	0.7%

4.2 SUMMARY RESOURCE FLOW ACCOUNTS

This section shows the basic summary tables extracted from the UK accounts. These tables are based on the REAP database and related workbooks. Data is generally based at 2003. There are variations in the Wales accounts which show up in the following section.

4.2.1 Table A: material flows

Shows aggregate material flows through the UK economy, per person: note that Direct Material Input (DMI) includes primary industries plus all imports. Detailed material data is available only for SIC sectors 1-84, ie. Primary & manufacturing.

	Domestic production *t/cap*	**UK imports** *t/cap*	**UK exports** *t/cap*	**controlled waste** *t/cap*	**other waste** *t/cap*	**recycled & reused** *t/cap*	**import fraction of DMI** *%*	**waste fraction of DMI** *%*
Agriculture, forestry, fish	1.65	0.28	0.06		1.47		17%	89%
Mining and quarrying	9.63	1.69	1.92		1.57		18%	16%
Manufacturing	5.74	1.95	1.30	0.72	0.00	0.33	34%	13%
Electricity, gas, water								recycling % of waste
Construction					1.72			
Wholesale & retail				0.31		0.14		45%
Transport & comms				0.04		0.02		36%
Financial intermediation				0.14		0.04		28%
Public administration				0.03		0.01		28%
Education, health, social				0.07		0.01		22%
Other services								
Domestic				0.59		0.12		20%
Private transport								
Other flows					0.61			
Total		**3.92**	**3.28**	**1.91**	**5.37**	**0.67**		35%
Direct Material Input (DMI)	**15.2**							

4.2.2 Table B: resource productivity

This shows the material flows as above, per unit of economic output, for a basic measure of physical resource productivity:

	Domestic production t/£M	**UK imports** t/£M	**UK exports** t/£M	**controlled waste** t/£M	**other waste** t/£M	**recycled & reused** t/£M	**total economic output** £billion
Agriculture, forestry & fish	3622	609	135		3224		27
Mining and quarrying	12439	2180	2484		2027		46
Manufacturing	269	91	61	34	0	16	1262
Electricity, gas, water							48
Construction					806		127
Wholesale & retail				175		78	106
Transport & comms				15		5	167
Financial intermediation				17		5	488
Public administration				20		5	82
Education, health, social				20		4	205
Other services							81
Domestic							
Private transport							
Other					0		
Total	**16330**	**2881**	**2680**	**280**	**6057**	**114**	2638

4.2.3 Table C: energy & emissions

This shows key indicators of energy demand & supply, with climate change emissions & ecological footprint per person.

	Total energy toe / cap	**Electrical energy** toe / cap	**Fossil fuel energy** toe / cap	**Greenhouse gases** t CO2 eq/cap	**Acid rain precursors** t SO2 eq./cap	**Carbon dioxide** t / cap	**Eco-footprint** gha/cap
Agriculture, forestry & fish	0.03	0.01	0.02	0.85	0.009	0.06	0.86
Mining and quarrying	0.14	0.00	0.13	0.56	0.001	0.42	0.12
Manufacturing	0.96	0.12	0.84	2.28	0.009	2.09	0.53
Electricity, gas, water	1.11	0.09	1.02	3.20	0.017	3.02	1.04
Construction	0.04	0.00	0.04	0.11	0.000	0.10	0.03
Wholesale & retail	0.14	0.05	0.10	0.31	0.001	0.25	0.08
Transport & comms	0.56	0.02	0.54	1.59	0.014	1.56	0.44
Financial intermediation	0.09	0.04	0.05	0.14	0.000	0.13	0.07
Public administration	0.07	0.01	0.07	0.17	0.001	0.17	0.04
Education, health, social	0.12	0.02	0.10	0.23	0.000	0.22	0.08
Other services	0.05	0.01	0.04	0.33	0.001	0.12	0.04
Domestic energy	0.83	0.17	0.66	1.58	0.003	1.52	0.49
Private transport	0.38	0.00	0.38	1.12	0.004	1.05	0.28

Total	**4.51**	**0.53**	**3.98**	**12.46**	**0.06**	**10.72**	**4.09**

4.2.4 Table D: energy & emissions by demand SIDE

Shows key indicators of energy & emissions as above, by demand side category:

	Total energy toe / cap	**Electrical energy** toe / cap	**Fossil fuel energy** toe / cap	**Greenhouse gases** t CO2 eq/cap	**Acid rain precursors** t SO2 eq./cap	**Carbon dioxide** t / cap	**Eco-footprint** gha/cap
households	3.20	0.39	2.81	9.00	0.040	8.20	4.20
government	0.36	0.04	0.32	1.00	0.004	1.00	0.40
capital	0.41	0.05	0.36	1.20	0.006	1.40	0.80
exports	1.10	0.10	1.00	3.10	0.019	3.50	0.00
other demand	0.02	0.00	0.02	0.06	0.000	0.10	0.00
total	**5.09**	**0.58**	**4.51**	**14.36**	**0.069**	**14.20**	**5.40**

4.2.5 Table E: resource productivity by energy & emissions

Shows resource productivity in terms of energy, emissions & footprint, per unit of economic output.

	Total energy t/£M	**Electrical energy** t/£M	**Fossil fuel energy** t/£M	**Greenhouse gases** t/£M	**Acid rain precursors** t/£M	**Carbon dioxide** t/£M	**Eco-footprint** gha/£billion
Agriculture, forestry & fish	0.06	0.01	0.04	1.86	0.02	0.13	1.88
Mining and quarrying	0.18	0.00	0.17	0.72	0.00	0.54	0.15
Manufacturing	0.05	0.01	0.04	0.11	0.00	0.10	0.02
Electricity, gas, water	1.38	0.11	1.27	3.99	0.02	3.76	1.29
Construction	0.02	0.00	0.02	0.05	0.00	0.05	0.01
Wholesale & retail	0.08	0.03	0.05	0.17	0.00	0.14	0.05
Transport & comms	0.20	0.01	0.19	0.56	0.00	0.55	0.16
Financial intermediation	0.01	0.00	0.01	0.02	0.00	0.02	0.01
Public administration	0.05	0.00	0.05	0.12	0.00	0.12	0.03
Education, health, social	0.03	0.01	0.03	0.07	0.00	0.06	0.02
Other services	0.03	0.01	0.03	0.24	0.00	0.09	0.03
Domestic energy	0.60	0.12	0.48	1.15	0.00	1.11	0.36
Private transport	0.27	0.00	0.27	0.81	0.00	0.77	0.20
Total	0.10	0.01	0.09	0.28	0.00	0.24	0.09

4.2.6 Table F: summary resource flow by household consumption

Shows resource productivity in terms of energy / CO2 footprint / ecological footprint: all calculated on the consumption basis.

		Energy demand (GJ/cap)	Carbon footprint CO2:kg/cap	Ecological footprint (gha/cap)	Energy demand % % of total	Carbon footprint % % of total	Ecological footprint % % of total
FOOD&DRINK	food	5.6	381	0.72	3%	3%	14%
	drink	1.2	79	0.09	1%	1%	2%
	catering	6.8	425	0.37	4%	4%	7%
HOME&ENERGY	house	3.4	247	0.14	2%	2%	3%
	services	64.3	2938	1.06	37%	27%	21%
TRANSPORT	private trans	21.1	1458	0.44	12%	13%	9%
	public trans	12.2	747	0.21	7%	7%	4%
	air travel						
CONSUMABLES	clothing	1.3	107	0.03	1%	1%	1%
	household	5.4	438	0.19	3%	4%	4%
	leisure	6.7	556	0.35	4%	5%	7%
SERVICES	private health etc	1.1	69	0.03	1%	1%	1%
	other services	6.9	452	0.20	4%	4%	4%
GOVERNMENT	national	10.2	659	0.25	6%	6%	5%
	local / non-profit	8.9	545	0.23	5%	5%	4%
CAPITAL	capital	19.1	1879	0.79	11%	17%	16%
TOTAL		5.08	174	10979	100%	100%	100%

4.2.7 Table G: full allocation of COICOP categories

This shows the full COICOP list and the revised allocation structure to Level 2 and Level 3 summary categories. It follows the consumer allocation principle, with a summary of the main resource impacts: ecological footprint, embodied energy, and carbon footprint. This is to be followed up by the revised calculation of footprint by SEI for WAG in late 2007.

				TOTAL E.F.	TOTAL ENERGY	TOTAL C.F.
				Total (gha/cap)	Total (GJ/cap)	Carbon dioxide (CO_2) (kg/cap)
FOOD&DRINK	food	01 - Food and non-alcoholic beverages				
			01.1 - Food	0.68	5.10	346
			01.2 - Non-alcoholic beverages	0.04	0.54	36
	drink	02 - Alcoholic beverages, tobacco and narcotics				
			02.1 - Alcoholic beverages	0.07	1.00	66
			02.2 - Tobacco	0.02	0.17	13
			02.3 - Narcotics	0.00	0.00	0
CONSUMABLES	clothing	03 - Clothing and footwear				
			03.1 - Clothing	0.02	0.96	83
			03.2 - Footwear	0.01	0.37	24
HOME & ENERGY	house	04 - Housing, water, electricity, gas and other fuels				
			04.1 - Actual rentals for housing	0.02	0.64	43
			04.2 - Imputed rentals for housing	0.05	1.42	95
			04.3 - Maintenance and repair of the dwelling	0.06	1.34	110
	services					
			04.4 - Water supply and miscellaneous services relating to the dwelling	0.03	1.57	85
			04.5 - Electricity, gas and other fuels	0.46	18.15	1228
		Domestic fuel and land consumption		0.58	44.56	1625
CONSUMABLES	household	05 - Furnishings, household equipment and routine household maintenance				
			05.1 - Furniture and furnishings, carpets and other floor coverings	0.05	0.94	125
			05.2 - Household textiles	0.01	0.55	37
			05.3 - Household appliances	0.09	3.01	189
			05.4 - Glassware, tableware and household utensils	0.01	0.27	22
			05.5 - Tools and equipment for house and garden	0.02	0.44	41
			05.6 - Goods and services for routine household maintenance	0.01	0.25	24
SERVICES	private health etc	06 - Health				
			06.1 - Medical products, appliances and equipment	0.01	0.28	23
			06.2 - Outpatient services	0.00	0.10	6
			06.3 - Hospital services	0.00	0.19	12
TRANSPORT	private transport	07 - Transport				
			07.1 - Purchase of vehicles	0.08	2.16	237
			07.2 - Operation of personal transport equipment	0.09	4.70	270
		Private transport (car fuel)		0.27	14.21	950
	public & other	Overseas tourists in the UK		-0.08	-1.72	-115
		UK resident holidays abroad		0.10	2.40	153
			07.3 - Transport services	0.17	10.69	652
			08 - Communication			
			08.1 - Postal services	0.00	0.04	3
			08.2 - Telephone and telefax equipment	0.00	0.01	1
			08.3 - Telephone and telefax services	0.02	0.81	54
CONSUMABLES	leisure	09 - Recreation and culture				
			09.1 - Audio-visual, photographic and information processing equipment	0.07	2.39	178
			09.2 - Other major durables for recreation and culture	0.01	0.27	23
			09.3 - Other recreational items and equipment, gardens and pets	0.19	1.71	195
			09.4 - Recreational and cultural services	0.04	1.55	97
			09.5 - Newspapers, books and stationery	0.03	0.74	63
			09.6 - Package holidays	0.00	0.00	0
SERVICES	private health & education	10 - Education				
			10.1 - Pre-primary and primary education	0.01	0.49	28
			10.2 - Secondary education			
			10.3 - Post-secondary non-tertiary education			
			10.4 - Tertiary education			
			10.5 - Education not definable by level			
FOOD & DRINK	catering	11 - Restaurants and hotels				
			11.1 - Catering services	0.32	5.99	374
			11.2 - Accommodation services	0.04	0.82	51
PRIVATE SERVICES	other services	12 - Miscellaneous goods and services				
			12.1 - Personal care	0.03	0.77	72
			12.2 - Prostitution	0.00	0.00	0
			12.3 - Personal effects n.e.c.	0.08	2.38	149
			12.4 - Social protection	0.02	0.61	39
			12.5 - Insurance	0.04	1.65	99
			12.6 - Financial services n.e.c.	0.02	0.86	51
			12.7 - Other services n.e.c.	0.02	0.67	43
GOVT & NON-PROFIT	non-profit / local govt	13 - Individual consumption expenditure of non-profit institutions serving households (NPISHs)				
			13.1 - Housing	0.05	2.00	116
			13.2 - Health			
			13.3 - Recreation and culture			
			13.4 - Education			
			13.5 - Social protection			
			13.6 - Other services	0.17	6.85	429
	public services	14 - Individual consumption expenditure of general government				
			14.1 - Housing	0.25	10.16	659
			14.2 - Health			
			14.3 - Recreation and culture			

incl. Air travel

4.3 KEY SECTOR DATA

This data is generated from the REAP system, and re-analysed into 'key sector' supply chain format. This enables a clearer view of each sector, in terms of the total resource flow metabolism in the supply side / demand side / capital investment categories. Note that production for export is not included. The category 'operations' shows domestic fuel consumption which appears on both production and consumption sides.
Note that assumptions have to be made as to the boundaries of each sector, and the allocations of items. A more rigorous method using 'structural path analysis' is under development. For details of methodology, data sources, applications etc, refer to www.sei.se/reap

4.3.1 Food & agriculture

SUPPLY SIDE

	electric energy	**total energy**	**green house gases**	**acid rain precursors**	**CO2**	**energy ecological footprint**	**total ecological footprint**
	GJ/cap	GJ/cap	kg/cap	kg/cap CO2 eq.	kg/cap	gha/cap	gha/cap
Agriculture	0.21	1.12	836.8	8.94	50.1	0.01	0.60
Fishing	0.03	0.16	7.8	0.14	7.7	0.00	0.17
Total	0.24	1.29	844.6	9.08	57.7	0.01	0.77
Food and drink	0.57	4.24	182.4	0.66	180.3	0.04	0.04
Fertilisers	0.05	1.06	92.3	0.09	30.9	0.01	0.01
Pesticides	0.01	0.07	3.1	0.01	3.1	0.00	0.00
Total	0.63	5.38	277.7	0.76	214.2	0.05	0.05
Hotels and restaurants	0.33	1.28	41.8	0.05	41.5	0.01	0.02
TOTAL	1.20	7.94	1164.1	9.89	313.4	0.08	0.84

DEMAND SIDE

	electric energy	**total energy**	**green house gases**	**acid rain precursors**	**CO2**	**energy ecological footprint**	**total ecological footprint**
	GJ/cap	GJ/cap	kg/cap	kg/cap	kg/cap	gha/cap	gha/cap
Food	0.60	5.10	791.7	5.75	345.8	0.11	0.68
Non-alcoholic beverages	0.06	0.54	53.0	0.29	35.5	0.01	0.04
Alcoholic beverages	0.12	1.00	98.8	0.55	66.2	0.02	0.07
Catering services	0.74	5.99	488.1	2.48	373.7	0.10	0.33
Total	1.52	12.63	1431.6	9.07	821.2	0.24	1.11

CAPITAL INVESTMENT

	GJ/cap	GJ/cap	kg/cap	kg/cap	kg/cap	gha/cap	gha/cap
Agriculture; forestry and fishing	0.03	0.24	44.2	0.28	22.4	0.01	0.03
Food, beverages, tobacco	0.03	0.28	34.9	0.07	34.0	0.01	0.01
Hotels and restaurants	0.06	0.56	64.4	0.15	62.2	0.02	0.03
Total	0.12	1.08	143.5	0.51	118.6	0.04	0.07

4.3.2 Housing & built environment

SUPPLY SIDE	electric energy GJ/cap	total energy GJ/cap	green house gases kg/cap	acid rain precursors kg/cap CO2 eq.	CO2 kg/cap	energy ecological footprint gha/cap	total ecological footprint gha/cap
Forestry	0.01	0.03	1.3	0.01	1.2	0.00	0.09
Wood and wood products	0.10	1.33	76.6	0.27	74.7	0.02	0.02
Plastics & Synthetic resins etc	0.06	0.72	32.7	0.16	32.4	0.01	0.01
Paints, varnishes, printing ink etc	0.04	0.14	4.6	0.01	4.6	0.00	0.00
Rubber products	0.06	0.55	25.9	0.11	25.5	0.01	0.01
Plastic products	0.51	1.75	64.7	0.20	63.4	0.02	0.02
Glass and glass products	0.10	0.49	22.2	0.05	22.1	0.01	0.01
Ceramic goods	0.04	0.21	7.6	0.01	7.6	0.00	0.00
Structural clay products	0.03	0.33	15.8	0.18	15.5	0.00	0.01
Cement, lime and plaster	0.08	1.34	186.6	0.83	185.8	0.05	0.05
Articles of concrete, stone etc	0.09	0.38	13.6	0.04	13.5	0.00	0.00
Iron and steel	0.18	7.42	424.8	1.39	420.1	0.10	0.10
Non-ferrous metals	0.35	1.10	48.6	0.34	48.1	0.01	0.01
Metal products	0.27	1.06	40.7	0.13	40.0	0.01	0.01
Mechanical machinery and equipment	0.23	0.94	37.2	0.12	36.6	0.01	0.01
Electrical machinery and equipment	0.10	0.37	13.6	0.04	13.4	0.00	0.00
Radio, television and communications	0.11	0.25	7.0	0.02	6.9	0.00	0.00
Construction	0.09	1.78	106.7	0.37	104.8	0.03	0.03
Real estate activities	0.06	0.47	18.4	0.03	18.2	0.00	0.00
TOTAL	**2.49**	**20.63**	**1148.7**	**4.31**	**1134.3**	**0.27**	**0.37**
OPERATIONS							
Domestic Energy Consumption	**7.06**	**41.77**	**1538.0**	**2.66**	**1523.0**	**0.37**	**0.49**
DEMAND SIDE							
	electric energy GJ/cap	**total energy** GJ/cap	**green house gases** kg/cap	**acid rain precursors** kg/cap	**CO2** kg/cap	**energy ecological footprint** gha/cap	**total ecological footprint** gha/cap
Actual rentals for housing	0.07	0.64	48.5	0.21	42.5	0.01	0.02
Imputed rentals for housing	0.17	1.42	108.4	0.47	94.9	0.03	0.05
Maintenance and repair of the dwelling	0.15	1.34	115.9	0.40	110.1	0.03	0.06
Electricity and gas distribution	1.29	18.15	1371.2	6.59	1227.6	0.31	0.46
Goods and services for routine household maintenance	0.03	0.25	25.0	0.06	23.8	0.01	0.01
Domestic fuel and land consumption	7.53	44.56	1640.6	2.84	1624.6	0.42	0.58
Total	**9.23**	**66.35**	**3309.6**	**10.56**	**3123.5**	**0.81**	**1.18**
CAPITAL INVESTMENT							
Other mining and quarrying	0.01	0.04	4.6	0.01	4.5	0.00	0.00
Electricity	0.05	0.40	48.6	0.10	47.4	0.01	0.02
Gas	0.01	0.07	9.3	0.02	9.1	0.00	0.00
Construction	0.03	0.25	30.8	0.06	30.1	0.01	0.01
Real estate, renting, business activities	0.26	2.23	258.1	0.59	249.9	0.07	0.10
Dwellings	0.34	3.36	285.9	1.05	269.5	0.07	0.13
Total	**0.69**	**6.35**	**637.4**	**1.82**	**610.5**	**0.17**	**0.26**

4.3.3 Transport & communications

SUPPLY SIDE	electric energy	total energy	green house gases	acid rain precursors	CO2	energy ecological footprint	total ecological footprint
	GJ/cap	GJ/cap	kg/cap	kg/cap	kg/cap	gha/cap	gha/cap
Rubber products	0.06	0.55	25.9	0.11	25.5	0.01	0.01
Plastic products	0.51	1.75	64.7	0.20	63.4	0.02	0.02
Glass and glass products	0.10	0.49	22.2	0.05	22.1	0.01	0.01
Iron and steel	0.18	7.42	424.8	1.39	420.1	0.10	0.10
Non-ferrous metals	0.35	1.10	48.6	0.34	48.1	0.01	0.01
Radio, television, communications	0.11	0.25	7.0	0.02	6.9	0.00	0.00
Motor vehicles	0.21	1.14	44.7	0.13	44.1	0.01	0.01
Ships, aircraft, other transport	0.12	0.49	18.3	0.05	18.1	0.00	0.01
Total	1.63	13.17	656.2	2.29	648.4	0.16	0.16
Motor vehicle distribution, repair, fuel	0.17	1.34	53.2	0.08	52.5	0.01	0.01
Wholesale distribution	0.51	2.49	91.0	0.44	88.9	0.02	0.02
Retail distribution	0.99	2.57	68.5	0.27	67.4	0.02	0.03
Railway transport	0.05	0.41	26.3	0.18	23.7	0.01	0.02
Road transport	0.21	7.47	473.6	3.23	466.4	0.11	0.14
Water transport	0.01	5.40	382.0	10.31	374.0	0.09	0.09
Air transport	0.06	10.29	763.5	0.18	756.9	0.18	0.18
Ancillary transport services	0.10	0.23	7.5	0.02	7.3	0.00	0.00
Post and telecommunications	0.34	0.80	30.1	0.12	29.4	0.01	0.01
Total	**0.76**	**24.60**	**1683.1**	**14.04**	**1657.8**	**0.40**	**0.44**
OPERATIONS							
Private transport (car fuel)	0.00	15.76	1109.9	3.78	1053.3	0.25	0.28

DEMAND SIDE	electric energy	total energy	green house gases	acid rain precursors	CO2	energy ecological footprint	total ecological footprint
	GJ/cap	GJ/cap	kg/cap	kg/cap	kg/cap	gha/cap	gha/cap
Purchase of vehicles	0.27	2.16	244.3	0.54	237.2	0.07	0.08
Operation of personal transport	0.35	4.70	282.9	1.07	270.2	0.07	0.09
Transport services	0.26	10.69	669.2	4.59	651.9	0.15	0.17
Overseas tourists in the UK	-0.19	-1.72	-141.5	-0.73	-115.4	-0.03	-0.08
UK resident holidays abroad	0.22	2.40	187.2	1.04	152.7	0.04	0.10
Private transport (car fuel)	0.00	14.21	1001.1	3.41	950.1	0.25	0.27
Total	0.91	32.44	2243.3	9.93	2146.8	0.54	0.63
CAPITAL INVESTMENT							
Transport equipment	0.04	0.34	37.9	0.09	36.8	0.01	0.01
Motor vehicles sales and repairs	0.06	0.53	46.1	0.13	44.5	0.01	0.02
Rail transport	0.00	0.02	1.7	0.00	1.7	0.00	0.00
Other land transport	0.04	0.30	34.3	0.08	33.4	0.01	0.01
Water transport	0.01	0.07	6.5	0.02	6.3	0.00	0.00
Air transport	0.05	0.33	28.5	0.08	27.5	0.01	0.01
Other transport services	0.05	0.50	46.7	0.15	44.3	0.01	0.02
Roads	0.02	0.22	17.9	0.07	16.8	0.01	0.01
Total	0.27	2.30	219.7	0.61	211.3	0.06	0.08

4.3.4 Products

SUPPLY SIDE	electric energy	total energy	green house gases	acid rain precursors	CO2	energy ecological footprint	total ecological footprint
	GJ/cap	GJ/cap	kg/cap	kg/cap	kg/cap	gha/cap	gha/cap
Tobacco	0.01	0.02	0.6	0.00	0.6	0.00	0.00
Textiles	0.15	1.10	48.3	0.20	47.8	0.01	0.01
Wearing apparel	0.02	0.12	5.3	0.02	5.2	0.00	0.00
Leather products	0.02	0.06	2.5	0.01	2.4	0.00	0.00
Wood, wood products	0.10	1.33	76.6	0.27	74.7	0.02	0.02
Pulp and paper	0.07	1.57	74.1	0.25	73.2	0.02	0.02
Paints, varnishes, printing ink etc	0.04	0.14	4.6	0.01	4.6	0.00	0.00
Pharmaceuticals	0.05	0.75	30.9	0.06	30.7	0.01	0.01
Soap and toilet preparations	0.04	0.15	5.4	0.02	5.4	0.00	0.00
Chemical products	0.03	0.34	13.9	0.09	13.8	0.00	0.00
Man-made fibres	0.06	0.44	22.2	0.13	21.8	0.01	0.01
Rubber products	0.06	0.55	25.9	0.11	25.5	0.01	0.01
Plastic products	0.51	1.75	64.7	0.20	63.4	0.02	0.02
Glass and glass products	0.10	0.49	22.2	0.05	22.1	0.01	0.01
Medical /precision instruments	0.09	0.23	7.5	0.02	7.3	0.00	0.00
Furniture , misc manufacturing	0.16	1.79	90.3	0.32	88.1	0.02	0.02
Total	**1.50**	**10.83**	**495.0**	**1.77**	**486.7**	**0.12**	**0.13**

DEMAND SIDE	electric energy	total energy	green house gases	acid rain precursors	CO2	energy ecological footprint	total ecological footprint
	GJ/cap	GJ/cap	kg/cap	kg/cap	kg/cap	gha/cap	gha/cap
Tobacco	0.02	0.17	27.9	0.19	13.1	0.00	0.02
Clothing	0.12	0.96	85.4	0.23	82.8	0.02	0.02
Footwear	0.07	0.37	26.4	0.10	23.8	0.01	0.01
Furniture, furnishings, carpets etc	0.10	0.94	127.7	0.21	125.4	0.04	0.05
Household textiles	0.07	0.55	38.3	0.14	36.6	0.01	0.01
Household appliances	0.53	3.01	209.3	0.85	188.9	0.05	0.09
Glassware, tableware, household	0.04	0.27	22.9	0.06	22.2	0.01	0.01
Tools and equipment	0.06	0.44	42.7	0.12	41.1	0.01	0.02
Medical products,appliances & equipment	0.03	0.28	24.0	0.08	22.6	0.01	0.01
Telephone and telefax equipment	0.00	0.01	0.7	0.00	0.7	0.00	0.00
Audio-visual, photo and IT equipment	0.37	2.39	191.5	0.68	177.6	0.05	0.07
Other major durables for recreation	0.03	0.27	26.8	0.10	23.2	0.01	0.01
Other recreational items & equipment	0.18	1.71	308.9	1.48	195.1	0.06	0.20
Newspapers, books and stationery	0.10	0.74	66.0	0.21	63.2	0.02	0.03
Personal care	0.10	0.77	75.3	0.18	71.6	0.02	0.03
Personal effects n.e.c.	0.42	2.38	165.8	0.67	149.4	0.04	0.08
Total	**2.23**	**15.24**	**1439.8**	**5.29**	**1237.4**	**0.34**	**0.65**

4.3.5 .../Products cont.

CAPITAL INVESTMENT	electric energy	total energy	green house gases	acid rain precursors	CO2	energy ecological footprint	total ecological footprint
	GJ/cap	GJ/cap	kg/cap	kg/cap	kg/cap	gha/cap	gha/cap
Textile and leather products	0.01	0.04	5.1	0.01	4.9	0.00	0.00
Pulp, paper printing and publishing	0.03	0.24	29.6	0.06	28.8	0.01	0.01
Extraction - oil and gas	0.05	0.80	59.9	0.67	57.6	0.02	0.02
Solid and nuclear fuels, oil refining	0.01	0.09	9.1	0.03	8.7	0.00	0.00
Chemicals, man-made fibres	0.04	0.31	38.6	0.08	37.6	0.01	0.01
Other non-metallic minerals	0.01	0.09	10.3	0.02	10.0	0.00	0.00
Basic metals and metal products	0.02	0.14	17.1	0.04	16.7	0.01	0.01
Machinery and equipment	0.01	0.10	13.4	0.03	13.1	0.00	0.01
Electrical and optical equipment	0.03	0.23	30.0	0.06	29.3	0.01	0.01
Other manufacturing	0.02	0.19	23.9	0.05	23.3	0.01	0.01
TOTAL	0.26	2.53	271.5	1.10	263.8	0.07	0.10

4.3.6 Commercial services

SUPPLY SIDE	electric energy	total energy	green house gases	acid rain precursors	CO2	energy ecological footprint	total ecologi footpri
	GJ/cap	GJ/cap	kg/cap	kg/cap	kg/cap	gha/cap	gha/ca
Post and telecommunications	0.336	0.803	30.106	0.116	29.434	0.007	0.(
Banking and finance	0.3	0.552	10.555	0.026	10.23	0.002	0.(
Insurance and pension funds	0.2	0.403	8.401	0.022	8.099	0.002	0.(
Auxiliary financial services	0.217	0.422	8.509	0.022	8.207	0.002	0.(
Renting of machinery etc	0.15	0.529	20.792	0.077	20.317	0.005	0.(
Computer services	0.28	0.465	10.035	0.027	9.715	0.002	0.(
Research and development	0.057	0.177	5.385	0.007	5.332	0.001	0.(
Legal, consultancy & other services	0.446	1.378	48.87	0.119	47.722	0.011	0.(
Education	0.403	2.731	100.107	0.132	99.567	0.024	0.(
Health and social work	0.474	3.212	123.62	0.227	122.876	0.03	0.(
Membership organisations	0.018	0.306	14.785	0.026	14.446	0.003	0.(
Recreational services	0.208	0.83	30.751	0.169	30.466	0.007	0
Other service activities	0.039	0.361	16.198	0.043	15.829	0.004	0.(
TOTAL	**3.128**	**12.169**	**428.114**	**1.013**	**422.24**	**0.1**	**0.1**

DEMAND SIDE	electric energy	total energy	green house gases	acid rain precursors	CO2	energy ecological footprint	total ecologi footpri
	GJ/cap	GJ/cap	kg/cap	kg/cap	kg/cap	gha/cap	gha/ca
Water supply & misc services	0.374	1.574	162.498	0.517	85.361	0.023	0.(
Out-patient services	0.012	0.099	6.803	0.024	6.308	0.002	0.(
Hospital services	0.022	0.186	12.545	0.043	11.619	0.003	0.(
Postal Services	0.007	0.044	3.127	0.013	2.961	0.000744	0.(
Telephone and telefax services	0.134	0.805	57.227	0.233	54.192	0.014	0.(
Recreational and cultural services	0.22	1.553	108.746	0.443	96.852	0.024	0.(
Package holidays	0	0	0	0	0	0	
Education	0.057	0.487	30.731	0.119	28.207	0.007	0.(
Accommodation services	0.101	0.816	66.591	0.339	50.98	0.014	0.(
Social protection	0.072	0.61	42.466	0.156	38.69	0.01	0.(
Insurance	0.246	1.647	104.922	0.427	98.792	0.025	0.(
Financial services n.e.c.	0.129	0.862	53.647	0.207	50.616	0.013	0.(
Other services n.e.c.	0.08	0.669	46.539	0.163	42.859	0.011	0.(
Total	**1.454**	**9.351**	**695.842**	**2.684**	**567.437**	**0.147**	**0**

CAPITAL INVESTMENT							
Wholesale trade	0.128	1.132	103.121	0.33	98.165	0.027	0.(
Retail trade	0.101	0.936	113.336	0.24	110.151	0.032	0.(
Financial intermediation	0.084	0.672	68.363	0.181	65.686	0.018	0.(
Other services	0.086	0.733	82.384	0.193	79.166	0.022	0.(
Transfer costs for land, etc.	0.078	0.693	54.132	0.208	50.071	0.013	0.(
Water	0.019	0.176	17.526	0.05	16.762	0.005	0.(
Post and telecommunications	0.154	1.051	135.072	0.264	131.64	0.035	0.(
Total	0.65	5.393	573.934	1.466	551.641	0.152	0.2

4.3.7 Public services

SUPPLY SIDE

	electric energy	total energy	green house gases	acid rain precursors	CO2	energy ecological footprint	total ecological footprint
	GJ/cap	GJ/cap	kg/cap	kg/cap	kg/cap	gha/cap	gha/cap
Public administration and defence	0.219	3.355	389.352	1.41	366.282	0.097	0.137
Education	0.403	2.731	100.107	0.132	99.567	0.024	0.041
Total	**0.622**	**6.086**	**489.459**	**1.542**	**465.849**	**0.121**	**0.178**

DEMAND SIDE

	electric energy	total energy	green house gases	acid rain precursors	CO2	energy ecological footprint	total ecological footprint
	GJ/cap	GJ/cap	kg/cap	kg/cap	kg/cap	gha/cap	gha/cap
Public administration (central)	0.487	5.428	389.352	1.41	366.282	0.097	0.137
Total	0.487	5.428	389.352	1.41	366.282	0.097	0.137
Public administration (local)	0.208	2.322	166.603	0.603	156.732	0.041	0.059
Education (local)	0.311	2.619	162.374	0.615	148.811	0.039	0.068
Health services (local)	0	0	0	0	0	0	0
Social work (local)	0.139	1.147	76.718	0.236	70.985	0.018	0.027
Sanitary services (local)	0.056	0.531	118.731	0.329	38.363	0.01	0.012
Total	0.714	6.619	524.426	1.783	414.891	0.108	0.167

CAPITAL INVESTMENT

Public administration etc.	0.059	0.535	49.966	0.155	47.518	0.013	0.021
Education	0.04	0.363	31.926	0.106	30.22	0.008	0.014
Health and social work	0.044	0.376	36.145	0.107	34.449	0.009	0.015
Sewage and refuse disposal	0.044	0.402	40.306	0.112	38.636	0.011	0.017
Total	0.187	1.676	158.343	0.48	150.823	0.041	0.066

4.3.8 Local Energy & Emissions

Source: DEFRA local CO2 database
Netcen September 2005

NUTS4 Area and Government Office Region	Industry and Commercial	Domestic	Road Transport	Land Use Change	Total	Population Thousands (1)	Per capita CO2 (tonnes)	Domestic per capita CO2 (tonnes)
Blaenau Gwent (2)	232	196	62	1	491	69	7.1	2.8
Bridgend	741	361	225	3	1331	130	10.2	2.8
Caerphilly (3)	631	473	189	2	1296	170	7.6	2.8
Cardiff	1053	731	504	2	2291	315	7.3	2.3
Carmarthenshire	737	488	452	20	1697	176	9.6	2.8
Ceredigion	170	201	214	21	605	77	7.8	2.6
Conwy	248	326	293	5	872	111	7.9	2.9
Denbighshire	317	285	207	5	815	95	8.6	3.0
Flintshire	2035	428	357	8	2828	149	18.9	2.9
Gwynedd	331	363	337	8	1039	118	8.8	3.1
Isle of Anglesey	482	201	139	8	829	68	12.1	2.9
Merthyr Tydfil (2)	135	158	95	1	388	55	7.0	2.8
Monmouthshire	535	250	366	23	1174	86	13.6	2.9
Neath Port Talbot	5567	382	311	5	6265	135	46.3	2.8
Newport	1157	378	455	6	1995	139	14.3	2.7
Pembrokeshire	3735	331	269	40	4376	116	37.6	2.8
Powys	362	378	483	29	1253	129	9.7	2.9
Rhondda, Cynon, Taff (3)	648	628	341	6	1623	232	7.0	2.7
Swansea	651	602	332	4	1588	225	7.1	2.7
The Vale of Glamorgan	708	266	179	13	1166	121	9.6	2.2
Torfaen	460	278	103	1	842	91	9.3	3.1
Wrexham	846	335	203	16	1400	130	10.8	2.6
TOTAL WALES	21782	8040	6116	225	36163	2938	12.3	2.7
UK TOTAL	262087	163737	128606	13676	568105	59537	9.5	2.8

4.3.9 Local CO2 emissions as proportion of total by local authority area

Source: DEFRA local CO2 database
Netcen September 2005

NUTS4 Area and Government Office Region	Industry and Commercial	Domestic	Road Transport	Land Use Change	Total	Population Thousands (1)	Per capita CO2 (tonnes)	Domestic per capita CO2 (tonnes)
Blaenau Gwent (2)	47%	40%	13%	0%	100%	69	7.1	2.8
Bridgend	56%	27%	17%	0%	100%	130	10.2	2.8
Caerphilly (3)	49%	37%	15%	0%	100%	170	7.6	2.8
Cardiff	46%	32%	22%	0%	100%	315	7.3	2.3
Carmarthenshire	43%	29%	27%	1%	100%	176	9.6	2.8
Ceredigion	28%	33%	35%	3%	100%	77	7.8	2.6
Conwy	28%	37%	34%	1%	100%	111	7.9	2.9
Denbighshire	39%	35%	25%	1%	100%	95	8.6	3.0
Flintshire	72%	15%	13%	0%	100%	149	18.9	2.9
Gwynedd	32%	35%	32%	1%	100%	118	8.8	3.1
Isle of Anglesey	58%	24%	17%	1%	100%	68	12.1	2.9
Merthyr Tydfil (2)	35%	41%	24%	0%	100%	55	7.0	2.8
Monmouthshire	46%	21%	31%	2%	100%	86	13.6	2.9
Neath Port Talbot	89%	6%	5%	0%	100%	135	46.3	2.8
Newport	58%	19%	23%	0%	100%	139	14.3	2.7
Pembrokeshire	85%	8%	6%	1%	100%	116	37.6	2.8
Powys	29%	30%	39%	2%	100%	129	9.7	2.9
Rhondda, Cynon, Taff (3)	40%	39%	21%	0%	100%	232	7.0	2.7
Swansea	41%	38%	21%	0%	100%	225	7.1	2.7
The Vale of Glamorgan	61%	23%	15%	1%	100%	121	9.6	2.2
Torfaen	55%	33%	12%	0%	100%	91	9.3	3.1
Wrexham	60%	24%	14%	1%	100%	130	10.8	2.6
TOTAL WALES	**60%**	**22%**	**17%**	**1%**	**100%**	**2938**	**12.3**	**2.7**

4.4 POLICY SCENARIOS

This section shows the result in overall ecological footprint of the policy scenario modelling exercise, focussing on the 'One Planet' scenario.

4.4.1 Ecological Footprint trend projections

This ecological footprint trend projection includes for policy impact assessments as shown in the technical reports to the Energy White Paper 2007. It then estimates the additional factors due to the UK proportion of air travel, marine shipping, imported goods, and land-use change and impacts in the countries of origin.

	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050	growth 2005 - 2050
Food & drink	1.19	1.28	1.37	1.48	1.59	1.71	1.84	1.98	2.13	2.30	1.5%
Home energy	1.45	1.36	1.27	1.19	1.12	1.05	0.98	0.92	0.86	0.81	-1.3%
Travel (incl.air)	0.71	0.78	0.86	0.94	1.03	1.14	1.25	1.37	1.51	1.66	1.9%
Consumables	0.98	1.01	1.04	1.07	1.11	1.14	1.18	1.22	1.26	1.30	0.6%
Services & government	0.94	0.91	0.88	0.85	0.82	0.80	0.77	0.75	0.72	0.70	-0.6%
TOTAL	5.25									6.76	0.56%

4.4.2 Food & agriculture policies

FOOD													
	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050	annual growth	proportion of total	cumulative reduction
BAU trend	1.29	1.32	1.36	1.42	1.48	1.54	1.60	1.66	1.73	1.80	0.8%		
stabilization target	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	0.0%		
low impact imports	1.29	1.28	1.27	1.25	1.23	1.22	1.20	1.19	1.17	1.15	-0.3%	10%	**90%**
low impact farming	1.29	1.27	1.23	1.18	1.14	1.10	1.06	1.02	0.99	0.95	-0.7%	15%	75%
food process mgmt	1.29	1.25	1.16	1.08	1.00	0.93	0.86	0.80	0.74	0.69	-1.5%	20%	55%
retail & catering	1.29	1.24	1.12	1.02	0.92	0.83	0.75	0.68	0.62	0.56	-2.0%	10%	45%
demand side mgmt	1.29	1.21	1.04	0.90	0.77	0.67	0.57	0.49	0.42	0.36	-3.0%	15%	30%
											-3.0%	70%	**30%**

4.4.3 Housing & built environment policies

BUILDINGS													
	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050	annual growth	proportion of total	cumulative reduction
BAU trend	1.09	1.11	1.14	1.17	1.21	1.24	1.28	1.32	1.36	1.40	**0.6%**		
stabilization target	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	**0.0%**		
local materials	1.09	1.09	1.08	1.07	1.07	1.06	1.05	1.05	1.04	1.03	-0.1%	5%	**95%**
sustainable construction	1.09	1.08	1.06	1.04	1.02	1.00	0.98	0.96	0.94	0.92	-0.4%	10%	85%
housing efficiency	1.09	1.05	1.00	0.94	0.88	0.82	0.77	0.72	0.68	0.64	-1.3%	25%	60%
property efficiency	1.09	1.01	0.91	0.80	0.70	0.61	0.54	0.47	0.41	0.36	-2.6%	25%	35%
												65%	

4.4.4 Transport policies

TRANSPORT													
	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050	annual growth	proportion of total	cumulative reduction
BAU trend													
incl.air stabilization	0.88	0.92	0.98	1.05	1.13	1.22	1.32	1.42	1.53	1.64	**1.5%**		
incl.air vehicle & fuel	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	**0.0%**		
supply chain	0.88	0.87	0.85	0.82	0.80	0.78	0.76	0.74	0.72	0.70	-0.6%	20%	**80%**
public transport	0.88	0.87	0.85	0.82	0.80	0.78	0.76	0.74	0.72	0.70	-0.6%	0%	80%
cars & highways	0.88	0.85	0.78	0.71	0.66	0.60	0.55	0.51	0.46	0.43	-1.7%	30%	50%
demand side management	0.88	0.82	0.69	0.58	0.49	0.41	0.35	0.29	0.24	0.21	-3.4%	25%	25%

4.4.5 Products & manufacturing policies

PRODUCTS													
	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050	annual growth	proportion of total	cumulative reduction
BAU trends	0.64	0.65	0.69	0.72	0.76	0.80	0.84	0.88	0.92	0.97	1.0%		
stabilization target	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.0%		
materials & imports	0.64	0.63	0.62	0.61	0.60	0.59	0.57	0.56	0.55	0.54	-0.4%	0.15	**85%**
supply chain management	0.64	0.62	0.58	0.53	0.50	0.46	0.43	0.40	0.37	0.34	-1.5%	0.3	55%
product life design	0.64	0.61	0.55	0.49	0.43	0.39	0.34	0.31	0.27	0.24	-2.3%	0.15	40%
demand side management	0.64	0.60	0.50	0.42	0.36	0.30	0.25	0.21	0.18	0.15	-3.4%	0.15	25%

4.4.6 Services & government (public services)

SERVICES & PUBLIC													
	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050	annual growth	proportion of total	cumulative reduction
BAU trends	0.65	0.66	0.68	0.70	0.72	0.74	0.76	0.79	0.81	0.84	0.6%		
stabilization target	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.0%		
public services	0.65	0.64	0.60	0.57	0.54	0.51	0.49	0.46	0.44	0.41	-1.1%	0.35	**65%**
financial services	0.65	0.63	0.59	0.56	0.52	0.49	0.46	0.43	0.41	0.38	-1.3%	0.05	60%
demand side management	0.65	0.62	0.57	0.51	0.46	0.42	0.38	0.34	0.31	0.28	-2.0%	0.15	45%
tourism & leisure	0.65	0.61	0.53	0.45	0.39	0.34	0.29	0.25	0.21	0.18	-3.0%	0.15	30%
retail & distribution	0.65	0.60	0.49	0.40	0.33	0.27	0.22	0.18	0.15	0.12	-3.9%	0.1	20%