6 Current Policy Context and Trends

6.1 Introduction

6.1.1 Background Information

Summary of issues

The South East profile includes the following features:

- The South East is the most high value, service based and capital intensive regional economy in the UK.
- The positive features, according to public opinion surveys, look at high quality environment and countryside, and the higher than average incomes.
- The negative features include the problems of development and congestion, and distribution of affluence and deprivation.

In terms of policy initiatives for reducing the Ecological Footprint through 'integrated resource management', the agenda has hardly been opened:

- 'Sustainable production' is the focus of the 'Environmental Management' objective of the Regional Sustainable Development Strategy, but there are few targets identified. This strategy is a major step forward, but does not include as yet any consideration of the global impacts of production and consumption, beyond a commitment to meet the Kyoto protocol for direct CO_2 emissions within the region.
- The Regional Economic strategy highlights environmental technologies as a major growth sector, but contains no specific targets on the theme of sustainable production and consumption.
- The Regional Planning Guidance aims to balance the need for housing and other development with environmental protection and the increases in urban densities: there is some consideration of improving energy efficiency, but the impact of supplying construction materials on such a scale is not on its agenda.
- The Regional Waste strategy is mainly concerned with disposal rather than minimisation, and projections of reductions in waste volumes are at best a small percentage of the total.
- The Regional Energy strategy is a major step forward, but even on the best projections, alternative sources of energy are unlikely to contribute more than 14% of the total power demand within 20 years.
- The UK government's strategy on Sustainable Consumption and Production is a strategic review of directions, and if successful should be an enabling device for much more specific actions at national, local and regional levels.

Generally it is clear that regional powers and resources are not very well suited to the policy aspiration of reducing ecological footprint, through 'integrated resource management', 'sustainable consumption and production', or any other policy package.

It is also clear that the government's commitment to reducing direct CO_2 emissions under the Kyoto Protocol means very little indeed, unless it addresses the challenge of reducing the energy/carbon embedded in the global supply chains of goods and products.

The ecological footprint method is far from a complete measure of environmental performance, but it is a powerful first step in identifying the scale of the challenge of sustainable consumption and production.

Current policy challenge

The primary linkage between the ecological footprint agenda and current regional policy is on the issue of energy and carbon emissions. The evidence in this report so far suggests that the use of the Kyoto targets for direct climate change emissions can be potentially quite misleading. The reason is the current profile of production and consumption, where the larger impact and growth trends in EF are indirect, embodied and distributed on a global scale.

Overall, a reading of regional strategies, and particularly the SD strategy, might provide the impression that with some reasonable policy adjustments, the region will be on course and sailing rapidly towards environmental sustainability. We would suggest, with respect, that this is a case of *'deckchairs on the Titanic'*.

The EF figures show that the global land footprint of the South East is approx 55 million global hectares: its own land area is a total of 1.9 million hectares. Hence the simple ratio of footprint 'overshoot' (i.e. land requirement vs actual land area) is in the order of 29 times. The F-1 Business as Usual scenario (Chapter 7) shows that the projected trends show a material input which is relatively static, but an EF which is still rising at 0.5–1% per year .

This imbalance is reinforced by the UN Human Development Report 2002, which states that 'the 20% of the population in the 'developed' world consume 86% of the resources, at a rate of about 20 times those in the 'developing' world (UNHDR, 2002).

There are few signs that any of the current policy strategies go anywhere near the required targets, or have the information or intention to do so. But simply sounding a voice of doom will not generate the required action.

So it is the aim of this and the next Chapters to focus on opportunities for 'win-win' potential, where policy objectives for economic and social welfare can be combined with a sustainable and integrated resource management approach.

Structure of the chapter

First we set out a general analysis of the role of regional policy in resource management, with a model framework for identifying and evaluating the role of different policies.

Then we look at each of the main policy areas in turn: economic development, transport, spatial/urban development, and environmental management including energy and waste. For each of these, there is a general format:

- Current policy challenges and pressures
- Current policy initiatives and structures

- General policy themes and questions on 'integrated resource management': i.e. ways of influencing the MFA-EF, as a combination of policy, business and other interests. Where appropriate, we show a scenario account to illustrate the effects of such policies: this is a counterpart to the broader scenario framework in Chapter 7.

6.1.2 Regional policy and resource management

This section looks broadly at the agenda of resource management and how it relates to current and forthcoming policies and programmes at the regional level.

The underlying purpose of public policy, in the context of the current situation of a western liberalised late-industrial market democracy, can be interpreted:

- Providing for material needs and aspirations, while protecting environmental capital.
- But not intervening with markets and lifestyles beyond the minimum necessary.

The central challenge for this project is that there is no legal requirement or specific policy directive to minimise consumption and its ecological footprint. The result is that consumption and footprint issues tend to fall between the gaps between other policies, and that any directive to 'reduce consumption' is likely to be politically non-viable, if considered on its own. The South East sustainable development strategy, like those of other regions, is beginning to recognise the issues of global impacts of regional activity, but is not in a position to take much action.

The implication is that we need a more lateral approach to the various roles of policy in influencing resource management.

In the South East region these aspirations may be even more challenging than in other regions:

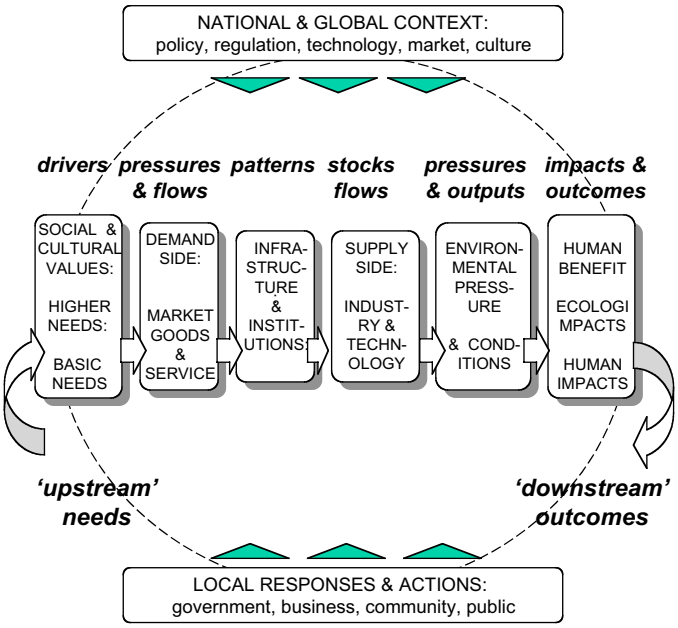
- Higher disposable incomes and closeness to the metropolis tend to encourage conspicuous consumption.
- Higher housing costs mean lower relative prices for material goods and products.
- Higher demand for long distance transport, and the poly-centric shape of the region, encourages distributed lifestyle and work patterns.

Systems approach to resource management policy

The analysis in the preceding chapters is a detailed breakdown of material consumption and its environmental pressures. The question is, what can be done to improve the situation, with an 'integrated resource management' approach, or 'sustainable consumption and production' strategy, in whichever version is most practicable.

The starting point is to assume that the majority of residents of the UK are not very likely to voluntarily reduce either their (perceived) social welfare or economic opportunity in the matter of physical consumption and production. Responses to this issue generally fall into two parallel approaches:

- Sustainable consumption and resource management as a generator of social welfare, satisfaction of needs, and quality of life.
- Sustainable production and resource management as a generator of economic competitiveness, added value and employment.



Integrated assessment framework for mapping of 'total metabolism' and 'sustainability balance'.
Source: Ravetz 2000, adapted from EEA 1995, OECD 1993.

Figure 6.1 Integrated assessment mapping of material metabolism

Closer analysis of the component parts of the MFA-EF databases in this project shows a practical framework or mapping of consumption and production. These can be seen in terms of cause-effect chains, which can be used as the basis for forming new policy initiatives, and analysing their effects (Figure 6.1). This is adapted from the European Environment Agency DPSIR scheme (driving forces, pressures, state, impacts and responses), and has been extended to represent more of the intangible driving forces and policy discourses.[1]

[1] Ravetz J, 2000: *'City-Region 2020: integrated planning for a sustainable environment'*: (with foreword by Michael Meacher), London, Earthscan, with the Town & Country Planning Association

EEA (European Environment Agency) (1995) *Environment in the European Union 1995: Report for the Review of the Fifth Environmental Action Programme,* EEA, Copenhagen / London, HMSO

- Consumer demand side: i.e. volume of throughput (e.g. numbers of cars, buses etc)
- Stock/flow effects: i.e. throughput (e.g purchases of newer more efficient cars)
- Infrastructure, both hard and soft: (e.g. availability of public transport: employer travel schemes)
- Supply side: (e.g. modal split in transport)
- Supply technology: (e.g engines and fuel efficiency)
- Environmental/spatial management: constraints or objectives which then influence other parts of the chain (e.g. air quality policies)

Table 6.1.1 Mapping policy approaches onto material metabolism

	KEY STAGES IN MATERIAL METABOLISM								
POLICY APPROACHES	Under-lying forces	Driving forces	Pressure	Infra-structure	Techno-logy	State	Impacts	Out-comes	Response
Technology innovation				•	•				
Policy: regulation / planning			•	•		•			•
Policy: fiscal / management		•					•		•
Market change	•						•		•
Lifestyles & values	•							•	

Following this, the likely focus and influence of the most common regional policy and strategy initiatives can be charted against the different stages in the material flow cycle, from extraction to disposal:

Table 6.1.2 Mapping regional strategies onto material metabolism

POLICY THEME	MATERIAL CYCLE					
	Extraction	Production	Distribution	Consumption	Waste	Impacts
Sustainable development	Mainly environment				Mainly environment	
Economic development		Business competitive	Social inclusion			
Employment & skills		Higher skill occupations	More efficient management			
Spatial development			Infrastructure	Some demand management	Facilities location	
Housing & communities			Infrastructure	Some demand management		
Transport & communication			Infrastructure	Some demand management		
Energy				Some demand management		
Climate change		Small influence				
Waste	Link minerals to landfill				Disposal, some minimization	
Minerals	Control & coordination					Supply constraints
Food, farming, countryside				Demand shift to local		Protection

It will be seen that each table contains many blank squares. Together they show the context for each of the sectoral 'scenario settings' summary tables which appear in Chapter 8. Based on the format of the first table, these identify the main quantitative scenario settings to be incorporated in the integrated model.

Integrated resource management models

'Integrated resource management' can be seen as a combination of policy goals, business practices and the commitment of consumers. On the general assumption that neither businesses nor consumers, on their own, will alter their current growth trends in resource consumption and environmental impact, it falls to the role of public policy to act as coordinator or catalyst for the other parties. Below are some of the different models or 'pathways' which might aim to combine policy goals with business viability and consumer demand. These are again arranged approximately in a material flow 'chain', from extraction to disposal and impact.

a) Reduce primary resource inputs

Resource use and waste arisings are not generally seen as part of the same problem, but all minerals quarried or resources harvested will at some point become a future waste. Therefore a systematic

approach dealing with the full 'cradle-to-grave' flow is needed. Spatial/urban development planning has an important role to play in managing demand and impacts, and solutions include:

- Enhanced durability and flexibility of buildings and infrastructure
- Design of components and materials for subsequent recycling (disassembly)
- 'Lean design': tackle the liability issues in specification which lead to over-design and engineering
- Environmental taxes such as the aggregates tax need to be targeted and set at levels which ensure maximum impact

b) Regional self sufficiency and proximity

The transport component is a major part of the EF for most construction materials, therefore there is a strong policy objective for the region to be as self sufficient as possible. However the proximity principle needs to be included in any trade-off decisions, as a strict self-sufficiency approach could increase the travel distances for many resources.

- Limit extraction from areas of environmental sensitivity
- Target future demand in line with regional resources

c) Closing material loops

The challenge is to convert current material waste streams into resources. Closed loop processes can be promoted through a range of measures:

- Changing material specifications: targeting performance rather than content
- Shift from low quality recycling towards reprocessing for higher quality re-uses
- Promote multi-material recycling centres close to urban areas to minimise transport
- Set targets for alternative materials within public procurement policy
- Introduction of mandatory segregation in regional demolition and landfill practice

d) Whole life responsibility

Generally, the concept of 'waste' needs to shift to that of 'unused resources' and the concept of 'recycling' towards a broader 'integrated resource management'.

- Promotion of Resource Management Enterprises
- 'Take back' contracts for infrastructure works
- Public sector promotion for recycled material markets

e) Integrated materials management

Suppliers, producers, regulators, users and consumers of materials all need to be aware of the opportunities for increased eco-efficiency and productivity. Business information systems for 'integrated materials management' will need to match supply and demand, identify alternatives and spot business opportunities, and for this an improved knowledge base is essential:

- Collation of material flow database with consistent boundaries and definitions
- Improve management potential through greater regional collaboration (match supply and demand more closely)

These general models for integrated resource management are to be seen applied in the following sections.

6.1.3 The South East in context

This section looks from the general level at the relevant themes in the main policy documents on the environment/development agenda in the South East region. This also includes some UK documents where none exist yet in the South East. These indicate the policy agendas, directions for change, and possible opportunities for the goals of integrated resource management.

General profile

A general profile of the South East region includes the following (South East Sustainable Development Strategy, 2001):

- A desirable region in which to invest, live and work, with high rates of in-migration; easy access to London, the Continent and the rest of the World, with well-developed infrastructure.
- An advanced, high cost, high income, broadly based and service-oriented economy – the second largest regional economy in England after London. There is above national and European average GDP per capita, but the Region is only 23rd out of 77 Regions in the European league table. It has the second highest (after London) total and per head GDP, disposable income per person, and consumption expenditure per person.
- Nearly a third of people in the Region were in the top fifth of the income distribution in 1996–7, a higher proportion than in any other region; The region has the highest economic activity rate for people of working age; a highly skilled workforce; the second highest rates of degree holders (after London) with 15.5% of the working age population possessing a degree or equivalent.
- There is a relatively healthy population with less than one in five people reporting a limiting long standing illness in 1996–7, a lower proportion than in any other region.
- One of the fastest growing regions with population growth of nearly 4% between 1991 and 1997, compared with growth of 2% in the UK as a whole.
- However there are pockets of deprivation, unemployment and social exclusion, particularly in parts of the South Coast such as Hastings and Brighton & Hove.
- On the downside, the countryside is under intense development and recreational pressure; there are very high costs of living and housing; there is congested road and rail infrastructure: after London, the Region has the second highest daily traffic flow. The distance travelled per person is more than in any other region, with an average of 8,000 miles per person per year. More miles are travelled by private car than in any other region.

- Growing amounts of waste produced and disposed of in the Region; each year it generates 13 million tonnes of waste, but also imports 3 million tonnes of waste. Ninety per cent of this waste is disposed of to landfill sites.
- Areas of the Region are experiencing growing pressure on water resources, with a higher per capita consumption of water than any other region.
- Uncertain and potentially significant effects of climate change on the economy and environment, with increased incidence of severe weather, hotter drier summers, and a rise in sea level of 54cm predicted by the 2080s.
- However there is attractive high quality natural, built and cultural environment reflected in large areas of land designated for amenity or intrinsic value – about 40% of the land area is subject to some form of protective designation eg Area of Outstanding Natural Beauty, Site of Special Scientific Interest, green belt.

Regional strengths and weaknesses

Many of the strengths and weaknesses addressed in current regional strategies were confirmed by a recent Mori poll commissioned by the Regional Assembly *(Figures 6.2 and 6.3)*.

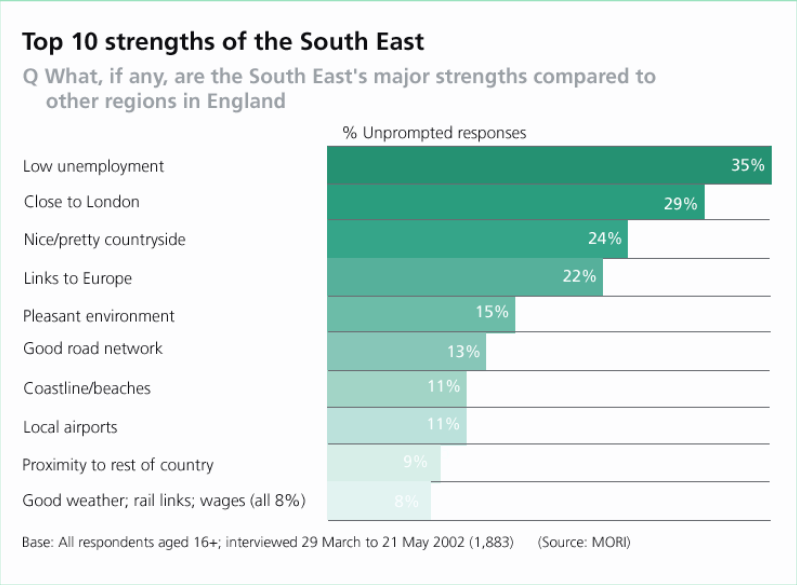


Fig 6.2 Top 10 strengths of the South East region
Source MORI

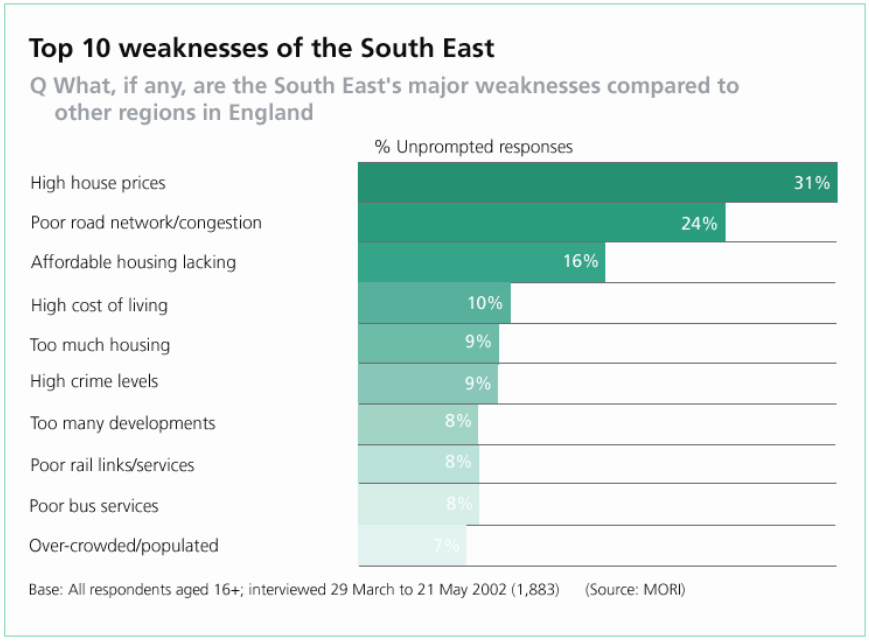


Figure 6.3 Top 10 weaknesses of the South East region
Source MORI

Regional identity and boundary

Beyond the basic regional profile quoted above, there are underlying issues which affect the ability of any kind of regional strategy or policy.

Regional boundary

As many have noted, there is a lack of definition and identity for the South East region, which is not a very distinct functional or political unit in the way that, for instance, the North East is. A more coherent unit might include Greater London, East of England and the South East, but this would have a combined population of over 19 million and be too large for many forms of planning and governance. The South East region itself divides into different sub-regions with no dominant central node except that of London which is outside the region. The local government structure is also complex and fragmented:

- 7 counties
- 12 unitary authorities
- 55 local authorities, some of which are grouped into 5 ‘former counties’

This suggests that the UK region which is economically most important is politically one of the weaker ones. This has implications for the way in which integrated resource management may or may not be politically viable.

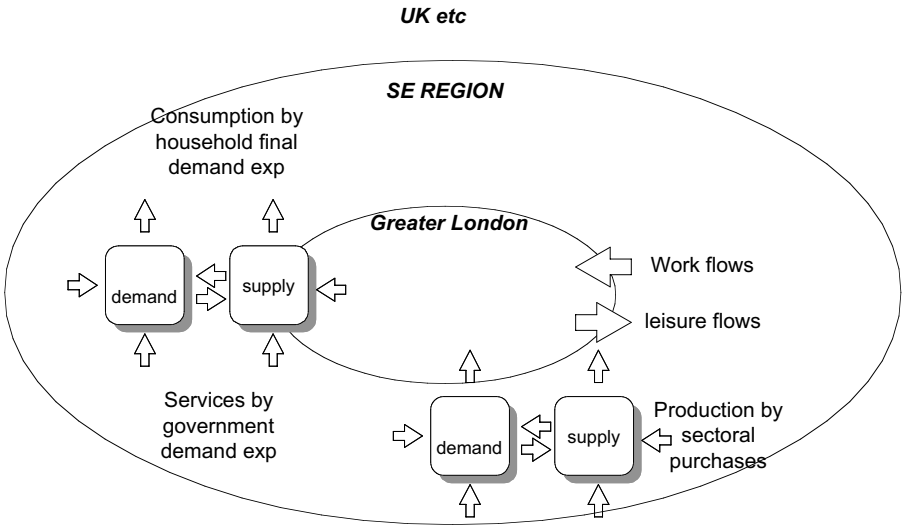


Figure 6.4 Inter-regional balance framework

Relationship to Greater London

The relationship of the South East to Greater London is clearly a high degree of inter-dependence *(Figure 6.4)*. This affects the calculation of MFA-EF, for instance in the allocation of 'consumption' to residential addresses in the South East, where in practice the residents may work, shop and seek leisure in London or abroad. It also affects the profile of consumption and production.

Regional trends and driving forces

The '***Future Think'*** document, produced by SEEDA in 2002, is intended as a framework which identifies some of the key issues and driving forces that will shape the future of the South East region:

- globalisation and free trade, for example enlargement of the EU;
- information and communication technologies;
- emerging technologies, in particular key fields for 'explosive' growth;
- demographic change;
- skills and employment, in particular a shift from manufacturing to service jobs, and an increased polarisation between high-tech jobs and unskilled labour;
- social cohesion and deprivation, with disparities within the South East seen as an important problem.

The most directly relevant of these is the agenda for ***environment and sustainability***:

- climate change impacts significant for the UK; more areas to be affected by water stress and scarcity; rising mean temperatures;

- emergence of environmental technologies as a high growth business area;
- alternative energy sources becoming more significant (power generation and transportation);
- trend towards a low waste/high value economy (resource efficiency); greater emphasis on waste minimisation;
- more extensive fiscal regimes and development of alternative transport modes to address traffic congestion;

Other key factors of socio-economic change include:

Globalisation and free trade

- Strong growth in global trade and investment
- Growth of global supply chains
- Low trade barriers
- Easier access to global markets
- Strengthening regional blocs, facilities multilateral trade
- Locational flexibility, allowing businesses to exploit new markets and manufacturing opportunities
- Enlargement of the EU
- Increased concentration of businesses in a few global regions

Emerging technologies

- Key fields for 'explosive' growth e.g. nanotechnology, biotechnology etc.
- Ethical concerns will circumscribe applications of genetic engineering
- Applications of genomics in public health, plant breeding and environmental remediation are likely to accelerate

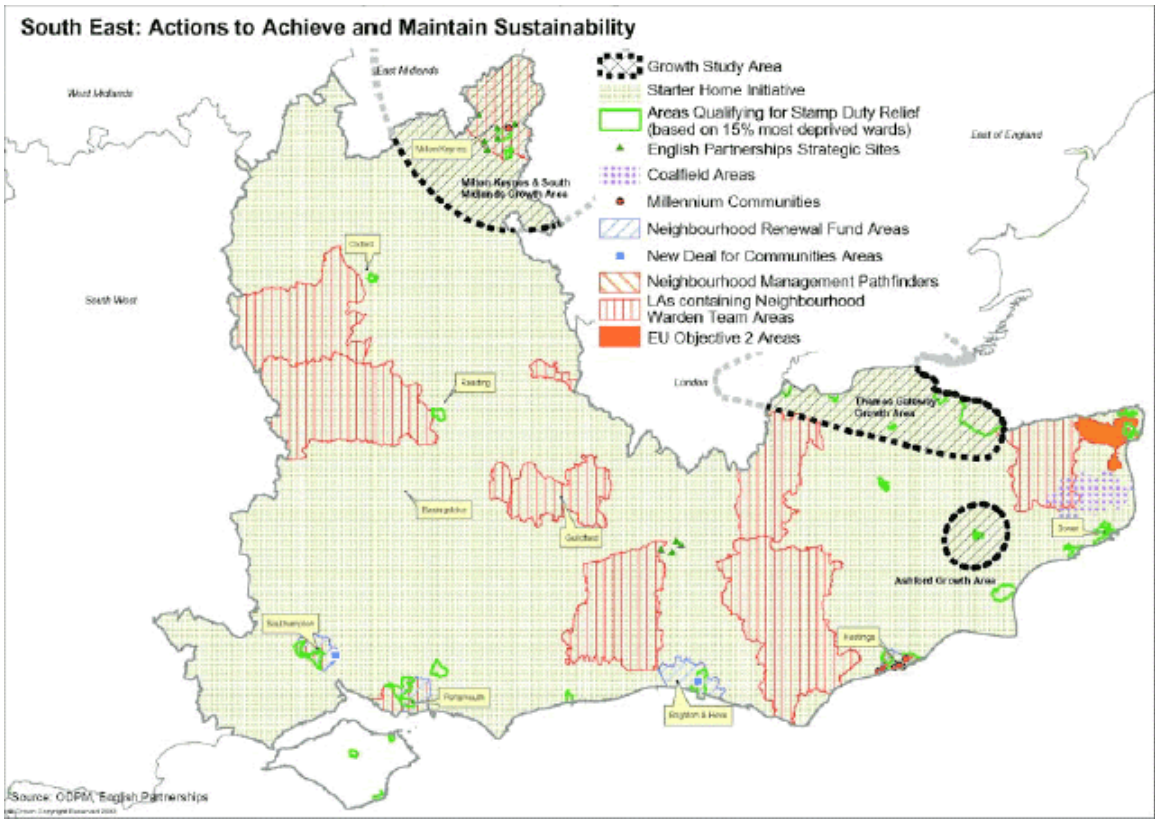
Demographic change

- UK population will increase to 62 million by 2021
- The demographic support ratio will fall from 4:1 to 2.5:1 by 2030
- By 2030 the UK will have 19 million people over 60

Public investment programmes

The ability of any regional strategy to influence resource management and the MFA-EF will be determined mainly by the public investment available. This of course changes every year according to political and economic priorities, however the broad scope of public investment will have considerable momentum.

The table below shows the current government investment programmes (over and above standard local authority investment), and the kinds of influence that this may have on resource management issues. The map following shows the areas and locations for key policies which are spatially targeted (Figure 6.5). The definition of 'sustainability' used here is clearly geared towards the social and urban



development agenda as in the government 'Sustainable Communities' programme.

Figure 6.5 Locations of 'actions to achieve and maintain sustainability'

Source: Regional Planning Guidance

Table 6.1.3 Summary of key Government programmes in the South East

Funding programme	Level of investment
European Structural Funds European funding used to stimulate economic development in the EU's least prosperous regions. Includes European Regional Development Fund (ERDF) and the European Social Fund (ESF).	£330m+ for 2000-2006
Approved Development Programme (ADP) Housing Corporation administered annual housing capital fund allocated to housing associations.	£93m for 2001/02, £114m for 2002/03 and £134m for 2003/04
Housing Investment Programme (HIP) Programme to provide housing capital funding for local authority housing. Amounts include Annual Capital Guidelines and Private Sector Renewal Grant.	£87m for 2001/02, £93m for 2003/04 and £78m for 2003/04
Major Repairs Allowance Resources to meet the ongoing capital costs of maintaining the current condition of local authority housing stock	£138m for 2001/02, £140m for 2002/03 and £140m for 2003/04
South East England Development Agency (SEEDA) SEEDA co-ordinates economic development and regeneration to improve the relative competitiveness of the region.	£126m projected for 2002/03
Starter Homes Initiative Initiative to help key workers to buy homes in urban and rural areas where prices would otherwise prevent them.	£79m for 2001/02 – 2003/04
Neighbourhood Renewal Unit (NRU) The NRU funds various programmes in the region to narrow the gap between deprived neighbourhoods and the rest of the country.	£10.3m for 2001/02 to 2003/04
New Deal for Communities (NDC) A community led partnership based around renewal in communities including pioneering approaches to neighbourhood management.	£95.9m for 2000/01 to 2010/11
Crime reduction and drug prevention	£51.6m for 2002/03

Regional policy structures

The key strategies which are identified in the following sections include:

- Sustainable Development Framework (2001) and the Sustainable Development Appraisal of regional strategy – final report (2001)
- Regional Economic Strategy (2002) – consultation document (2002); and the Framework for Employment and Skills (2002)
- Transport strategy (2002)
- Regional Planning Guidance (RPG) (2001); together with the national Sustainable Communities programme (2003)
- Regional Waste Strategy
- South East Climate Change Partnership – response to RES consultation (2002); together with 'Harnessing the Elements': a strategy for energy efficiency and renewable energy consultation draft (2002)
- At the national level there is also the new UK Strategy for Sustainable Consumption and Production (SCP)

6.2 Sustainable Development Framework

The regional framework

The Sustainable Development Framework for the South East, "A Better Quality of Life in the South East", was published in June 2001 as an over-arching integrated policy document, to guide and help in the monitoring of the quality of life within the region. The Regional Assembly led on the production of the Framework in conjunction with the South East England Development Agency, the Government Office for the South East, the Environment Agency and the National Health Service.

The first of its kind for the South East, the Framework sets out a vision for the region and proposes objectives, indicators and targets which contain all the themes of sustainable development. The Framework is not a detailed action plan. Its aim is to clarify what sustainable development means for the South East of England and how the region can contribute to sustainable development of the country as a whole, through identifying objectives to work towards. In addition, the Framework:

- provides a common reference point for sustainable development which will help guide the work of organisations, particularly those operating at a regional level, and ensure that sustainable development is at the heart of regional policy;
- provides a useful aid to policy formulation and appraisal by the many partners involved in its preparation, and will be relevant to a wide range of other organisations and to businesses;
- sets the sustainable development context within which strategies will be formulated, implemented and reviewed;
- will be a key tool in sustainability appraisals of strategies and programmes, and for incorporating sustainability into corporate strategy and decision-making. In particular, the Regional Planning Guidance and the Regional Economic Strategy;
- will help to achieve consistency, setting the regional context for sub-regional and local initiatives, plans, strategies, including local authority development plans, Local Agenda 21 and Community Strategies. Such strategies are, and will continue to be, a major means of delivery of sustainable development, and of the objectives of the Framework. The Framework does not aim to replace or duplicate this work, but aims to fill a gap at the regional level.

Like the majority of regional sustainable development strategies or frameworks, there is often a gap in the powers and resources for implementation. Hence such frameworks are more like coordination devices, awareness raising or catalysts for partnerships.

Sustainable Development Framework analysis

The table below shows a more detailed analysis of where the regional SDS objectives are relevant to the issues of resource management and MFA-EF. The implication is that only some of the regional objectives are directly relevant to resource management MFA-EF.

Table 6.2.1 Analysis of the Sustainable Development Framework

	STAGES IN THE MATERIAL METABOLISM					
(italics shows no specific influence on resource management)	Extraction	Production	Distribution	Consump-tion	Waste	Impacts
SDF 'Effective protection of the environment' theme						
9.To improve efficiency in land use through the re-use of previously developed land and existing buildings.	Could increase high energy material use		Marginal reductions in transport		Could increase demolition waste	
10.To reduce air pollution and ensure air quality continues to improve.						Air quality feedback to transport
11.To maintain and improve the water quality of the Region's rivers and coast.						
12.To address the causes of climate change through reducing emissions of greenhouse gases.						question on embodied emissions
13.To conserve and enhance the Region's biodiversity.						
14.To protect, enhance and encourage enjoyment of the countryside.						
15.To reduce road traffic and congestion through reducing the need to travel by car and improving travel choice.	Reduce energy & minerals demand	Affects location of production	Affects distribution infrastructure	Affects location of consump-tion		
16.To maintain, enhance and make accessible the historic environment						
'Prudent use of natural resources' theme						
17.To achieve sustainable water resources management.						Reduce EF of water supply
18.To reduce the risk of flooding that would be detrimental to public well-being, the economy and environment	increase minerals demand?					
19.To reduce waste generation and disposal, and achieve sustainable management of waste.		Waste minimisation		Waste minimisation	Best practice in disposal	Reduces EF of disposal.
20.To increase energy efficiency.						As for climate
21.To increase the proportion of energy generated and consumed in the Region from renewable sources.	Replaces high impact energy sources					

Sustainable development appraisal (2001)

In this appraisal programme there is a focus on SEEDAs Standard Accountability Plans (SAPs). These are regarded as SEEDAs 'contract with the region' and include key milestones and targets. There are six groups of SAPs which mirror the key themes of the original RES.

Social progress which recognises the needs of everyone

There is a strong tendency towards growing spatial concentration and polarisation across the South East region. This evidence points to the need for a sub-regional component to the analysis.

Effective protection of the environment

This contains a standard list of environmental objectives, though the appraisal highlighted the need to appraise projects and interventions ex-ante, transparently and on a case-by-case basis. This ideally would be a framework in which environmental, social and economic balance sheets are assessed with equal and substantial vigour, and in which both the short term and long term consequences are taken into account.

Prudent use of natural resources

It is recognised that the issues regarding resource use in the region will become more severe. Water management is cited as an area of particular attention.

Maintenance of high and stable levels of economic growth and employment

Promotion of economic growth and competitiveness, but also to ensure a better distribution of economic activity around the region.

6.3 Regional Economic Strategy 2002

6.3.1 Policy context

Regional economic context

Key features of the South East regional economy include:

- The South East is thought of as a service economy yet has a higher gross manufacturing turnover than any other UK region.
- People in the South East travel farther than those in any other region; The South East has the most heavily used roads outside London; In terms of peak track capacity, less than 10% of the rail network is operating at 90% of capacity or more.
- Lack of affordable housing is a threat to the sustainable growth of the region.

Economic challenges

- The South East is a global gateway: principal gateway to Europe and the rest of the world. In many respects the economy is intertwined with that of London.
- In economic terms the South East is a significant contributor to European prosperity and it is the preferred location for multinational HQs in Europe. With enlargement bringing in potentially 12 new countries, and with seven of them joining as early as 2004, the number of EU consumers will grow from 320 million to 500 million.
- The South East exported nearly £28 billion of goods (DTI, 2001), more than any other UK region and a higher figure per head of population than any other UK region apart from Scotland. Between 1990 and 2000 the economy grew faster than any other UK region, expanding at an average annual rate of 3.1% (against 2.2% for the UK as a whole).
- South East England performs strongly against most of its 39 comparators in some respects: overall economic activity is above the global high performing mean, ranking 17th, the proportion of the workforce employed as knowledge workers is well above the high performing mean, ranking 6th, and the proportion of the workforce employed in high technology, high value added sectors is again well above the high performing mean, ranking 8th.
- Creative and cultural activities are a £50 billion industry, accounting for 60,000 businesses and 500,000 employees. This embraces media and digital, content origination, arts and design, heritage and stewardship, tourism, recreation and sport.
- Less impressive is the ability to translate strengths into economic value: GDP per capita and labour productivity are both 23% below high performing mean, and average earnings are 13% below high performing mean.
- Regional differentials: between 1990 and 2000 GDP growth in Kent, East and West Sussex lagged significantly behind the regional average. SEEDA research has highlighted the fact that 23% of all businesses are based in rural areas, that should be seen as a regional and national economic asset. Labour shortages, a growing lack of affordable housing and grinding congestion of transport networks are clear signs of the challenges ahead.

'Sustainable economic development' strategy

Environment-economy challenges

There are also some key issues or possible conflicts between economic/urban development, and the environmental impacts and resources limits:

- The issue of water supply is becoming a development constraint in some parts of the region (higher than average per capita consumption).
- The generation of waste has increased in recent years - disposal is becoming an increasingly critical issue.
- Likely to see a significant increase in the use of renewable energy in the region over the next decade.

In pursuing a 'sustainable economic development' strategy themes, specific priorities and actions have been set out:

- Environmental technologies
- Business and sustainable development
- Corporate social responsibility
- Sustainable construction
- Water
- Waste
- Renewable energy
- Land and landscape management
- Sustainability appraisal

Economic strategy key themes

Each theme in the regional economic strategy, can be seen with its implications for resource management and ecological footprint:

- ***World Class Businesses***: the factors of innovation and competitiveness are crucial to a better class of resource management.
- ***World Class Learning*** **and** ***World Class Workforce***: best practice in resource management starts and ends with people and their skills:
- ***World Class Transport***: the South East is clearly a region choking on its own need for mobility, one of the largest components of the ecological footprint. Hence the transport agenda is crucial for both environmental and economic performance.
- ***World Class Environment***: protection of natural assets is crucial in a crowded overheating region. This provides the logic to resource management in business. However it is relatively acceptable to safeguard environmental assets within the region, even while increasing the

exploitation of other regions and overseas. One of the main applications of the EF approach is to identify this.

- ***World Class Communities and Urban Renaissance***: this provides the logic to resource management via 'sustainable consumption'.
- ***World Class Rural Economy***: While the land bio-capacity is small in relation to the total footprint, this throws light on the application of 'sustainable rural development'.

The South East regional economic strategy also highlights the theme of natural resources:

- Achieve sustainable management of water resources and waste
- Contribute to a reduction in emissions of GHGs from energy use through improving energy efficiency and increasing the proportion of energy derived from renewable sources
- Ensure that the highest standards of sustainable construction are achieved across the South East
- Enable a more prosperous future for the land-based sector by encouraging fully integrated approaches to sustainable land management

Economic priority sectors and clusters

Three types of actual or potential clusters are present in the South East:

- Concentrations of firms which benefit from a shared local pool of specialised labour or from proximity to key facilities, such as international airports, but do not otherwise work collaboratively
- Supply chains and other forms of trading or production links between firms
- Examples of active local networking and co-operation between businesses

Certain key sectors are selected for public investment and coordination activity:

- Manufacturing
- Pharmaceuticals and biotechnology
- Service industries
- Tourism
- Creative and cultural industries

There are currently seven region-wide sector groups, each one of which is dependent on environmental quality or environmental regulation in some way:

- Technology, media and telecommunications
- Tourism
- Transport and logistics
- Aerospace and defence
- Marine technologies

- Building and construction
- Pharmaceuticals, biotechnology and medical technologies

In addition a further three groups are in preparation:

- Environmental technologies
- Advanced engineering
- IT/software

Framework for employment and skills (2002)

This document provides economic and employment trends and targets for the region. In particular, the data collated in the table below could be used as the basis for scenario projections.

The South East is forecast to lead growth in the UK, with the regional economy set to expand by 3.2% per annum between 2000 and 2010 (Business Strategies Limited, 2001). Employment in the region is forecast to rise by 360,000 net additional jobs by 2011, an increase of 9%, at almost 1% per year.

SEEDA has identified three categories of emerging sectors that will become increasingly important to the overall success of the regional economy. These are biotechnology, pharmaceutical and creative/cultural industries, the latter growing by 14,200 jobs between 1998 and 2000 to 89,500 (ABI, 2000).

Those sectors experiencing large-scale job losses in the South East in recent years (Annual Business Inquiry, 1999–2001, absolute numbers) include:

- Public administration and defence (-30,800)
- Construction (-16,500)
- Food, drink and Tobacco (-16,500)
- Minerals (-15,400)
- Agriculture, forestry and fishing (-9,700)

The table below shows summary statistics and projections to 2010 by sector, and the following chart shows projections to 2015.

Table 6.3.1 Projections of employment and GVA by sector:

Sector	Employment share %	% employment change 2001-10	GDP share	% change in GVA 1989-98	% of workforce high skilled
Agriculture	1.1	-34.3	1.1	-1.6	16
Energy and water	0.4	-7.5	1.7	35.8	39
Manufacturing (incl. chemicals, pharms etc)	12.0	-14.5	15.2	42.9	27
Construction	4.3	13.5	5.3	14.4	13
Distribution, hotels and restaurants	25.7	9.6	15	86.0	12
Transport and communications	6.6	1.5	10.1	67.3	13
Banking, finance and administration	22.9	13.2	32.9	21.6	40
Public administration, education and health	22.3	8.7	16.4	72.9	44
Other services	4.9	24.9	5.3	157.1	21

The effect of projected 'business as usual' economic trends to 2015 on the regional occupational classes is shown below. This is based on the REWARD economy-environment modelling system, using default or 'business as usual' assumptions.[2] This provides a striking picture of a region which looks likely to be increasingly made up of managers, professionals, shopkeepers and 'personal service' occupations, at the expense of producers.

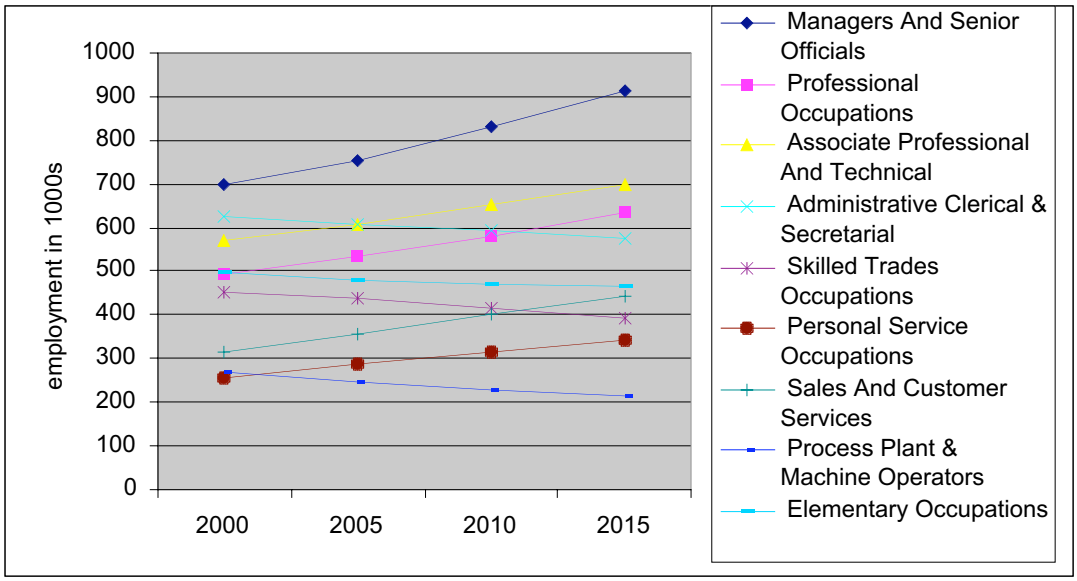


Figure 6.6 Projections of employment and occupation to 2015

[2] Details on www.reward-uk.org

Regional environmental economy

A report commissioned by SEEDA in 2002 indicates that the 'environmental economy' in the region contributed £7.8 billion Gross Value Added (GVA) to the region's economy, which represents 6% of the total regional economy. An estimated 230,000 people were employed by the environmental sector in 2000, which is 5.5% of the region's workforce.

- Primary industries dependent upon environmental resources, including forestry, agriculture, fishing and mineral extraction. These are approx 3% of total GDP.
- Industries that depend upon a high quality environment such as leisure and tourism: 18% of GDP, depending on how they are measured.
- Activities that contribute to a high quality environment, including conservation organisations and some sections of local and government and government agencies: figures are concealed in public administration and other services.
- Businesses that deliver environmental technologies or services, depending on how these are defined, but relating directly to air, water, land, waste, energy and similar activities.

SEEDA has identified that the environmental economy as a whole contributes more to the regional economy than any other sector, except financial services, health and education. Future growth has been identified across the following sectors:

- Niche activities such as organic farming and aggregates recycling
- Waste recovery, recycling, renewable energy production
- Tourism and particularly 'green' tourism
- Environmental technologies, management and training.

6.3.2 Economic strategy and resource management

Economic structure and trends

The regional economic strategy now recognises the 'environmental economy' above as a major component of the regional profile. However beyond that, there is little consideration of the environmental effects of increasing economic growth and household incomes. The strategy as a whole focuses on competitiveness, and most of its components focus on 'supply side' measures for the labour force (skills, training, networks etc), and distributional issues such as social inclusion and housing shortage.

Underlying these economic trends however are some more general and structural economic shifts which have a bearing on resource management and the MFA-EF.

- ***Services shift***: the move of employment and investment to higher value added sectors and functions is universal in industrial economies. However this does not mean that less materials are used: if anything it suggests that the same volumes are generated at greater distances, coming from the developing world in many cases. The general shift towards higher skill and

higher value labour will itself tend to reduce the relative prices of materials and products, and reduce the incentive for reuse and recycling.

- ***Dematerialisation of production***: production itself has the potential to shift towards a 'service' concept. One example is the provision of 'floor covering services' with the leasing of various materials , rather than carpet products which are purchased and then disposed of. This has the potential to reduce resource demands through re-use and re-manufacturing.
- ***Environmental management in business***: over time this is likely to lead towards waste minimisation and to some extent reducing primary inputs per unit of production.
- ***Environmental technologies*** and cluster development: high level groupings of industries on particular sites or networks will tend to affect production rather than consumption directly. However there is likely to be spill over effects from one to the other.
- ***Dematerialisation of consumption:*** in some sectors but not others, it is clear that greater consumer satisfaction/social welfare can be delivered with much reduced physical resource consumption. However this is always subject to the effects of new business models with other objectives. For example newsprint in the UK has now approx 40% minimum recycled content: but the introduction of free newsheets on an alternative business model has contributed to rapid increases in the overall consumption.

This last issue points to the largest potential missing link in the regional economic strategy, the ***social economy***. Where there are social networks and cultural norms which can encourage people to share, re-use and combine their consumption, then there are the greatest opportunities for resource management. This is seen most clearly in the transport and urban development fields: if people can fulfil their needs through an urban model of dense housing and public transport, then the reduction in resources is very significant. However for most of the population this depends on a reinvention of social networks and cultural norms to support it.

Economic benefits of resource management

Generally if more wealth is created by fewer resources and less pollution, then costs to business are reduced. Not only can many of the measures that businesses take to improve resource productivity reduce their immediate costs, but the overall efficiency of the economy will be increased. The total benefits for UK manufacturing businesses from reducing waste has recently been estimated for the first time in a recent report[3] commissioned by the Environment Agency:

- If manufacturers invested in best-practice waste minimisation techniques they could achieve around £2–2.9bn savings in annual operating costs. To put this figure in context, this represented 1_-2% of UK manufacturing value added and 5–7% of profits in 2000.
- This supplements potential savings from other kinds of investment in resource productivity. The Cabinet Office Strategy Unit's Energy Review in 2002 estimated that the implementation of cost-effective measures to promote energy efficiency could save £1.8bn in industry and £7.3bn for all sectors of the economy.

[3] Cambridge Econometrics and AEA Technology (2003) *The Benefits of Greener Business: the costs of the unproductive use of resources* Bristol, Environment Agency, available on – www.environment-agency.gov.uk

- Typically the case studies conducted under the Government's Envirowise programme suggest that the average payback period on the investment is twelve months or less. This compares with the 2–4 years cited for energy efficiency investments by the Cabinet Office Strategy Unit's Energy Review.
- The annual savings estimates from waste minimisation made in this study are likely to understate the potential benefits to businesses from a more efficient use of resources because they include only carefully audited 'good housekeeping', easily identifiable savings found to date from process changes.
- Firms may underestimate the potential savings by focusing only on their waste disposal costs. Figure 6.7 shows that almost 60% of the savings come from lower purchase costs of materials that do not end up in the final product.
- Firms also incur costs of processing and handling these 'unnecessary' materials and in some cases these are considerably larger than the purchase costs of materials. Case studies of various sectors within manufacturing show that the value of companies' processing costs embodied in their waste were almost double the purchase cost of materials.
- The case studies were carried out prior to the increase in the Landfill Tax announced in the Budget. The incentives for curbing waste disposals are therefore now higher.

As regards further work, it is intended to develop further tools as part of an integrated MFA-EF national system, which will enable breakdown of MFA-EF by industrial sectors, and establishing benchmarks for resource productivity in each sector. This will in time lead to a powerful system for informing and leading a range of '***sustainability strategies'*** at the regional sectoral level.

Figure 6.7 Savings from Resource Productivity

From: The Benefits of Greener Business: Final report submitted to the Environment Agency by Cambridge Econometrics and AEA Technology, April 2003. Available on www.reward-uk.org

Green economic strategy

The 'greening of business' is one step in a long evolution, from the 'smokestack' approach, to integrated pollution control (IPC), eco-modernisation and de-materialisation. The new-born business-environment agenda contains several layers – management of the local impacts of production: extended supply chains and product life-cycles, and wider indirect trading and investment linkages. In each case there are physical questions on materials and processes and wider questions on management techniques and market structures.

The primary resource for all economic activity is energy, whether for physical processing or for the buildings which house service based activity. Nearly half of total energy consumption is in public services, commerce and industry and half of this is in buildings and equipment. In modern shops and offices, lighting and equipment often use 30%, and air-conditioning can take 40% of total energy.[4] Many 'best practice' programmes show that 10% savings come simply from good management and a further 20% savings are generally viable with a payback of less than 3 years.[5] For new buildings such as supermarkets, low-energy design can save 60% on current standards by integrating equipment with building systems and there is technical potential for 90% reduction – the Factor of Ten goal.[6]

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[4] BRECSU (Building Research Energy Conservation Support Unit) (1995) *Energy Management Guide, organizational aspects of energy management,* General Information Report No 12, Watford, Building Research Establishment

[5] Dept of Energy, Energy Efficiency Office (1990) *Energy Use and Energy Efficiency in the UK Domestic Sector up to the year 2010,* London, HMSO

[6] von Weizsacker, E, Lovins, A and Lovins, L.H (1997) *Factor Four: Doubling Wealth, Halving Resource Use,* London, Earthscan

In contrast, the industrial parts of the South East region contain many older and inefficient commercial buildings and, with a 2% growth rate in demand for floorspace, many will stand for a long time to come. For such property, low asset values, split responsibility, multiple leaseholds and falling energy prices make forward investment much more difficult and such property also houses the SMEs which are most vulnerable to regulation and short of investment capital. To bridge the gap, as with housing, there could be a 'regional energy agency' to coordinate an energy efficiency investment package in partnership with energy services companies, providing incentives for landlords, and trading in 'nega-watts'.

Industrial processes and motive power account for a third of business energy use. Applying the best cost-effective technology can deliver between 5–30% savings and applying the 'theoretical best' shows 15–40% savings. There are different cost-efficiency profiles for intensive industries with energy costs of 20% of turnover, such as cement, medium-impact industries such as food and light manufacturing, and low-impact industries with average energy costs of 2% of turnover.[7] The larger the plant, the longer the investment times, so efficiency upgrading has to coordinate plant life-cycles with new processes and best-available technology. However long investment cycles, complex contract conditions, falling energy prices and market deregulation each undermine the theoretical efficiency potential. Each industrial sector is now negotiating possible voluntary agreements with the government and city or regional partnerships should provide the added value and incentive on the ground.[8]

The business use of energy is now the target of the UK's first major energy tax and there is intense negotiation on exemptions, reliefs and internal trading systems. For all the pain, the tax is expected to reduce business CO_2 emissions by only 2%, and increased energy costs will probably be absorbed in falling prices. Nevertheless the tax sends a signal to industry which should be followed up by progressive increases in the coming years.[9]

A business-energy strategy would focus on institutional moves to overcome such barriers and promote 'best practice' efficiency levels. For services, increases in floor spaces are contained and both old and new efficiency levels could be doubled from those of the BAU trends. Integrated building design keeps air-conditioning demand to a minimum and electricity is switched to gas, solar and direct heat supply wherever possible – this would stabilise final energy demand and reduce CO_2 emissions by 30%. For industry, an aggregated scenario assumes that physical throughput is stabilised, unit efficiency raised by 25%, and fuels switched to low-impact sources wherever possible – the effect is to reduce final demand by 25% and CO_2 again by 30%.

Environmental management

Environmental management systems have been a growth industry in the last decade. EMAS ('environmental management and audit system') was promoted by the EU, and British Standard 7750 was a UK system used internationally; both are overtaken by ISO 14001 which is now used on over 700 sites in the UK, with numbers doubling every two years. In practice most environmental reviews and audits take place internally with less involvement of management time and costs. However, while environmental management systems are the first step in controlling environmental impacts, many

[7] International Energy Agency (1991) *Energy Efficiency and the Environment,* Paris, IAE and OECD

[8] Roberts P and Jackson T (1999) Incorporating the Environment into European regional programmes – evolution, progress and prospects, *Town and Country Planning* Vol 67:85-88

[9] HM Treasury (1998) *Economic Instruments and the Business Use of Energy (Marshall Report),* London, HM Treasury, TSO

registered firms are among the largest polluters in the UK. And while the spread of such systems may be reaching critical mass in some industry supply chains, there is a general lack of interest and take-up by SMEs: such firms are responsible for the bulk of environmental impacts, but often lack expertise, time or commitment to achieving better practice.[10]

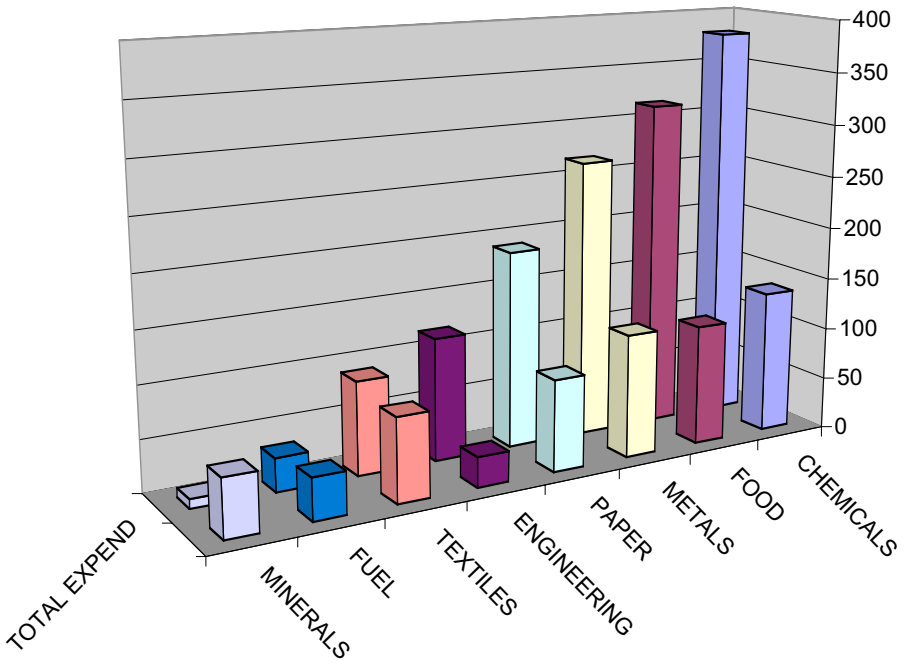


Figure 6.8 Analysis of environmental management in industry. Data based on ECOTEC 1996: DTI 1996: OECD 1997

Formal management systems are also seen as a 'license to pollute' – meeting short term paper targets by end-of-pipe fixes, rather than the real challenge of cleaner technology, process substitution and product innovation.[11] A sectoral breakdown of environmental expenditure shows a measure of the problem rather than the solution –substitution and innovation would often show smaller expenditure with greater effect *(Figure 6.8)*. Green labelling is also problematic –fragmented standards allow misuse on products which are far from green and many firms who equate 'green' with inefficiency avoid such labels.[12]

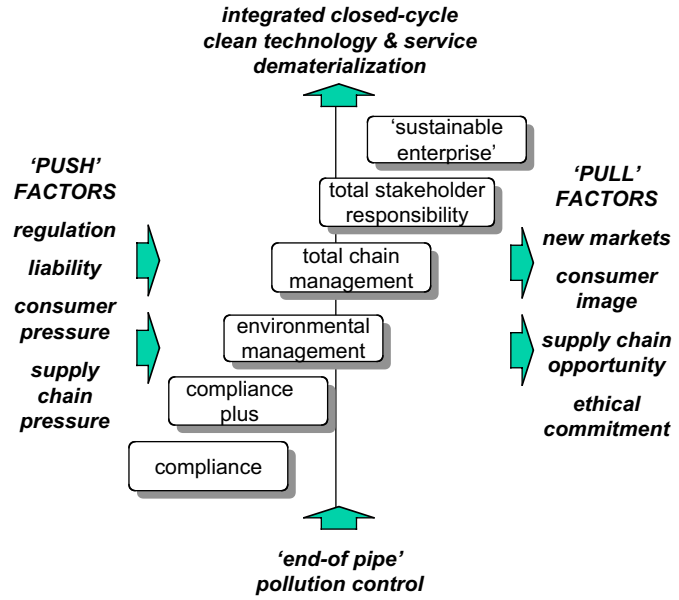
In the longer term environmental management systems are one tool among many. Environmental accounting systems, supply-chain management, risk assessment, best practice frontiers, eco-efficiency standards, eco-balance LCA, sectoral benchmarking, product eco-labelling, life-cycle leasing and

[10] Groundwork Foundation (1996) *Small Firms and the Environment - a Groundwork Status Report,* Birmingham, Groundwork Foundation

[11] Gouldson A and Murphy J (1999) *Regulatory Realities: the implementation and impact of industrial environmental regulation,* London, Earthscan

[12] Design Innovation Group (1996) *The Commercial Impacts of Green Product Development,* DIG, Open University, Milton Keynes

others, each show a slice of the total picture and need to combine in a wider framework.[13] Forward looking firms will seek to climb the steps towards the goal of a 'sustainable firm', where corporate values are the dynamic behind technical change *(Figure 6.9)*.[14]



Push and pull motivation for shift from end-of-pipe to 'sustainable firm'.
Source: adapted from Wood 1995: Gouldson & Murphy 1998

Figure 6.9 Pressures and opportunities for the 'sustainable firm'

Industrial ecology strategy

While most EMSs focus on firms, sites and processes, a wider view looks at the combined impact of whole industries and sectors. Large variations can be seen in the climate and acidification burden of different sectors in the South East, such as chemicals with the highest overall impact, and non-metallic industries with the highest impact per added value *(Figure 6.10)*.[15] Such sectoral profiles are the basis for the UK industry and trade association voluntary agreements under continuing discussion with government. The prospects for high impact sectors, such as chemicals, textiles and light manufacture, should be coordinated with the regional environment strategy, as in the examples below.

[13] Bennett M and James P (Eds) (1999), *Sustainable Measures: Evaluation and Reporting of Environmental and Social Performance,* Sheffield, Greenleaf Publishing
[14] RSA Inquiry (1995) *Tomorrow's Company: the role of business in a changing world,* London, Royal Society of Arts
[15] based on UK estimates from ONS 1996 and 1997: adjusted for multipliers in GM

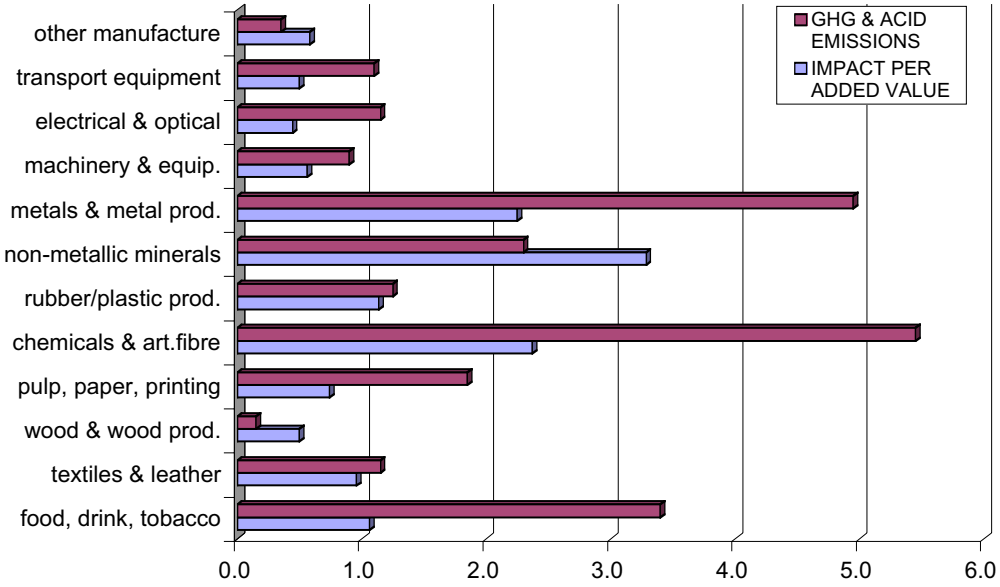


Figure 6.10 Environmental impacts of industry and employment. Aggregated climate change and acid rain impacts by manufacturing sector, with ratio of impacts to employees and added value per sector. Figures apply to percentage of UK totals. Source: ECOTEC 1996.

Sectoral profiles are also the basis for developing 'industrial ecology' systems which cascade energy, resource and waste flows from a variety of industries.[16] Such coordinated networks of material flows are suited to areas of heavy industry, and integrated design is most common in large chemicals complexes. At the regional level, established materials industries could develop markets and trading networks, anchored on a cluster of materials reclamation and disassembly plants. Such a 'green growth pole' could stimulate development in the same way that chemicals or car plants did in previous decades.[17]

Green economic strategy

To promote environmental management and industrial ecology, each area and territory has to evolve its own approach. The size and complexity of the region means that one central organisation or network may not be appropriate and different models may be suited to each business type and size band:

- larger companies: policy and development role for city-region environmental management framework, technology R&D, infrastructure

[16] Ayres, R and Simonis, U, (Eds) (1997) *Industrial Metabolism: restructuring for sustainable development,* New York, United Nations University Press

[17] Roberts, P (1995) *Environmentally Sustainable Business: a Local and Regional Perspective,* London, Paul Chapman Publishing

- medium-sized manufacturing: access to specialist consultancy and finance: networks for collaboration on transport, energy, waste
- local SMEs: general promotions, access to technology, information, financial packages
- local micro and start-up businesses: basic guidance and access to support and services
- commercial and retail services: green-ethical supply chains, purchasing and marketing
- financial and producer services: green-ethical investment policies and projects
- public or quasi-public services, particularly health and education: purchasing and contracting, social trading networks

More than ethics and ideals, the practical motivation for green economic strategy is to maximise opportunity and minimise risk. For the first, the 'environmental industries' market is about £1 billion pro rata for the South East region – including pollution control, land remediation, water and waste management. European and world markets are doubling every decade or so for the foreseeable future.[18] Further business opportunities will follow from environmental policy in each key sector – construction, energy, transport, countryside management, producer services such as packaging and printing, consumer products, and the re-manufacturing of waste to resources while creating jobs.[19]

Green investment and purchasing

The bulk of industrial production is now in external and overseas operations, where environmental and social impacts are indirect and invisible. Ethical investment is the main means by which policy can affect the production cycle at source and the evidence so far is that its profit levels, if anything, can out-perform the market average.[20] All public bodies should adopt as principle , active ethical investment policies for their capital and pension funds and link these with city-regional development funding as above.[21]

Greening the economy is also linked to the other end of the chain – the 'checkout revolution'. Pressure for change may come from firms, supply chains, scientific evidence, the media or from public opinion, and frequently from a confusing and controversial mixture of these. For organic food for instance, there is a compounding of consumer demand, retail supply chains, and producer innovation, but the result so far is unmet demand. In Japan, by contrast, vertically integrated producer-consumer cooperatives have grown into major businesses, showing the way for similar ventures in the UK. But with market failure again due to many factors, the lead role falls again to public bodies to coordinate in-house purchasing with distribution networks for green and ethical products.

For each of these, the ecological footprint approach is perhaps the single most effective measure for analysis and communication of the global impacts of production and consumption.

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[18] OECD (1997), Environmental Policies and Employment, London, TSO
[19] Roberts P and Pike J (1998) Mining the Urban Waste Stream, Town and Country Planning **67**/10:324-326
[20] Holden Meehan (1994) An independent guide to ethical and green investment funds, London, Holden Meehan
[21] Simpson, A (1994) Local Authority Investment and the Environment, In: Agyeman, J and Evans, B, (Eds)'Local Environmental Policies and Strategies, Harlow, Longman

6.4 Regional Transport Strategy

6.4.1 Policy context

This section reviews the transport challenges, the regional strategy, and other possible solutions, in relation to resource management and the MFA-EF theme. Space does not allow for a full discussion on the economic, social and locational issues of transport strategy (see Ravetz 2000 for a more in depth discussion).

Transport: the challenge

The transport system in the South East region operates closer to capacity than in any other English region, except London. Average daily vehicle flows are one third higher than the national average. Levels of passenger overcrowding on the main rail routes to London are the highest in the country.

- People in the South East travel further than those in any other region (8,000 miles per year, against an England average of 6,800 miles per year).
- The region has seen considerable growth in travel. The majority of this growth has been in car travel, which now accounts for 85% of the total. Vehicle trips in the South East are forecast to grow by 17.5% between 2001 and 2011.
- Over 70% of journeys to work are by private car. The South East has the most heavily used roads outside London (4,900 vehicles per day/km compared with the England average of 3,700 vehicles).
- Nearly 70% of all national rail passenger journeys occur in London and the South East and the radial rail routes are among the most congested in the country.
- The rail system is predominantly focused on London; it is, therefore, difficult to use the rail network for other cross-regional travel.

Alternative transport strategies

The focus on increasing the supply has taken place within a fiscal framework that continues to see the cost of motoring decline both in real terms and relative to the cost of public transport. This approach has been fundamentally flawed from some perspectives. It has encouraged a pattern of development that is car-orientated and characterised by ever-increasing trip length. There are many pressures and influences which have contributed to this, particularly the specialisation and out-sourcing of business, and the spatial concentration of commercial and public services.

The Government's 10 year transport plan shows that on the road network overall, traffic levels are predicted to grow by 22% between 2000 and 2010, with congestion in urban areas predicted to increase by 15%, and inter-urban movements to grow by 28%. On the rail network over the same period of time, the 10 year plan notes that a predicted growth in movements of 34% would be limited to 23% by constraints within the network (DTLR 1999).

In terms of the regional economy, the PSA targets set an ambitious target of 3.1% annual growth in regional GDP. Clearly, if this level of regional growth were to be realised, the demand for movement in the region could be appreciably higher than the figures set out in the 10 year transport plan.

In terms of spatial strategy, the Regional Planning Guidance (RPG9) seeks to promote a rebalancing of the region whereby the development potential of the eastern part, especially the Thames Gateway, is realised.

For transport strategy as such, the (consultation draft) document – ***'from crisis to cutting edge'*** provides one of the few examples of sectoral scenario studies in a public document in the region. Several strategic options were reviewed as part of the process:

- ***Do nothing:*** Let congestion be the key determinant of demand. This approach would lead to a lower level of economic activity taking place than would otherwise be the case.
- ***Predict and build:*** An approach that concentrates on increasing the capacity of the transport system. The ORBIT study showed that it would not be possible to provide sufficient capacity within the highway system to accommodate the demand for movement arising from increased economic activity.
- ***Rational reduction:*** Reduction in the demand for movement through persuasive argument and the use of new restrictions and regulations to manage the transport system. Achieving an absolute reduction in the total amount of travel that is implied by this approach would be incompatible with both the increased economic activity assumed within RPG9, the RES and current public attitudes.
- ***Invest and manage:*** The way forward is to integrate increased investment and more active management of the capacity and use of the transport system into a single strategy.

Key strategic proposals

The strategy focuses on a range of key proposals which then serve as guides to sub-regional and local strategies:

- new or improved strategic cross-London public transport services to assist movement to and through the capital;
- key transport 'hubs' - essential for economic activity;
- linked 'spokes' or key corridors;
- regional frame of appropriate transport improvements (focusing on four strategic corridors);
- major investment in public transport (rail, buses and local mass transit systems);
- substantial enhancement of freight capacity of the railway system;
- selective investment in the road network;
- a new package of mobility management measures;
- a strong European dimension.

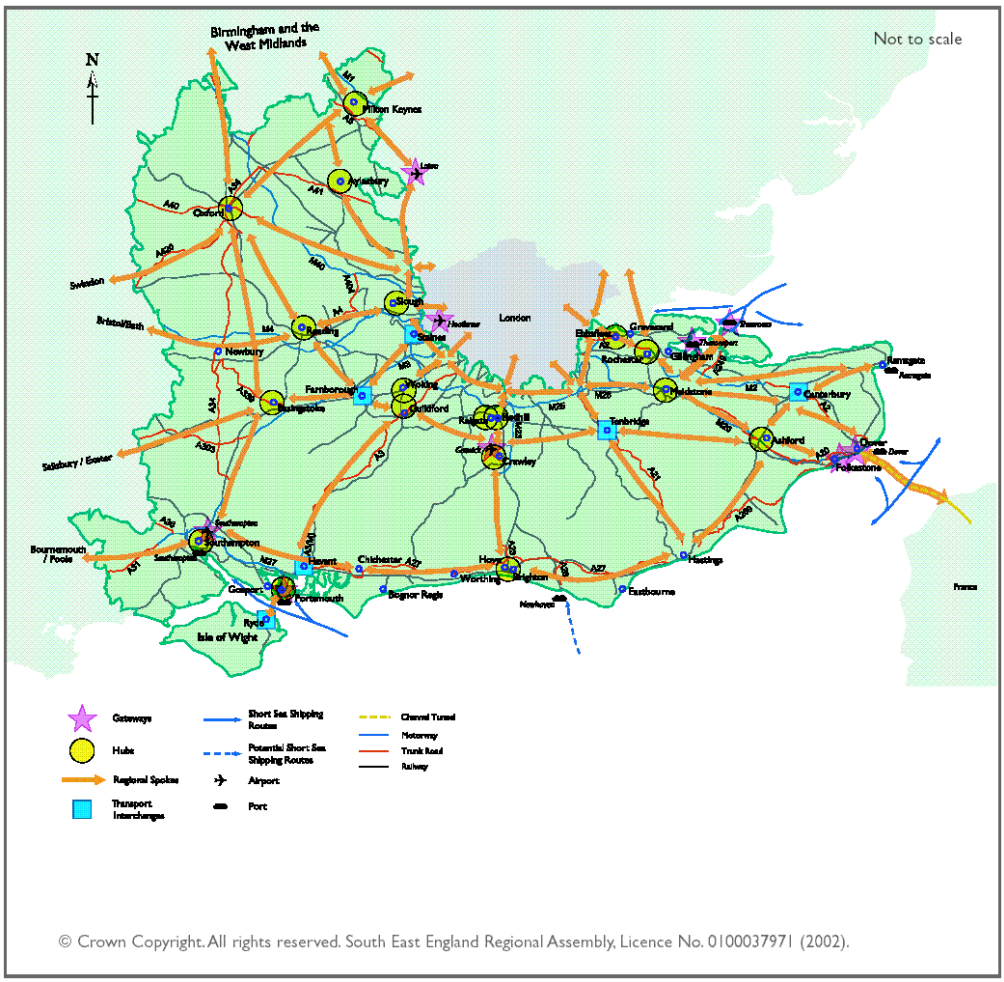


Figure 6.11 Regional communications structure: Source: Regional Transport Strategy

The map above shows the different kind of transport agendas in the varied geography of the South East region, including:

- Strategic radial routes: subject to acute congestion on both road and rail.
- Strategic orbital routes: the principal highway being the M25, shared with Greater London, also subject to even more acute congestion.
- Urban areas, where the low comfort and convenience standards of much public transport make it increasingly a second choice.
- Rural areas, where increasing traffic volumes are in direct conflict with a vulnerable landscape.
- Inter-city and inter-urban travel, principally by rail, dependent on the political economy of a privatised rail system.
- Growth of the airports as regional, national and international hubs: including new possibilities provided by the low-cost airlines, and also increasing amounts of domestic travel by air as the quickest means.

- The role of shipping should not be underestimated in the imports of goods and products. The controversial proposal for the Dibden Bay freight interchange is part of this picture.

Transport strategy objectives

Like most transport strategies, the South East regional strategy shows an uneasy balance between conflicting priorities.

There are a set of sub-regional objectives: to improve transport infrastructure within and to the Thames Gateway to maximise regeneration potential and encourage economic development; to improve strategic road and rail links within and to the Western Policy Area to maintain economic success; to improve road and rail links along the South Coast Corridor to improve spatial connectivity and realise economic opportunities to reduce disparities within the region; to support economic development in East Kent through investment in improved accessibility; to take forward transport infrastructure proposals required to support development in the growth areas of Milton Keynes and Ashford.

Of the wider objectives, only the last below has any specific mention of environmental objectives:

- to develop road and rail links that improve inter and intra-regional connectivity whilst avoiding the need to interchange in London;
- to improve and develop more sustainable transport connections to the region's key ports, airports and international rail stations as a basis for the enhancement of its gateway function to Europe and the rest of the world;
- to facilitate urban renaissance and foster social inclusion by bringing forward measures that encourage modal shift, with particular emphasis given to significantly improving the attractiveness of local public transport services;
- to reduce the wider environmental, health and community impact associated with the transport system by bringing forward measures to positively manage the transport system in urban areas that reduces our dependence on the private car.

Transport targets

The South East regional transport strategy, like many others, is noticeably silent on tangible targets for transport volumes and impacts – such information would no doubt be a hostage to political fortune. Even the regional baseline data and projections are not easily accessible. For information here, the national transport trends and forecasts are quoted below as the context to regional trends.

Table 6.4.1 Passenger transport, annual average rate of growth

	1996	2001	2006	2011	2016	2021	2026	2031
Road traffic: percentage annual growth		1.99	1.83	1.78	1.49	1.21	1.19	1.17
regional air traffic		5.00	5.00	5.00	5.00	4.50	4.05	3.65
overall 5 year growth rates								
Road traffic		1.10	1.09	1.09	1.08	1.06	1.06	1.06
air traffic		1.28	1.28	1.28	1.28	1.25	1.22	1.20
Total growth from 1996 baseline = 100								
Road traffic	100.00	110.35	120.83	131.97	142.10	150.91	160.10	169.69
air traffic	100.00	127.63	162.89	207.89	265.33	330.65	403.25	482.30

Source: Road traffic: from DTLR national Road Traffic Forecasts: high forecast for total traffic to 2031: Air traffic: from Civil Aviation Authority air travel forecasts, high economic growth

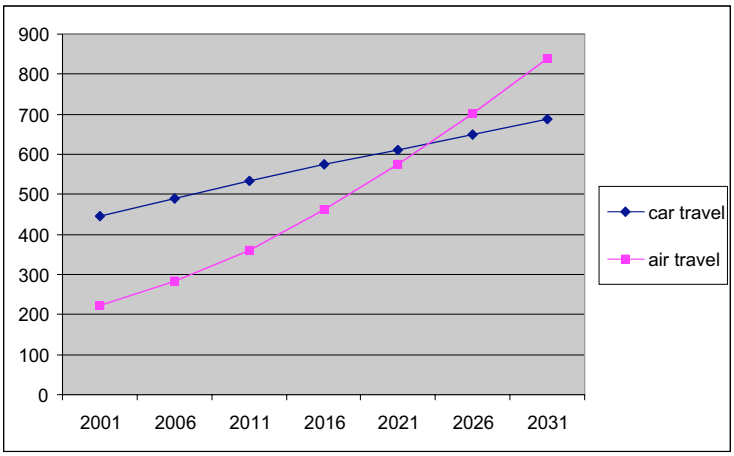


Figure 6.12 Ecological footprint projections based on UK 'business as usual' growth in car and air travel. (*Units in 10^E9 gha*)
Source DTLR (2002) National Road Traffic Forecasts: Civil Aviation Authority.

For much of the South East road or rail network it is likely that these national projections would be constrained by limits to capacity. However this depends on technological solutions such as electronic motorway management. Equally likely is a demand side management programme to cope with severe congestion, such as now seen with the congestion charge in Central London.

However no such limit can be assumed for air travel, where the government's national airports strategy has been up to now demand-led.

Transport case studies

Against a somewhat gloomy background of worsening trends and impacts of transport, there are a few notable examples of success through win-win solutions:

- Oxfordshire – Since its introduction in 1991, the Oxford Transportation Strategy has resulted in a growth in bus patronage of approximately 50%, probably the highest rate in the country.

During that time the proportion of trips made by bus is estimated to have grown from 27% to 44%.

- Buckinghamshire – Vigorous school travel planning by the County Council has seen car journeys fall by between 16% and 88% at individual schools. This not only reduces congestion and air pollution, it also helps to improve children's health and social development.

6.4.2 Transport and resource management

Transport modes and footprints

As in other sectors, it is clear that the main agenda for transport strategy will be constructed around social and economic objectives and it is to be hoped that environmental and resource objectives can be combined as a added value spin-off or win-win case.

For information the ecological footprint of a typical car/light van through its life cycle can be summarised (Chapter 3, table 3.3):

- Fuel combustion: 70%, of which $C0_2$ emissions are 99.75% of the total
- Manufacture and maintenance: 30%
- Road/parking area: negligible

This is very revealing in the sense that improvements to occupancy (usage) and fuel efficiency will on aggregate have twice the effect of any changes to ownership and manufacturing of the physical item. In other words, the government advice still stands, that increasing ownership is acceptable while targeting reductions in usage, at least on environmental grounds.

Vehicle emissions controls relate mainly to NO_x , particulates and other pollutants, which have very little influence on the EF total. Future versions of EF methodology are being developed to take account of this).

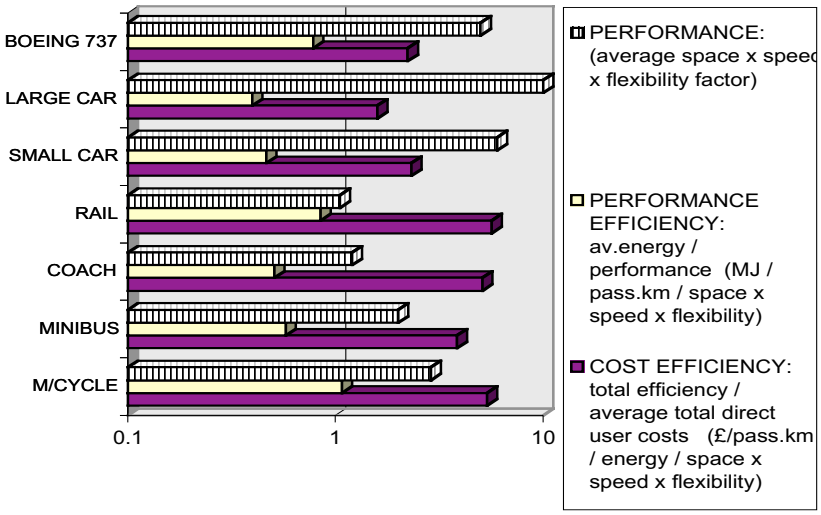
Current EU targets are to increase the carbon/fuel efficiency of cars by 30% from 1996/2010. This is being partly undermined by the recent trend for more powerful SUV type vehicles. There are no practical known technologies which can increase significantly the efficiency of air travel at current speeds.

The effect of the current trend forecasts (business as usual) on the relative EF factors of the dominant modes, car travel and air travel, can be seen in the chart above. While long distance air at present is relatively 50% more efficient and car travel is 50% greater in volume, its much higher rate of growth increases to outweigh car travel soon after 2021. The continuation of this trend line after 2031 is a matter for speculation. (*Units in 10^E9 gha)*

The impact of travel depends on how it is done – the energy consumption of different modes per passenger km varies by a factor of twenty, from large petrol cars to fully laden buses. However if the 'performance' factors of space, speed, and flexibility are taken into account, the efficiency and cost-effectiveness of cars is relatively high *(Fig 6.13)*.[22] So the problem is not only one of travel 'from a to

[22] Ravetz J 2000 City-Region 2020: Integrated Planning for a Sustainable Environment London, Earthscan

b' – it is the standards to which we have become accustomed.[23] Raising occupancy rates is one key to energy efficiency, for both cars and public transport, and multi-occupancy schemes are on trial around the UK. However the net gains may be marginal, and if public transport networks are extended closer to homes and jobs as many would argue, its physical occupancies and efficiencies could be lowered.



Aggregated indices on aggregated scale for performance factors including energy, space, speed, flexibility, direct cost.
Source: Ravetz 1996b: Freund & Martin 1994

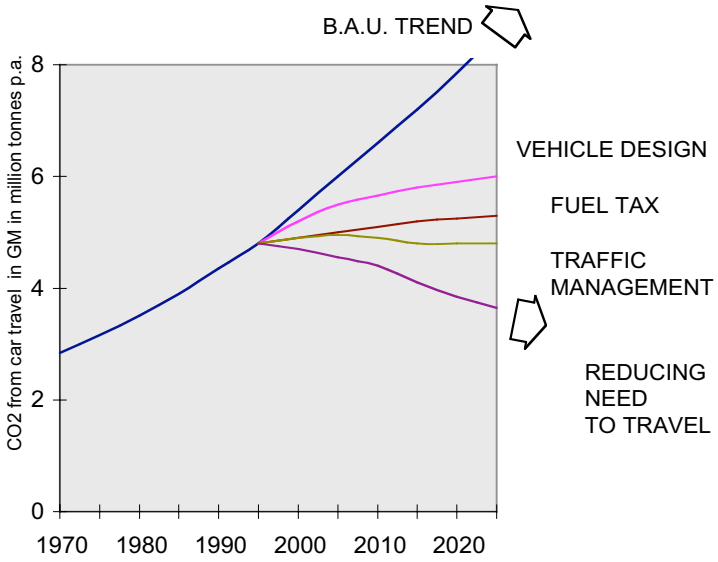
Figure 6.13 Performance efficiencies of transport modes

There is also huge scope for increased efficiency in cars – a 40% improvement is quite viable with current technology, and 'hypercars' are operating at over 300 mpg. A European 'voluntary agreement' sets out targets for a 30% improvement in new vehicles by 2010, but this conflicts with strong lobbying from the oil industry. Since the 1970's oil crisis, average fuel/power ratios have doubled, but the gains have been outweighed by increased performance, power and travel demand.

Many alternative technologies are on trial without a clear winner as yet – some EU cities are experimenting with electric vehicles or 'city-bugs', but until the power itself comes mainly from renewable sources, city-bugs have only local benefits. Gas engines are cleaner and produce 20% less carbon, and some UK cities have started to convert their fleets to gas, however small releases of methane could be a problem. Renewable fuels such as ethanol and rapeseed oil each produce emissions and odours and the most promising technology could be a complete hybrid of petrol,

[23] Whitelegg, J (1993) Transport for a Sustainable Future, London, Belhaven Press

electric and hydrogen fuel-cells. The projected effects of different technologies and policies can be seen on climate emissions *(Figure 6.14)*.[24]



Effects estimated for national & local policy measures on total CO2 (as C) emissions from car travel in the SE region, shown cumulatively.
Source: model results based on Hughes 1994

Figure 6.14 Road transport policy options and scenarios

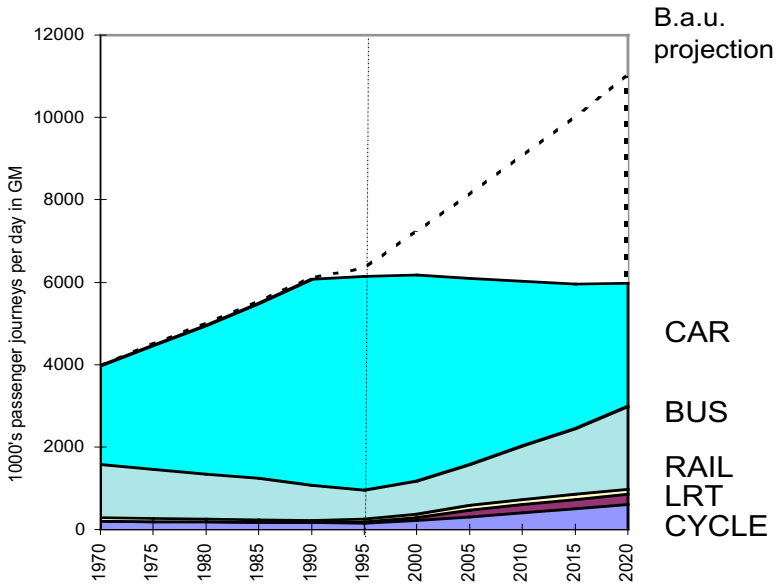
The main efficiency incentive in the UK at present is the 'escalator' of 6% increase in fuel duty per year, and the graduated vehicle road duty. There is a case for doubling each of these and introducing a graduated purchase tax linked to eco-labelling.[25] Although the auto industry is totally multi-national, clean technology can be encouraged at the regional or sub-regional level with natural gas for commercial fleets and electric city-bugs for personal travel. To achieve this would need a full policy menu – infrastructure for fuelling and servicing, petrol-free zones, graduated parking charges, mileage allowances, employer subsidies and tax breaks, purchasing and contracting conditions, and subsidised clean car clubs.

Transport – resource management scenario

Putting together plausible assumptions on technology, markets, politics and lifestyles, and comparing with current trends, we can sketch out an integrated transport-environment scenario for the South East region *(Figure 6.15)*. This leaves some room for growth from current travel levels in the light of current trends, rising disposable income, and levelling up across the population. The passenger

[24] Hughes, P (1993) Personal Transport and the Greenhouse Effect, London, Earthscan
[25] RCEP (Royal Commission on Environmental Pollution) (1994) *18th Report, Transport and the Environment,* London HMSO

scenario anticipates 30% reductions in the 'travel economic intensity' indicator (passenger km/person/£GDP) – so while GDP increases by 2.25% per year, total travel increases at less than half that rate.



Historic trends & projected targets for SE region area to 2020:
Source: based on ISCAM scenario accounts

Figure 6.15 Integrated Transport Strategy

The scenario envisages a stabilisation of the growth in car traffic – reduced in the inner urban area, with small growth on the periphery – and half of this shifted to gas or electric vehicles. Buses see their total mileage tripled, and half the fleet converted to natural gas. LRT travel is increased tenfold, covering all radial corridors in the city-region, while local rail is tripled up to network capacity. While there is an 18% growth in total passenger mileage, its energy and emissions show a 30% reduction.

Air travel follows the current airport expansion programme, and then stabilises by 2025 at 2_ times current levels. Assuming a 40% efficiency and utilisation improvement, the result would be energy and emissions growth of 25%. For freight, the key indicator of 'freight economic intensity' (tonne-km/£GDP) is assumed to reduce by 30%, rather than stay level in the BAU scenario, leaving room for freight travel growth of 13%. Most of this shifts to gas-powered or other clean vehicles, with a doubling of rail freight and 40% increase in water and pipeline movement. The overall result of the strategy would be a 14% reduction in energy demand from 2000 to 2025, and a 20% reduction in CO_2 emissions, in line with a climate emissions strategy.

Note that this scenario is generated 'bottom up' from the transport-environment factors. It would then relate to the top down scenario framework in Chapter 7, particularly in terms of the F-4 'Factor Four' scenario, with some adjustment to take account of policy inertia and external influences.

6.5 Urban Development Strategy

6.5.1 Policy context

This section reviews a set of connecting and overlapping policies and strategies, covering regional planning, housing and construction. Each of these are instrumental in the production of the built environment. Space here does not allow for a full discussion of all the issues, so again we focus on the linkages and influence on resource management and MFA-EF issues.

Regional planning guidance

The Regional Planning Guidance system is shortly to shift to one of 'Regional Spatial Strategies', which involves greater coordination with other sectors and objectives. The current version for the South East region 'RPG9' is in the process of review and revision. In the meantime it highlights potential targets and objectives for which regional targets should be defined. Its themes include:

- Quality of life in town and country (however this might be defined)
- Environmental strategy and the countryside
- The regional economy
- Housing
- Development and the supply of infrastructure
- Mineral resources and other development
- Sustainable transport; (covered in the previous section above)

Some key recommendations of RPG9 have been superseded by the government's 'Sustainable Communities' plan which involves much higher levels of growth in selected areas in the South East region (see below). However the development policies still apply over a much wider area, with significant influence on resource management.

Key development principles

The key principles in RPG9 are fairly typical of regional strategies, with an emphasis on 'poly-centric concentration' of development and spatial activity. However it could be observed that on a regional scale, this approach involves an uphill battle against the general trends of spatial diffusion and counter-urbanisation, which affects lifestyle patterns, social networks and economic organisations. Nowhere is this more apparent than in the South East region, where the Greater London hinterland offers the largest specialised business and employment market in the UK.

On an urban or local scale, the situation may be different and the policies for densification of urban areas and clustering of local services may have very significant effects.

The main principles that should govern the continuing development of the Region have been identified:

1. Urban areas should become the main focus for development through making them more attractive, accessible and better able to attract investment.

2. Greenfield development (namely, on previously undeveloped land) should normally take place only after other alternatives have been considered and should have regard to the full social, environmental and transport costs of location.

3. The pattern of development should be less dispersed with more sustainable patterns of activity, allowing home, work, leisure, green spaces, cultural facilities and community services to be in closer proximity.

4. London's World City role and the South East's international connections should be developed as a basis for the enhancement of the Region's attractiveness in Europe and the world

5. Economic opportunities should be increased by raising skills levels and reducing the disparities between different parts of the Region. In particular, by positive investment strategies for the Thames Gateway and Priority Areas for Economic Regeneration to improve the performance of poorer parts of the Region and by managing the localised impacts of development in economically buoyant areas.

6. Sufficient housing, and in particular affordable housing, should be provided for all who need to live and work in the Region, to encourage social inclusion and avoid pressure for housing in adjoining regions.

7. The development of housing should be more sustainable, providing a better mix of sizes, types and tenures, having regard to the structure of households and people's ability to access homes and jobs.

8. Development should be located and designed to enable more sustainable use of the Region's natural resources, in the supply of food, water, energy, minerals and timber, in the effective management of waste, the promotion of renewable energy sources and to assist in reducing pollution of air, land and water.

9. There should be continued protection and enhancement of the Region's biodiversity, internationally and nationally important nature conservation areas, and enhancement of its landscape and built and historic heritage.

10. The life of the countryside and rural communities should be sustained through economic diversification which respects the character of different parts of the Region and enables sustainable agriculture and forestry.

11. Access to jobs, services, leisure and cultural facilities should be less dependent on longer distance movement and there should be increased ability to meet normal travel needs through safe walking, cycling and public transport with reduced reliance on the car.

12. Transport investment should support the spatial strategy, maintaining the existing network, enhancing access as part of more concentrated forms of development, overcoming bottlenecks and supporting higher capacity and less polluting modes of transport.

Spatial strategy and resource management:

The table below shows approximately the main linkages between the components of the RPG, assuming that these will be carried forward into the new system of regional spatial strategies, and the agenda for MFA-EF.

Table 6.5.1 Analysis of linkage between urban development and material metabolism

Theme	Selected potential targets & aspects - (relevant to MFA-EF)	Primary materials	Production & supply side	Consumption & demand side	Waste & other impacts
Quality of life in town and country	At least 60% of all development to be on previously developed land and through conversion of existing buildings in ROSE Secure at least 30-50 dwellings per hectare net in ROSE Make best use of existing properties		Some effect on location of industry & services	Effect on patterns of urbanisation, i.e. transport demand, land take.	
Environmental strategy and the countryside	No net loss or damage to designated sites of international, national or strategic importance through developments Year on year increase in each key habitat Increased woodland area in ROSE from 11% to 15% by 2016 Year on year improvements in pollution levels	Small increase in regional timber supply			Conservation of special land areas.
The regional economy	Year on year reduction in disparities between economic performance of different parts of the region Maintain high and stable levels of employment Increase skills levels			Effect on household incomes & expenditure	
Housing	Sufficient housing Sufficient affordable housing units 60% of all new housing to be on previously developed land and through conversions of existing buildings in ROSE by 2008				Recycling of damaged land
Sustainable transport	Reduce road congestion on the inter-urban network and in urban areas below current levels by 2010 Increase rail by 50% and bus use by 10% from 2000 levels by 2010 Reduce annual rate of increase in car traffic and, in urban areas, absolute reductions in private motorised traffic Achieve a one-third increase in the proportion of households in rural areas within about 10 minutes walk of an hourly or better bus service by 2010 Triple by 2010 the number of cycling trips compared with a 2000 base	Reduction of primary energy demand		Influence on demand management.	Modest reduction in transport emissions
Development and the supply of infrastructure	Reduce the amount of municipal waste landfilled Increase the proportion of household waste or sewage sludge recycled or composted Balance demand and supply of water Increase amount of electricity derived from	Increase renewable energy sources Regional water balance			Influence on waste disposal & recycling (not waste arisings per se)

Theme	Selected potential targets & aspects - (relevant to MFA-EF)	Primary materials	Production & supply side	Consumption & demand side	Waste & other impacts
	renewable sources				
Minerals/other development	Year on year increase in use of recycled and secondary aggregates				Influence C&D waste recycling

The 'sustainable communities' programme

In February 2003, the UK government published its national Sustainable Communities Plan[26], highlighting the need for development in four 'growth areas', including the Thames Gateway region in the South East of England[27].

Table 6.5.2

	New homes to 2031	New jobs to 2031
Thames Gateway	370,000	300,000
Milton Keynes – South Midlands	370,000	300,000
Ashford	31,000	28,000

Thames Gateway: this has unique features which give it a national as well as regional significance. It offers the opportunity to regenerate existing deprived communities through access to 300,000 new jobs that could be accommodated by 2031. The area has one of the largest concentrations of brownfield sites in the country; and is in a strategic location on major transport links to the continent and is close to London.

The Milton Keynes South Midlands growth area is already demonstrating dramatic capacity for economic success. The area's potential for further growth has been assessed in a study commissioned by regional and local partners. The study has identified opportunities to achieve much more with the right east-west links, a cross-boundary approach, a raising of skills levels and significant regeneration. The potential for growth to 2031 is up to 300,000 jobs and 370,000 homes. The study's preferred option concentrates growth on five major urban areas: Milton Keynes: Luton/Dunstable/Houghton Regis: Bedford: Northampton: Wellingborough/Kettering/Corby.

Ashford's strategic location and role as a gateway to Europe will be strengthened with completion of the high speed rail link to London in 2007. The growth area study indicates substantial scope for further growth through diversifying its employment base, redeveloping its town centre and increasing the annual rate of new housing to provide at least 31,000 new homes and 28,000 new jobs by 2031. Ashford Borough Council and its partners believe that at least this level of growth is achievable with effective local delivery arrangements provided that the following are addressed. Other areas in the Sustainable Communities plan include:

- Oxford: Creative use of brownfield sites for residential development in the city has contributed to regenerating underused areas of the city.

[26] ODPM (2003) Sustainable Communities: Building for the future (http://www.odpm.gov.uk/communities)
[27] ODPM (2003) Sustainable communities in the South East (http://www.odpm.gov.uk/stellent/groups/odpm_communities/documents/page/odpm_comm_022208.hcsp)

- Basingstoke: A clear local plan policy on type of housing provision has led to a more balanced mix of housing types and sizes in new developments.
- Chatham Maritime: St Mary's Island is a joint venture project involving SEEDA and Countryside Maritime in the largest brownfield development in the UK.

Sustainable communities plan assessment

On behalf of WWF-UK, and as a contribution to WWF's One Million Sustainable Homes Initiative, the BioRegional Development Group (BDG) conducted a study to assess the environmental impact of alternative scenarios for development of the Thames Gateway. The study investigated the implications of building 200,000 new homes to different environmental standards and residents' lifestyles. The Ecological Footprint study has been carried out by the Stockholm Environment Institute based on an earlier study. The main findings and conclusions of the report[28] have been described below.

By developing 200,000 new homes in the Thames Gateway to a minimum of EcoHomes 'Very Good' standard[29], the following significant environmental savings could be made per home/year when compared with homes built to current Building Regulations:

- 32 per cent reduction in carbon dioxide (CO_2) emissions from energy use in the home, (this saving of 0.993 tonnes of CO_2/home/year equates to 198,840 tonnes of CO_2 or 54,220 tonnes of carbon for the 200,000 homes each year);
- 39 per cent reduction in water use;
- 4 per cent reduction in the amount of household waste sent to landfill for an 'average' UK resident; and
- 25 per cent reduction in the amount of household waste sent to landfill for an environmentally aware resident.

The study showed that even greater savings could be made per home per year by developing all homes in the Thames Gateway to Z^2 standards (Zero fossil Energy, Zero Waste):

- 99 per cent reduction in CO_2 emissions from energy use in the home (this saving of 3.05 tonnes of CO_2/home/year, equates to 610,640 tonnes of CO_2 or 166,540 tonnes of carbon for the 200,000 homes each year);
- 65 per cent reduction in water use; and
- 76 per cent reduction in the amount of household waste sent to landfill.

The figures in the Z^2 scenario showed that individuals can reduce their footprint by 40 per cent compared with the UK average. This is because this scenario facilitates more sustainable lifestyle decisions (e.g. by providing car clubs to minimise personal car use and by enabling deliveries of locally produced organic food). This study shows that residents living in this scenario can go a long way in reducing their ecological footprint, but it would still not be enough to enable an individual to live a truly 'one planet' lifestyle.

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[28] James N, Desai P (2003) One Planet Living in the Thames Gateway, A WWF-UK One Million Sustainable Homes Campaign Report; BioRegional Development Group, June 2003

[29] Building Research Establishment's (BRE) EcoHomes 'Very Good' standard with 'average' UK residents

The Ecological Footprint analysis suggests that UK residents could reduce their 'three planet lifestyle' by approximately one planet through living in a Z^2 home and through their lifestyle choices. To achieve the goal of living within a "fair share" of the Earth's resources, the impact of shared infrastructure and services would have to be reduced, too.

Housing strategy: the challenge

Across the region, there are continuing pressures and mismatches between housing supply, demand, location, and other urban policies. The Housing Strategy objectives include:

- To provide for the region's growing population. The region is one of the fastest growing with growth of nearly 5.7% between 1991 and 2000, compared with 3.7% nationally.
- To turn around the trend in house completions. Completions are too low; they dropped to 22,900 per annum dwellings by 2000, 18% below the figure indicated by RPG.
- To improve the match between housing needs and the type of housing being built. For example, while there is a substantial increase in the number of single person households, new developments are more often for houses with 3–4 bedrooms or more.
- To make better use of land. Despite being one of the most densely populated regions, land is used inefficiently; overall the region has among the lowest average density rates in the country.

Affordability of housing is also an extreme challenge in the South East region. There is a twin track approach:

- To make home ownership more affordable. Owner occupation is now out of the reach of many people, including key workers such as nurses, police, teachers and their support staff.
- To provide for more homes. The number of households in housing need is rising. By the first quarter of 2000, 4.3 households per 1,000 were accepted by the local authorities as being in priority need. Although the number of rough sleepers in the region has reduced, it still remains an issue in local hot spots such as Dover, Oxford, Reading and Canterbury.

Housing strategy analysis

Housing in the South East shows an extreme case of the inter-relationship between supply, demand and land use policy.

Demand side: An increase of 1,104,000 households between 1991 and 2016 (825,000 natural increase, 279,000 in-migration). As the population ages there will be a shortfall of workers compared to jobs and a significant increase in the number of elderly and single people. If employment growth increases, either more in-migration or more long distance commuting will be the likely consequences.

Housing markets: About half of all 'new' households in the South East could not afford to buy in their local area. Some of these households will share, others may move to cheaper properties outside the area and a minority will gain access to social housing.

Land supply: The process of planning and the time taken for housebuilders to react to policy change and acquire new sites mean that it could take ten years or more to feed through into noticeable change. The intention is to achieve a high proportion of housing on previously used land, however it is

contended that the mechanisms for achieving this are not readily available. Need for sufficient thought is given to quality and amenity. One potential source of housing land could be redundant employment land or land zoned for that purpose, however authorities are uncertain about releasing this land. Even with a cautious approach, it will be necessary to look for Greenfield land releases.

Regional housing model

The prototype model used as part of the strategy provides a logic and structure for addressing the relationship between household formation, housing demand, land supply and the planning policies in a systematic and transparent manner (*Fig 6.16)*

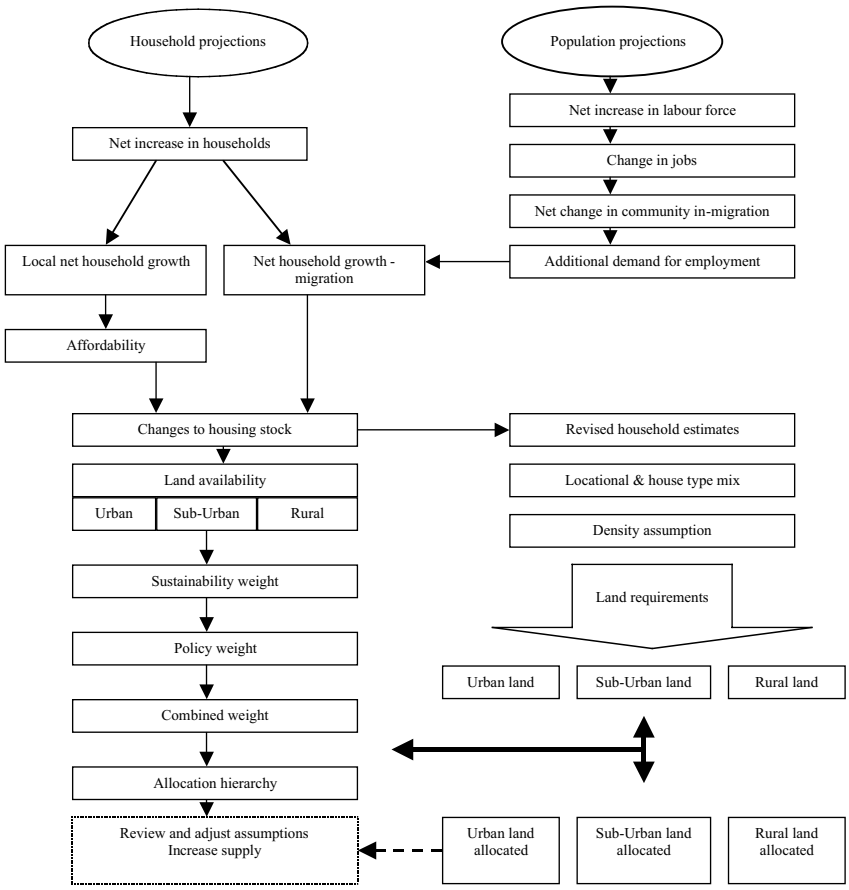

Figure 6.16 Regional housing model framework

Housing: best practice examples

Housing is one sector where there is no shortage of best practice examples, going all the way to virtually zero energy and zero waste. Region wide, a number of housing associations and developers in the region are developing schemes which not only produce cheaper housing but also address environmental sustainability issues. Particular schemes include:

- Atlas Project by Midsummer Housing Association, involving 150 affordable homes in Milton Keynes, achieving high standards of insulation.
- SUN (Sustainable Urban Neighbourhood) by Hyde Housing in Southampton incorporating many aspects of green issues.
- People Power by Maidenhead & District Housing Association, producing low cost homes that generate their own electricity.
- Surrey – The county and district councils jointly commissioned and issued a guide to encourage the provision of affordable housing. The guide promotes best practice, covering all relevant procedures and provides a number of working examples.

The challenge here is how to translate the best practice from the minority to the mainstream. It is also about applying the lessons from new build housing, which comprises 1–2% per year of the total, to the large inertia of the existing built stock. In that respect there is great scope for positive action by the housing lenders (i.e. building societies and banks) who are responsible for over 70% of the housing stock.

6.5.2 Built environment and resource management

General prospects in resource management

Generally the South East region is under more pressure than any other region, to incorporate new housing on a massive scale. There is a population growth forecast of 5.5% per decade, a reducing household size from 2.4 to 2.1 and current problems of over-heating, affordability and shortages of key workers. Dealing with such problems raises interesting questions for the application of a footprint method:

- Construction of 28,000 dwellings per year will consume massive amounts of materials and energy, wherever it is done.
- However the new dwellings have the potential to be much more efficient in energy and water than the existing stock: there is technological potential to reduce resource demands almost to zero.
- Calculation of the MFA-EF depends on estimates of the life-cycle and end-fate of the new houses: this is assumed at 80 years but in practice is intended to be indefinite.
- Concentration of new construction in urban areas, will tend to generate more reclamation and demolition waste than the equivalent in a green field location.
- The planned concentration in urban areas will contribute to more sustainable transport demand patterns: however the scale of the effect may be much smaller than previously thought, and has been estimated at a 3% reduction in transport emissions
- It is likely that the social and economic effects of regeneration, and their effects on affluence and consumer spending habits, will be much more significant certainly than the transport effects, and possibly than the direct energy requirements of the new housing.

In the light of this, there are several kinds of analysis to be carried out on current conditions, trends and projections, and their implications for policy:

- Analysis of alternative demand strategies, in terms of volume, location and type of construction
- Analysis of alternative supply strategies, in terms of materials, design, specification and efficiency in use of construction.

Environmental impacts of the built environment

The most direct impact of the 3.3 million dwellings of GM is through their energy demand of 150,000 million kwh per year, accounting for over half the total climate change emissions, or about 45 million tonnes of CO_2 per year. In recent decades the 'floorspace efficiency' of the building stock has increased by 7–10% per decade, but not as rapidly as space per person, comfort standards and the numbers of modern appliances. Such trends will continue, with energy use in buildings projected to rise by about 10% per decade, unless positive action is taken.[30] The effect of climate change over several decades may help to reduce heating demand by 20%, but this could be outweighed by the use of air conditioning for summer cooling.

While energy efficient technology is proven, there are many financial and institutional obstacles. Falling energy prices undermine efficiency investment – payback periods for business are 1–2 years, and those for householders are shorter, and much viable investment is stopped by inertia, uncertainty and split responsibility between landlords and tenants. Meanwhile over a quarter of all households suffer some form of energy poverty, with costs to public health and building maintenance in the South East region estimated at £500 million per year.[31]

There are several approaches to a built environment energy strategy – improving efficiency on the demand side, renewable sources and CHP on the supply side *(next section)*. Unfortunately there are conflicts – higher efficiency on the demand side tends to mean lower viability on the supply side. Success may depend on diversity, where each area would develop an integrated energy strategy based on current conditions and future prospects.[32] In practice energy is rarely the first priority for businesses or households, so energy strategies have to work through parallel programmes such as health, regeneration and economic development.

Up to one quarter of housing in the South East region by 2025 may be new. For this, 'best practice' construction at NHER 10 rating can reduce energy consumption to about 25% of current levels, for about 1–2% extra on overall costs.[33] When life-cycle maintenance and management savings are factored in, low-energy construction can save over 15% of total costs.[34] For the great bulk of existing and older houses the investment payback may be 5–15 years, depending on how far efficiency upgrading is combined with renovation and rehabilitation.

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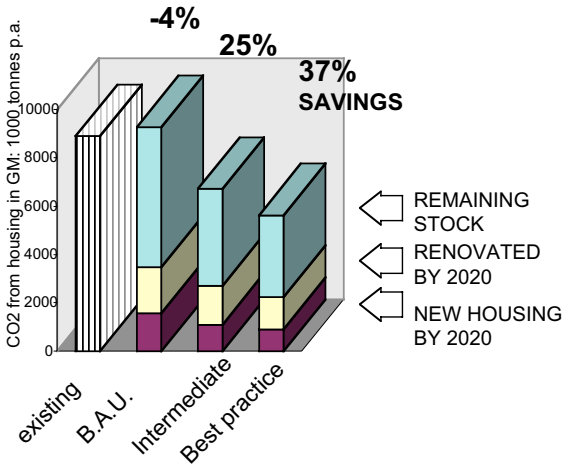
[30] DTI 1995

[31] Boardman, B, 1991: *'From Cold Homes to Affordable Warmth'*: London, Belhaven Press

[32] Guy S and Marvin, S (1996) *Disconnected Policy: the Shaping of Local Energy Management,* Environment and Planning C: Government and Policy Vol 14:145-158

[33] NHER (National Home Energy Rating) is one of several efficiency rating schemes

[34] Eco-Logica Ltd 1995: *'Life-Cycle Analysis of Housing: Report for Scottish Homes'* White Cross, Lancaster, Ecologica



Scenarios for energy & carbon emissions from total housing stock in GM to 2020.
Source: EEO 1993, GMR 1995

Figure 6.17 Energy efficiency in housing

In the energy efficiency 'best practice' scenario below, the domestic target is for 'final energy' reductions of 10% from current levels. New dwellings would be built at NHER 10 rating, renovated houses to NHER 9, and the whole of the remaining stock upgraded to at least 1995 building regulations standards or NHER 7. This will result in CO_2 emissions reductions in use of 40% from current levels, assuming improvements in the 'energy intensity' per unit of floor space of 20% for existing and 60% for new housing *(Fig 6.17)*. With higher standards of insulation and heat recovery, there would be a greater proportion of electricity used for refrigeration, cooling, and home working. Most coal and oil would be replaced by a 20% contribution from local CHP, with a further 5% from on-site solar renewables.

In practice there are diminishing returns in increasing insulation, and to approach 'zero-energy' standards involves re-engineering for heat recovery and integrated element design, with special expertise and equipment. Meanwhile the largest consumption growth comes from appliances such as freezers and dishwashers, with a large latent demand in the South East region from lower-income households. This suggests that incentives for purchasing and maintenance of low-energy technology is crucial. Another simple target would be to replace every lightbulb in the region with low energy fittings, saving up to 8% of total CO_2 emissions.

Life-cycles and eco-cycles

Building fabric is the largest cause of environmental impact, not only from energy use, but from huge volumes of bulk materials, and a vast range of toxic substances. The average new house contains about 30 tonnes of 10,000 different types of components, many of them shipped from around the world.[35] The bulk material shifted to extract and process these materials is upwards of 100 tonnes per

[35] Vale B & Vale R (1991): Green Architecture: Design for a Sustainable Future: London, Thames & Hudson

house and every year the South East region builds at present about 23,000 houses and about 3 million m^2 of commercial floorspace.[36]

While large scale urban renewal is hailed as 'sustainable development', the benefits have to be balanced with the impacts of construction, but as yet there is no simple way of calculating this balance. Methods such as 'BREEAM' contain an outline checklist, but even with this only about 4% of construction is assessed as yet.[37] Standards should be set and negotiated by local authorities using any available means so that all new and renovated buildings meet the 'best practical environmental option' or BREEAM 'good' standard. An example has been set by the West Midlands Housing Association, the first to let a building contract not on price but on energy and environment rating.[38]

Buildings 'embody' large amounts of stored energy in materials, typically about 5–10 years' worth of energy-in-use, two thirds of which is in cement, bricks, blocks and plaster.[39] Building standards should include for assessment of embodied energy, which can be reduced by 75–80% with alternative materials such as timber framing and cladding.[40] Zero-energy buildings should in principle include for tree planting to absorb the carbon emitted by their embodied energy – for an average house this would be about 20 broadleaf trees. The total construction industry in the South East embodies emissions of 11 million tonnes of carbon per year which could be taken up by about 3 million hectares of mixed forest.[41] If this was managed as part of a regional 'carbon cycle', it would produce several times the existing demand for timber, paper and board, which would then substitute for other materials in a 'carbon-neutral' construction industry. In practice such a forest would be located overseas in an 'international carbon offset' and if it was to take up the overall total emissions from the South East region, its area would need to be several times the size of the UK.[42]

About 20% of the total impact of an average building is at the construction stage, about 80% in use and maintenance over 50 years, and about 2% at the demolition and disposal stage. Meanwhile the rate of change in housing and business increases, and many commercial and public buildings are obsolete in 20 years. Designing buildings for flexibility and adaptability to new uses is crucial to reducing their life-cycle impacts.

Materials and environments

Bulk materials alone in construction in the South East demand over 43 million tonnes of aggregates: demolition aggregates are largely recycled but mostly as low-grade bulk fill material, and there is a strong case for 'higher level' recycling of up to 75% of bulk material.[43] Such impacts can be greatly reduced by careful specification of bulk materials which are recycled or from local sources.

The overall use of materials in construction is as follows (see Chapter 3 for details):

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[36] Douglas I and Lawson N, 1997: *'An Earth Science Approach to Material Flows Generated by Urbanization and Mining'* In: Bringezu et al 'Regional and National Material Flow Accounting' (special report 4) Wuppertal Institute for Climate Environment and Energy

[37] 'Building Research Establishment Environmental Assessment Method': BRE 1994

[38] Architects Journal 23/01/98 p15

[39] Vale, R (1995) *Selecting Materials for Construction,* In: *European Directory of Sustainable and Energy Efficient Building,* London, James and James

[40] Buchanan, A: Honey, B: 1994: '*Energy and Carbon Dioxide Implications of Building Construction':* In: Energy and Buildings International Journal, Vol 20, p 205.

[41] Adger, W. & Brown, K: (1994) '*Land use and the Causes of Global Warming'* Chichester, Wiley

[42] Adger, W. and Brown, K: (1994) '*Land use and the Causes of Global Warming'*: Chichester, Wiley

[43] Howard Humphreys and Partners, 1994: *'Managing Demolition and Construction Wastes':* London, DOE, HMSO

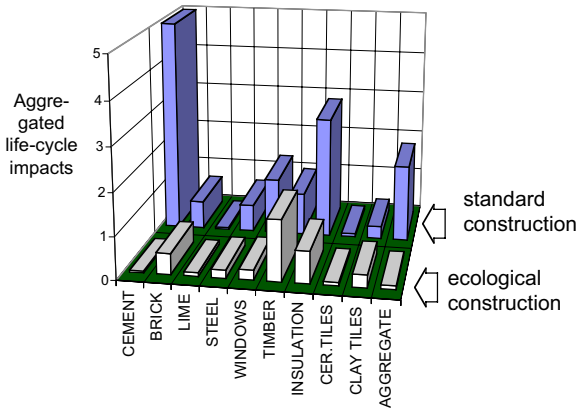
Table 6.5.3 Summary of Total Material Consumption in construction in the South East

Construction Materials (year 2000)	TOTAL Material Consumption (TMC) (Mt)	Total EF [gha]	Product CO_2 EF [gha]	Transport CO_2 EF [gha]
quarry products	43.2	2133	318	1815
wood products	5.7	473	390	83
finishes, coatings	1.9	447	441	5
plastic products for const	1.5	358	353	5
glass products for const	0.7	97	92	5
ceramic products for const	0.9	48	34	15
bricks and other clay	1.2	67	47	20
cement, concrete, plaster	18.8	1299	1079	220
stone/other non-metallic	20.0	5598	5557	41
metal products for const	8.1	671	652	20
cabling, wiring, lighting	0.1	8	7	0.5
Overall Total	102.2	11198	8968	2230

The total material input is in the order of 100 million tonnes, of which two thirds are quarry, stone or mineral products. The table then shows crucial differences in the calculations for product EF (embodied energy of production) and transport EF. The transport component shows the effect of longer distance travel for quarry products, which could be a target for reduction.

Total life-cycles for common materials and constructions are now being assessed for their contribution to climate change, acidification, toxics, eutrophication and other impacts (*Fig 6.18*). An 'ecological' specification can produce about one tenth the life-cycle environmental impact of a standard design and construction, with a 60% reduction in energy use, and a 15% capital and maintenance saving over 60 years.[44]

[44] Whitelegg, J, Smith, M and Williams, N (1998) *The Greening of the Built Environment,* London, Earthscan



Weighted environmental life-cycle impacts compared by standard & ecological multi-storey domestic construction.
Source: Ecologica 1995

Figure 6.18 Ecological building: comparison of life-cycle impacts of alternative design

Resource management strategy

The key to integrated resource management in the built environment is to link it to social and economic goals. Energy efficiency is a prime area for job creation and local business development – investment in housing in the South East region would be over £200 million per year, most of which would be recouped by consumer savings within 5 years. The housing energy programme could generate directly 20,000 jobs, and including commercial property would increase this to 30–40,000 jobs, mostly manual, locally based and suited to training and business development.

Such a programme could be led by a regional or sub-regional Energy Agency, a partnership or consortium of developers, financiers, landlords, utilities, equipment suppliers and consumers. Its key role would be to set up financial mechanisms and packages to complete the circle from forward investment to consumer savings. With the liberalised market structure now in place, and tremendous opportunities in the utilities market, there is a strong case for a regional or sub-regional consortium to take on the challenge of integrated energy planning.[45]

[45] Local Government Association (1998) *Energy Services for sustainable communities: the local government position,* LGA (www.gov.uk/policy/energyservices)

6.6 Regional Waste Strategy

South East Regional Waste Management Strategy

The Strategy formally covers the period up to 2016, the same timescale as RPG9, but it also looks further ahead. It sets out a vision and planning framework looking to 2026 and even beyond. This longer term thinking will be incorporated in a revised overall regional strategy, which we plan to publish in 2004.

The Strategy takes the agenda and the growing size of the challenge head on:

> *"We face a waste production and disposal crisis. We have become a throwaway society. If we re-used and recycled the products that we discard, the impact of this wastefulness would be reduced. But we do not. We recycle less than any other northern European country and most of the currently discarded goods go straight into landfill sites. Truly this is a scandalous waste. The result of this profligacy is, literally, a growing mountain of waste. Growing, in our region, at over 3% per annum. We already produce over 25 million tonnes of waste per annum in the region for disposal, and another four million tonnes are imported, mostly from London.*

In order to prepare the Strategy, the South East Regional Assembly commissioned, with SERTAB (the regional advisory body on waste), a Waste Management Statement which set out:

- current waste production and management;
- forecasts of waste management needs;
- scenarios of different waste management emphases;
- sustainability appraisal of the different scenarios.

Given the necessary scale of change, SEERA has put forward two strategy options for consultation, with a possible third variant.

- The first option (identified as the preferred option in the Strategy) would try to exceed the targets for recycling and recovering set by the Government and the European Commission. This ambitious approach was favoured by many of the stakeholders consulted in preparation of the Strategy.
- The second, alternative option would envisage at least meeting the statutory targets, but would not seek to exceed them and would therefore see the creation of new facilities running at a rather slower pace.

Both these options have their attractions and problems. The first option seeks to reduce untreated disposal to landfill as quickly as possible, and, if successful, would move us closer to our vision. Achieving such high rates of change from such a low base, however, will be difficult. A large number of new facilities would be required. Seeking very high recovery targets before recycling infrastructure and markets are in place could also lead to over-commitment to other types of recovery, such as some forms of energy from waste. The alternative option might well avoid these pitfalls, but does reduce the impetus for change and, ultimately perhaps, the delivery of the vision.

A possible hybrid of the two options might involve a slower initial build-up than under the preferred option, followed by rapid increases in recovery, including recycling, in the later stages of the Strategy. At the time of writing SEERA welcomes comment on these options.

Wastes currently managed in the South East

The South East managed approx. 25.2 million tonnes of waste produced within the region in 2000/01. In addition, London exported approximately 3.2 million tonnes of waste to the South East, which was all taken to landfill. The breakdown includes:

- Municipal solid waste (MSW), 16%. Although not the largest waste type, this is often thought the most challenging as it is highly variegated and dispersed in its location.
- Commercial and industrial (C&I), 32%: most forms of C&I waste show high rates of recycling. However commercial waste is the fastest growing sector, at 3.27% annual growth.
- Construction and demolition (C&D) waste, 52%: this is the largest in volume but the least difficult to manage: the majority of this waste is re-used in some form for land engineering.

Forecasting future wastes

The detailed appraisal of options in the Statement makes waste management look like an exact science. In practice there is huge uncertainty on the volumes of waste even in 10 years' time, and the Strategy is more about balancing various degrees of risk and uncertainty in new technologies, a complex set of legislative and financial constraints, and, not least, intense public opposition to new facilities. The key which underpins this is the alternative forecasts for waste arisings over 25 years, which were constructed in some detail in the Statement.

Municipal solid waste (MSW)

Four scenarios for waste arisings were developed for examination. A central, or best estimate, scenario is used for the sustainability assessment of scenarios, with three other profiles considered in a sensitivity analysis of the capacity of infrastructure needed to meet targets under the alternative scenarios.

The central scenario is based upon forecast growth in the number of households in the region, together with a further element representing increases in waste production per household. This latter element is projected to decline as a range of minimisation measures come into play.

- ***Base case***: as assumed by the EC Directive and UK Waste 2000: 3% annual growth throughout: net change 2000/2025 amounts to +103%.
- ***Central scenario***: starting at actual household growth plus 2% (2.9784%), tapering off to household growth +0.5% (1.2834%): net change to 2025 amounts to +59%;
- ***Household growth***, i.e. related to population size with no other changes: current annual growth of 0.9762%, tapering to 0.7834%: net change 2000/2025 amounts to +23%.
- ***Rapid minimisation***: initially 3% annual growth, tapering to –3% annual reduction, giving a –14% net change (reduction).

Commercial and industrial (C&I) waste forecasts

Two scenarios are considered jointly, starting from a current high rate of growth at 3.27%. A declining growth scenario is used in order to characterise the scenarios and conduct the sustainability appraisal, whilst a scenario representing more rapid progress in stabilising growth in waste production, i.e. reducing year on year, is used as a sensitivity case.

- Declining growth: initially 3.27% growth, tapering to 1% growth: net change 2000/2025 amounts to +64%
- Rapid minimisation: initially 3.3% growth, tapering to –3% growth: net change 2000/2025 amounts to +4%

Construction and demolition (C&D) waste forecasts

Figures are drawn from a WRc report covering the whole country. For the purposes of the Regional Waste Management Statement, the conservative assumption has been made that net arisings of C&D waste will remain constant over time (in part, due to impact of landfill tax).

Other waste streams

Special waste arisings are assumed to remain constant over time.

Table 6.6.1 South East region waste composition and regional balances: Source: South East Regional Waste Management Statement

Special waste source (98/99)	Production in the SE (tonnes)	Disposal in the SE	Balance (net export)
Mining and minerals	1423	73	1350
Agriculture and food production	1588	478	1110
Wood and paper production	359	63	296
Leather and textile production	43	0.38	42.62
Petrol, gas and coal refining	24315	20578	3737
Inorganic chemical processes	10570	2500	8070
Organic chemical processes	48467	45564	2903
Paint, varnishes, adhesives, inks	11038	8624	2414
Photographic industry	1001	317	684
Thermal process waste	2850	4547	-1697
Metals treatment/coating process	6103	2865	3238
Shaping/treatment of metals and plastics	7303	3849	3454
Oil and oil/water mixtures	183024	156989	26035
Solvents	16740	2446	14294
Packaging, cloths, filter materials	2127	834	1293
Not otherwise specified	29408	49782	-20374
C&D waste and asbestos	107903	167606	-59703
Healthcare	1615	780	835
Waste/water treatment and water industry	9696	10204	-508
Municipal and similar commercial wastes	2200	2642	-442
Unclassified	2970	463	2507

Waste management scenarios

Illustrative scenarios were developed in order to assess the sustainability of different management routes. The 6 scenarios were shaped by two key requirements:

- firstly, to examine scenarios that met targets and constraints, but went no further, as well as those that went beyond these limits; and
- secondly, to consider the extremes of possible combinations of diversion routes to identify advantages and disadvantages.

Each of the scenarios was considered twice, i.e. making 12 variations in all:

- once with all the facilities assumed to be large scale;
- once with all the facilities assumed to be small scale.

This allows differences in transport, number of facilities and proximity to point of waste arising to be accounted for. A sustainability appraisal was then carried out on all scenarios, with ranked performance tables.

Generally the scenarios including larger facilities were more highly scored than those with smaller facilities.

The preferred option, as in most other regions, then emerges as a combination of thermal, recycling and composting facilities, with mainly larger facilities, with a mixture of older and newer technologies.

Table 6.6.2 Summary of waste strategy scenarios

Scenario	Description
1	Will meet target of diverting from landfill 15% of C&I waste by 2005. Will also meet target for diverting MSW and be over and above recycling and recovery targets in Waste Strategy 2000. Where targets are not specifically framed in terms of recycling, diversion will be through energy from waste.
2	As above. Diversion from landfill will be through recycling and composting, except for existing energy facilities.
3	As above. Diversion and equal split between energy and recycling/composting.
4	Will meet C&I target. Beyond 2005, diversion from landfill will increase year on year. Where targets are not specifically framed in terms of recycling, diversion will be through energy from waste.
5	As 4. Diversion from landfill will be through recycling and composting, except for existing energy facilities.
6	As 4. Diversion an equal split between energy and recycling/composting.

Comparison of waste projections

The table shows a summary of the assumed 'consensus' on the forecast projections in waste arisings, to be managed via all routes in the South East 2000–2025.

Table 6.6.3 Waste arising projections under regional waste strategy. Source: SERTAB, Regional Waste Statement

Year	Total MSW	Total C&I	Total C&D	Sub-total for SE	London's export to landfill in SE	Total for SE (including London exports)
1995/96	3.57	-	-	-	-	-
2000/01	4.14	8.05	13.02	25.22	3.23	28.45
2005/06	4.77	9.46	13.02	27.25	3.04	30.29
2010/11	5.36	10.70	13.02	29.08	2.79	31.87
2013/14	5.67	11.36	13.02	30.05	2.54	32.59
2016/17	5.94	11.99	13.02	30.95	2.31	33.26
2020/21	6.24	12.73	13.02	31.99	1.99	33.98
2024/25	6.57	13.24	13.02	32.84	1.67	34.51
Change 2000-25	159%	164%	100%	130%	52%	21%
Annual growth rate 2000-25	1.9%	2.0%	0.0%	1.1%	-2.6%	0.8%

The analysis and comparison of the different growth rates is very interesting (especially in the light of the scenario growth rates in Chapter 7.1). The overall South East region subtotal of 1.1% annual growth is an average over the period. For comparison the growth rate to the mid point in 2015 is 1.40% total, (excluding the effects of imports from London).

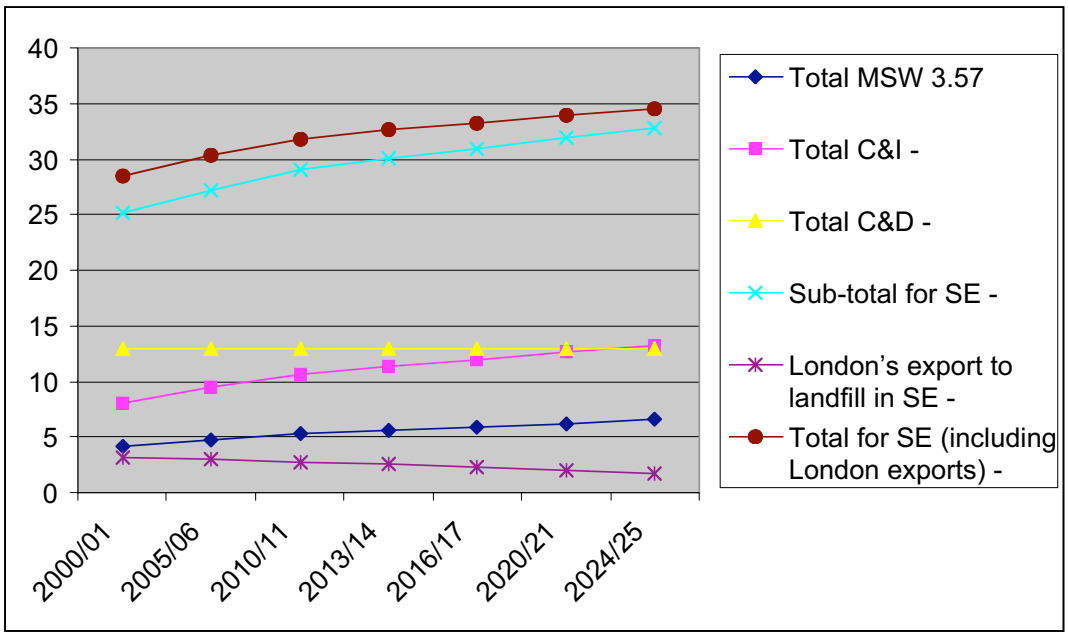


Figure 6.19 Waste arising projections under regional waste strategy.
Source: SERTAB, Regional Waste Statement

This 'policy driven' projection can be compared to an independent source of forecasting. Here this is based on preliminary results from the REWARD regional modelling system (www.reward-uk.org). The model was run in default mode, showing the 'business as usual' projection for waste arisings to 2015 (with slightly different classification).

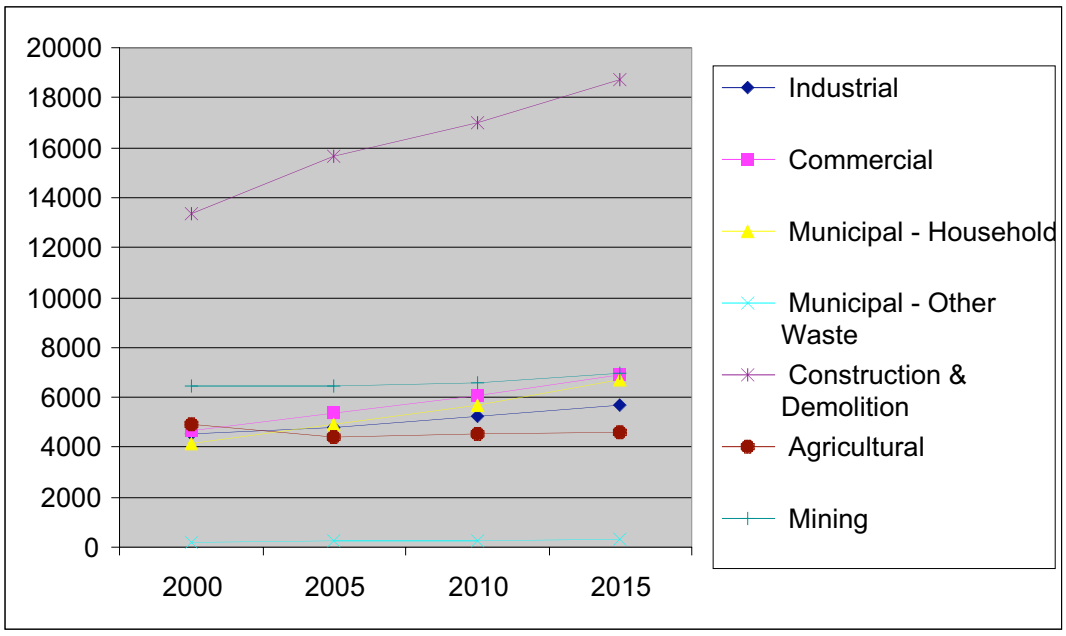


Figure 6.20 Waste arising projections under business as usual default assumptions
Source REWARD modelling system.

This projection includes for a total growth rate in waste arisings of 2.40% to 2000/2015 (excluding London imports). The difference between this and the SERTAB/SEERA strategy projection amounts to 1.75 million tonnes of waste (all types).

One reason for the total difference is the forecast for C&D waste: assumed at zero growth in the South East Strategy, but in this forecast estimated at 50% growth, related to forecasts of construction activity.

On the management side of the scenario, the South East Strategy targets for recovery and recycling represent a total step change which is extremely challenging. Although the South East has the highest rate of recycling of any region, a change from 12% to 56% overall recycling rate represents a doubling of facilities every 10 years, and also a doubling of recycled material coming on to the market.

The effects of the recycling targets can more easily be seen in chart form *(Fig 6.21)*.

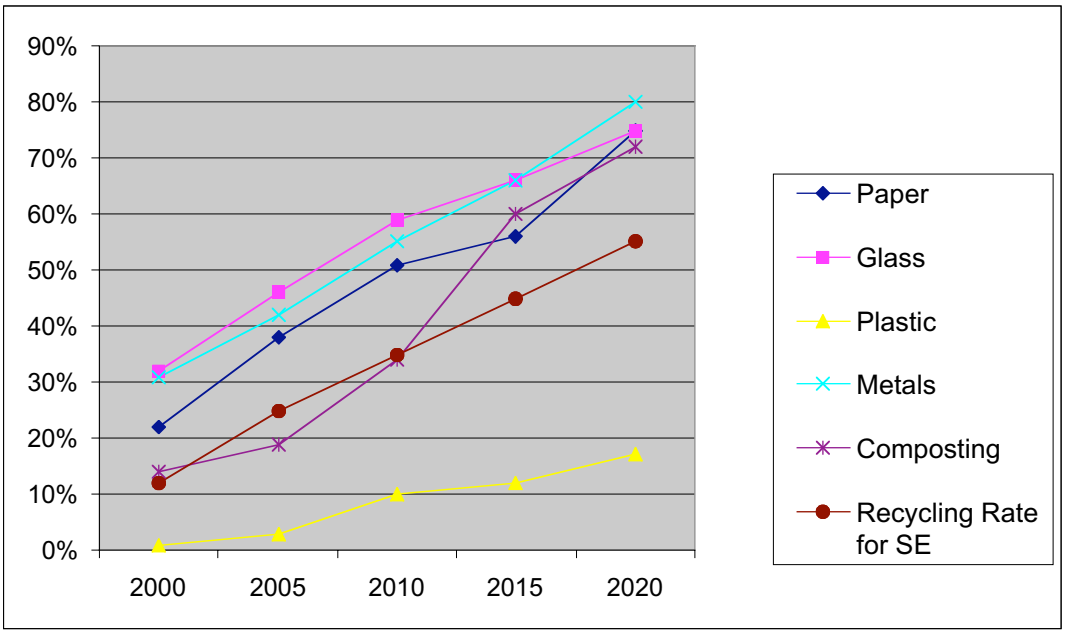


Figure 6.21 Regional waste strategy targets for waste recovery and recycling
(Source: SEERA, Regional Waste Strategy (consultation draft)

Waste strategy and resource management

Solid waste is the residue at the end of the material chains of an industrial society – a massive resource devalued to zero or less by total 'entropy' or disorder. Until recently the waste industry was mainly concerned with holes in the ground but now there is no such thing as a cheap and environmentally friendly method of disposal. In the longer term, the issue is not so much ***waste*** management as ***materials*** management – where recycling, re-using and minimisation are the only viable options. This involves re-organising and re-engineering material chains and processes throughout the region.

In reality this is a huge challenge. The growth in national waste arisings of 1–3% per year (with huge uncertainty in the absence of better information) could double waste volumes in 25 years. At present responsibility for such a growing mountain is fragmented into many competing purchasers and providers. At each stage in the material chain there are government, counties, districts, partnership companies and private companies, each getting to grips with interlocking contracts, new subsidies and taxes, new technology, new environmental standards, new targets and Directives and new commodity markets. At the root of the waste problem is the behaviour of individuals in households and businesses who produce waste, disorder or zero value in material resources.

The main contribution of the this regional MFA-EF study is to provide some fundamental insights on the environmental impacts and benefits of waste streams and different options for management. This is at least a start in piecing together the bigger picture of the Factor Four strategy for the region as a whole.

Recycling is the traditional response to waste problems – but in the industry view, the environmental benefits are not always clear, the economics depend on unstable markets, and success depends on volatile consumer commitment. Meanwhile there are cities in EU and North America with up to 75% recycling rates, with lower municipal costs and large-scale job creation programmes. The London

Waste Strategy draws on such experiences, and sets a new standard for large cities.[46] Recycling rates of 60–80% can be achieved not just as ends in themselves, but as part of an overall market transformation with many benefits.

The environmental benefits of recycling compared to landfill can be summed up by the reductions in CO_2 emissions of 0.5–5 tCO_2 per ton of waste, many times that of incineration.[47] Up to 5 ,000 recycling jobs could be created, and up to 10,000 in related materials management industries. There are huge savings in the eventual costs of full kerb-side recycling systems which can be a fraction of landfill or incineration methods. However there is a 'hump' of increased capital and start up costs to be overcome, which could be by diverting other revenues or levies on waste streams. Funding could also involve PFI-type initiatives with potential materials operators and markets – newsprint, metals, plastics and so on – and in each case the public sector will need to expand its remit from waste to materials management.

The recycling strategy also has interesting implications for a successful post-industrial 'green collar' business – customer focused, ICT responsive, supply-demand integration, just-in-time logistics, and a networked rather than monolithic structure.

Overall the prospects for waste management in the South East region look towards the horizon, a new kind of material metabolism in production and consumption. Non-essential throughput would be minimised, all products would be designed for re-use and recycling, and remaining waste would be sorted on collection. Organic and nutrient-rich materials from households, agriculture, and industry would be linked through local and regional eco-cycles.

To achieve this vision the region has to find its appropriate functions and territories and level of intervention. Following a solutions-multiplier approach, the region resource management strategy would look for added value through combining job creation, competitiveness, new business, cost savings, environmental benefit and quality of life factors. In this sector, like few others, there are now enough practical examples from around the world to enable new ways of thinking between waste operators, businesses, development agencies, local authorities and voluntary sectors.

[46] Murray R et al 1999: 'Re-inventing Waste: towards a London Waste Strategy': London, Ekologica

[47] US EPA 1997: 'Greenhouse Gas Emissions from Municipal Waste Management' USEPA ref 530-R-97-010 (www.epa.gov/epaoswer/non-hw/muncpl/ghg)

6.7 Regional Minerals Strategy

Current regional strategy

This draft Regional Minerals Strategy is the last in the Assembly's series of mini reviews of existing Regional Planning Guidance. SEERA will shortly start preparing a full review of Regional Planning Guidance, rolling forward to a new horizon of 2026. The draft Strategy adopts the same overall stance as earlier reviews and, in particular, relates closely to the Regional Waste Management Strategy.

It focuses, firstly, on measures to reduce demand, secondly on the recovery and recycling of used materials and then on a mixture of sources to supply residual regional need. For a few minerals, such as silica sand, the region can meet all its own needs and supply a wider national market. But for the most significant mineral, aggregates, the region has long been dependent on supplies of hard rock and marine gravels from outside the region in order to augment local supplies. That situation will continue for some time, but the question remains on the right balance between the different elements, both for the region as a whole and also between different parts of the region. Below is a summary of the key policies and projections.

Policy M1 – Sustainable Construction and Environmental Management

The Regional Assembly will encourage the development of sustainable construction practices and will work with the construction industry, SEEDA and other stakeholders to promote good practice, reduce wastage and overcome technical and financial constraints, including identifying sustainable supply routes and seeking to reduce delivery distances. **The intention is that by 2016 annual consumption of primary aggregates will have stabilised.**

Policy M2 - Recycling and Re-Use

The use of secondary aggregates and recycled materials in the South East should increase from 5.3 million tonnes per year (Mt/yr) (23%) to at least 7.4 Mt/yr (33%) by 2016, so as to reduce the need for primary aggregates extraction.

Policy M4 - Primary Aggregates

The supply of construction aggregates in the South East should be met from a significant increase in supplies of secondary and recycled materials, a reduced contribution from primary land-won resources, and an increase in imports of marine-dredged aggregates and crushed rock from elsewhere. Mineral planning authorities should make provision to maintain a landbank of planning permissions for primary aggregates which is sufficient, throughout the Mineral Plan period, to deliver **13.0 million tonnes (Mt) of sand and gravel** and **2.2 Mt of crushed rock** per annum across the region.

The largest category by weight is sand and gravel, with apportionment shown as follows:

Table 6.7.1 Regional minerals strategy apportionments for sand and gravel

Land-won Sand and Gravel Apportionment For Revised Aggregate Guidelines 2001-2016 For South East England (Million Tonnes Per Annum)

(including comparison with MPG6 figures, and total sales 2001-2016)

MPG6 apportionment million tonnes per annum	1994-2006	Recommended apportionment for revised guidelines 2001-2016* (million tonnes per annum)	% reduction	Total sales 2001-2016 to nearest million tonnes
Berkshire Unitaries	2.3	1.50	34.8	24
Buckinghamshire	1.2}	0.94	12.5}	15
Milton Keynes	}	0.11	}	2
East Sussex/Brighton & Hove	0.3	0.01	96.7}	0.2
Hants/Portsmouth/Southampton	2.7}	1.80	6.7}	29
New Forest National Park	}	0.72	}	12
Isle of Wight	-	0.05	-	0.8
Kent/Medway	3.2	2.42	24.4	39
Oxfordshire	2.0	1.96	2.0	31
Surrey	3.4	2.62	25.9	42
West Sussex	1.4	0.87	37.9	14
TOTAL	16.5	13.0		209

* the apportionment is based on average sales over the last seven years (1995-2001),with the highest and lowest sales years omitted from the calculation, and an adjustment in recognition of special circumstances that have applied in Buckinghamshire.

Minerals and resource management

Quarrying is by nature disruptive, with impacts on landscape amenity, freight transport, dust and noise. There is a strong case for limiting extraction in proximity to both areas of urban development and landscape value – but on the other hand local production reduces long-distance transport, and generates other spin-offs such as voids for landfill site, leisure activities and unusual habitats.

Minerals are a non-renewable resource, and in principle a 'sustainable' level of consumption should be equivalent to the rate of development of substitutes, however that could be defined.[48] In practice, regional reserves of sand and aggregate are huge, and the viable extraction rate is limited by the viable locations and their environmental impacts. Growth in demand for minerals is likely in any BAU scenario and even in a 'resource management' scenario where restructuring of urban form and fabric will take a lot of 'stuff'.[49] So is there a workable definition of a 'sustainable' minerals strategy?

One approach is to look again at the total material metabolism of the South East region (further details in Chapter 8).

- Direct Material Consumption (DMC): 87 million tonnes/year
- Direct waste arisings: 38 million tonnes/year

[48] Hammersley, R, 1995: 'An Inquiry into Prospects for Sustainability in Minerals Planning': *Sustainable Development*, Vol 3/ 2, ERP Environment, Chichester, Wiley

[49] National Centre for Business Sustainability (2002): From Rocks to Rubble: build a sustainable region: Manchester, NCBS

- Emissions: the largest category being CO_2 , $N0_x$, VOCs, and $S0_x$ at 17 million tonnes direct emissions.
- Residual or build up in the system: 32 million tonnes/year. Of this build up, construction minerals are by far the largest part.

At current rates of growth the total 'anthropogenic' mass of the region would double in about 40 years, and as local sources are limited by local constraints, increasing amounts would be imported, while demolition wastes take up landfills which are increasingly scarce.

So there is a strong case for greater efficiency in the regional material metabolism, of which the mineral supply is an important part. The landfill levy and 'quarry tax' are the first steps towards this and further steps would increase the use of secondary aggregates and recycled material, an industry already established in the region. Such closed-loop material cycles could be aided by an urban or regional processing system, distribution market, and construction specifications for recycled materials.

6.8 Regional Energy/Climate Strategy

6.8.1 Policy context

Strategy for energy efficiency and renewable energy

The consultation draft of the South East regional strategy 'Harnessing the elements: a strategy for energy efficiency and renewable energy' was produced in 2002. The strategy proposes a number of measures that can be implemented through the planning system to reduce energy use, increase efficiency and encourage the use of renewable energy, complementing a range of fiscal measures and regulations. It also contains proposals for assisting the development of renewable energy markets and supply chains, for raising awareness of and commitment to energy efficiency and renewable energy and for addressing barriers to renewable energy development.

- ***Energy efficiency:*** the Strategy encourages local authorities to seek increases in energy efficiency in development through the design and orientation of buildings and the use of energy efficient materials and technologies.
- ***CHP: the*** Strategy proposes that development plans should encourage the integration of CHP and DH facilities into development and identify suitable sites for CHP plants.
- ***Renewables***: At present only a very small proportion of electricity generation in the South East is from renewable sources (0.65%). Most of this is from landfill gas. The proportion falls to 0.05% if energy from waste is excluded.

The regional targets take account of the current low level of deployment in the South East, the physical nature of the region and constraints to the exploitation of renewable energy. Minimum targets for the region are:

Table 6.8.1 Regional targets for renewable power generation:

Year/ Timescale	Installed capacity (MW)	% of regional generation capacity
2010	450	4
2016	700	6
2026	1610	14

Source: SEERA 2002: 'Harnessing the Elements'

The proposed targets exclude energy from municipal, commercial and industrial waste, including landfill gas combustion. The greatest potential contribution is expected from the following sources:

- Biomass
- Wind energy
- Solar energy

Table 6.8.2 Renewable Energy Assessment and Targets for the South East

	2000	2010	2015
Biomass		105	180
Offshore Wind		200	400
Onshore Wind	1	123	148
Solar		15	40
Hydro		1	16
Other		18	48
Energy from Waste	72	288	298
TOTALS (MW)	73	750	1130

Source: ETSU/AEA Technology plc and Terence O'Rourke plc (2001). Development of a Renewable Energy Assessment and Targets for the South East. Final Report

Renewable energy assessment and targets

In its 'Renewable energy assessment and targets for the South East' (2000), the South East was recommended to adopt a target for renewable energy capacity of 750MW for the year 2010. This represents 6.6% of current capacity. A projection of what is more probable, given the constraints of relative prices, investment, technical uncertainty, and planning permission delays, focused on the lower end of target range for deployment (330MW).

- This represents a moderate deployment. For some technology areas (particularly waste) it continues the current trends within the region and so could be partly classified as BAU. For most other technologies it represents a major increase from the current minimal uptake.
- Relatively few biomass schemes appear, with existing barriers persisting, however, hybrid green waste and biomass projects are tested.
- Significant growth in grid-connected onshore wind power, in line with supportive planning policies.
- An offshore wind farm is constructed off the South East coast.
- PV deployment continues to grow but at a moderate rate.

Analysis of the upper end of what is possible (660MW) focused on the following:

- Ambitious level of deployment (closely represents the majority view from the consultation process).
- Wind energy, biomass and PV all increase contributions significantly, though waste adds little.
- Substantial growth of short rotation coppice.
- Use of green waste with biomass.
- Larger amounts of onshore wind are deployed (small scale but appear within designated areas).
- Four offshore wind farms.
- Deployment of PV expands dramatically.

National context: RCEP

For the national context, the agenda has been set by the Royal Commission on Environmental Pollution. In the 'Energy – the changing climate' (RCEP 2001), four scenarios were constructed for meeting energy demand in 2050 (assuming the UK has to reduce CO_2 emissions from the burning of fossil fuels by 60%). They differ in three main respects: energy demand, use of renewable sources, and nuclear/fossil fuel baseload.

- ***Scenario 1:*** No increase on 1998 demand, combination of renewables and *either* nuclear power stations *or* large fossil fuel power stations at which CO_2 is recovered and disposed of.
- ***Scenario 2:*** Demand reductions, renewables (no nuclear power stations or routine use of large fossil fuel power stations).
- ***Scenario 3:*** Demand reductions, combination of renewables and *either* nuclear power stations *or* large fossil fuel power stations at which CO_2 is recovered and disposed of.
- ***Scenario 4:*** Very large demand reductions, renewables (no nuclear power stations or routine use of large fossil fuel power stations).

Table 6.8.3 National scenarios for energy generation

	Scenario 1	Scenario 2	Scenario 3	Scenario 4
% reduction in 1997 CO_2 emissions	57	60	60	60
			Demand (%): Reduction from 1998 final consumption	
Low grade heat	0	50	50	66
High grade heat	0	25	25	33
Electricity	0	25	25	33
Transport	0	25	25	33
Total	0	36	36	47
Supply (GW): Annual av. Rate				
Fossil fuels	106	106	106	106
Intermittent renewables	34	26	16	16
Other renewables	19	19	9	4
Baseload stations (nuclear or fossil fuel with recovery)	52	0	19	0

Source Royal Commission for Environmental Pollution, 2001, 'Energy – the changing climate'

- A long term stabilisation of demand, as envisaged in scenario 1, would require changes in energy policy but these need not be massive nor disruptive.
- Real prices for energy would have to rise gradually over the period.
- Major efficiency improvements would need to occur to existing housing.
- Substantial improvements in the efficiency of vehicles and aircraft offsetting the growth in traffic.

Meeting demand for energy on that scale, while also reducing CO_2 emissions by 60%, requires either a contribution from nuclear power that is more than 4 times as large as at present or an equivalent contribution from fossil fuel stations with recovery. It also requires the largest contribution in any of the scenarios from renewable sources, a more than 20-fold increase from the present output of 2.3 GW.

By 2050 all present nuclear stations will have closed – required capacity in scenario 1 is equivalent to 46 of the UK's most recent nuclear power station (Sizewell B). Some of the new stations might be based on groups of smaller reactors rather than a single large reactor.

If energy supplied as heat is taken into account, the largest contribution from renewable sources comes from hundreds of small CHP plants located in or near urban areas and connected to District Heating networks. These could possibly be fuelled by fast growing crops or agricultural/forestry wastes. On the basis of present productivity, cultivation of energy crops on this scale would take up 15% of UK's present farmland.

- A large contribution will be expected from offshore wind turbines.
- Another large contribution comes from electricity generated by PV panels. These will cover large flat roofs, south facing pitched roofs of houses, and the upper part of multi-storey office buildings.
- Onshore wind would provide 65 times as much electricity as it does today. Assuming that no development takes place in areas designated for natural beauty or importance to wildlife, they will occupy 10% of remaining areas with the highest wind speeds, predominantly near coasts or on higher ground, and are visible from almost everywhere in those areas.

Scenarios 2 and 3 are based on an alternative assumption about energy demand, with reductions of 36% (the largest being from low-grade heat). Final energy demand is 50% less than it would otherwise have been under BAU conditions.

- Increasing taxation on energy with recycling to efficiency improvements
- Fuel cells replace internal combustion engine
- Larger share of journeys made by public transport
- Large proportion of population work from home, or in places close to home

Scenario 2: a lower level of demand is met by a combination of renewable sources and fossil fuels. This entails large-scale development of renewable sources, but not on the scale of scenario 1 due to lower demand.

Scenario 3: same demand is met by obtaining equal amounts of electricity from renewable sources and from either nuclear power or fossil fuel stations with recovery.

Because of the much smaller use of energy crops in scenario 3 and the elimination of municipal waste as an energy source, the number of CHP plants is reduced considerably.

Scenario 4: deep cuts in CO_2 emissions while limiting the environmental impact of alternative energy sources.

Common features of scenarios: Large fossil fuel capacity, though would be used intermittently i.e. to cover winter peaks. The need for back-up arises because of an inability to store output from generating plants. The alternatives would be to influence demand to smooth out peaks or to develop technologies that enable storage. If efficiency could be improved by around 1% a year, this would reduce consumption by more than a third over the next 50 years.

What all the scenarios have in common is that they all involve fundamental shifts over the next half-century in the ways energy is obtained and used and the associated infrastructures. In addition to development of renewables on a very large scale, they would all require extensive modifications to both the building stock and the transport system. DH systems, supplied by CHP plants, would become commonplace in urban areas, as would use of heat pumps. Electricity networks would have to be restructured to accommodate the much larger numbers of smaller generating plants embedded within them, many supplying electricity only intermittently.

National context: Energy White Paper

The UK Energy White Paper adopts a broad scenario for what it imagines an energy system might be like in 2020. It draws on several sources including the DTI Foresight work. More detailed scenarios were developed for DTI (2002) '*Options for a low carbon future'.*

The White Paper has an ambition of reducing emissions by 60% by 2050. This is about midway between the FACTOR 2 and FACTOR 4 scenarios as detailed in Chapter 7.

The energy system of 2020 is envisaged as being much more diverse, with a greater mix of energy affecting both the means of supply and the control and management of demand.

- Much of our energy will be imported, either from or through a single European market.
- The backbone of the electricity system will still be a market based grid balancing the supply of large power stations, though some of these will be offshore marine plants. Smaller on-shore wind farms will also be generating. The market will need to be able to handle intermittent generation by using back-up capacity.
- There will be much more local generation, in part from medium to small local plant. These will feed local distributed networks, which can sell excess capacity into the grid. Plant will also increasingly generate heat for local use.
- There will be much more micro-generation (CHP, fuel cells or PV).
- Energy efficiency improvements will reduce demand overall, despite new demand for electricity i.e. air conditioning may become more widespread.
- New homes will be designed to need very little energy, with existing building stock increasingly adopting energy efficiency measures.
- Gas will form a large part of the energy mix as the savings from more efficient boiler technologies are offset by demand for gas for CHP (which in turn displaces electricity demand).
- Coal fired generation will either play a smaller part than today in the energy mix or be part of capture and storage technologies.

- The *existing* fleet of nuclear power stations will almost all have reached the end of their working lives.
- Fuel cells will be playing a greater part in the economy, initially in static form in industry or as a means of storing energy, but increasingly in transport (hydrogen to be generated primarily by non-carbon electricity).
- In transport, hybrid vehicles will be commonplace in the car and light goods sectors, delivering significant efficiency savings. There will be substantial and increasing use of low carbon biofuels. Hydrogen will be increasingly fuelling the public service vehicle fleet and utility vehicles.

National context: climate change scenarios

Presentation of four alternative scenarios of how climate change may affect UK climate over the next 100 years. These scenarios are labelled: low emissions, medium-low emissions, medium-high emissions and high emissions (based on IPCC scenarios).

Although the UKCIP scenarios are derived from a high-resolution model and the results presented at a resolution of 50km, users should be wary of over-interpreting the significance of geographical differences on these small scales.

The UKCIP98 climate change and the RegIS socio-economic scenarios provide the modelling context. The linked scenarios, which are internally consistent visions of the future, are investigated according to:

- Regional enterprise linked with the UKCIP98 High scenario. The RE scenario suggests vibrant, semi-autonomous regions which imaginatively develop their economic, social and environmental assets. This scenario is likely to impose the highest socio-economic pressure upon the environment, and provides the extreme case of a society that does not respond to the threat of climate change over the next 50–80 years.
- Global sustainability linked with the UKCIP98 Low scenario. In the GS scenario, sustainable development takes precedence over regional responses. The GS socio-economic scenario brings with it the lowest environmental pressure upon water, biodiversity, agriculture and the coastal zone i.e. a 'better case' analysis.

6.8.2 Regional energy strategy and resource management

Resource management context

In the South East region and in the UK as a whole, the basic key objectives of an energy strategy and a resource management strategy are very closely aligned – i.e. to reduce emissions of greenhouse gases, and in particular emissions of CO_2.

- One issue for regional strategy is that ***energy demand*** is largely autonomous – while there are many efficiency schemes providing advice or subsidy, regional powers and resources have little real purchase on the bulk of demand from households and businesses.

- The other issue is that ***energy supply*** is almost entirely in the private sector, most of it subject to the objectives of multi-national utility corporations and subject to complex trading and regulation mechanisms.

The upshot is that much regional strategy has to focus on indirect demand – influencing travel patterns, housing design, business supply chains and so on. On the supply side there is much publicity on the renewables strategy, however this has even on the best projections a marginal effect on the regional total energy and carbon commitment.

The response from an integrated resource management strategy is therefore to look closely at the largest sources of energy/carbon throughputs, and where there are opportunities to reduce or manage these through a combination of integrated resource management actions.

This also involves a strong element of sub-regional thinking, on the basis that the South East is very much a collection of its components, and that each of these faces a quite different agenda for development and regeneration. Where there is reference to 'regional' strategy in the sections below, this should be taken to mean a sub-regional, regional or other appropriate level of coordination.

Resource management of energy supply and demand

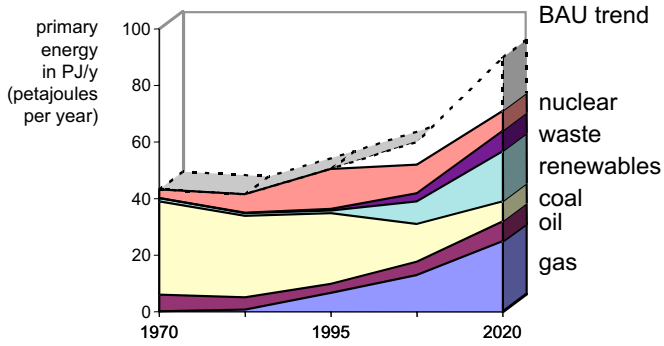
The technical case for improving supply efficiencies and reducing impacts hinges on power generation, and its effect on the ratio between 'primary' and 'final' energy.[50] At present power in the UK comes from gas, coal, oil and nuclear, together with small amounts of hydropower and other renewables, and the generation industry is the largest single source of CO_2 emissions. The total system efficiency and its EF impacts depends on:

- The proportion of electricity in the energy mix: electricity being the most versatile but inefficient of fuels. Substitution by gas has benefits and is viable in refrigeration and large-scale motive power
- The primary fuels used for power generation – gas produces half the carbon for the same heat output as coal but UK resources are limited. Nuclear produces little carbon but has many other risks.
- The proportion of power from renewables and CHP, and proportion of direct heat, which displace power and other fuels.

Each of these – substitution, fuel switching, and displacement – is an objective for energy-climate strategy. In practice power is distributed through the national grid, mostly outside local influence, although there is a large 'own-use' industrial generation capacity in the region. So a local energy-climate strategy has to make assumptions on a future 'green power' scenario, based on climate targets, national projections and scenario modelling.[51] The power scenario shown here shows power demand increasing by 30%, mainly due to increased use in transport – while its CO_2 emissions reduce by 15%, due to a further shift from coal to gas, and a major contribution from renewables.

[50] 'Primary' energy is the energy content of raw fuels for processing and power generation; 'final' or delivered energy is the output to final users. The difference between primary and final energy is mainly due to the efficiency of power generation and distribution at about 30-40%.

[51] Cambridge Econometrics, 1994: *'Prospects for Reducing CO2 Emissions to the Year 2020: Report submitted to the Nuclear Free Local Authorities':* Manchester, NFLA



'Sustainable Development' power generation scenario for UK by primary fuel source in PJ/year, pro-rata for consumption in the SE, excluding local variations from embedded generation.
Sources: based on ISCAM scenario accounts, data from DTI 1995, National Grid 1994.

Figure 6.22 Scenarios for UK power generation mix

In practice the UK power industry is in great flux, amidst conflicting pressures from the remaining coal industry, limited gas resources, unstable oil markets, uncertainty on the nuclear option, fierce global competition and acquisitions, and new climate change commitments.[52] With a context of falling world prices and a deregulated market, such technical and political uncertainties make prediction more of an art than a science.

Energy markets

The transformation of the UK energy industry over the last decade is now being completed, with the final stages of deregulation in generation, distribution and consumer choice – with the regulators in the sensitive role of mediating between economic, social and environmental interests, in roughly that order. As a result, market structures have shifted from a former monolithic 'supply-led' industry, to a much more diverse interaction of contracts, subsidies, subsidiaries, environmental constraints, and 'consumer interests' as defined by the regulators.[53]

The bulk of the South East power utility profits come from regional distribution and supply but these are closely regulated. Growth opportunities lie in other areas such as generation and parallel utilities, and such diversification may be suited to renewable sources and energy services.[54] In practice the potential is constrained by falling energy prices in the UK and world markets – even while the total environmental costs of energy use are several times its direct price, and the UK is alone in Europe in taxing efficiency measures more than fuel use. The government is aiming at a 'negotiated dialogue' with major energy-using sectors although the evidence so far is that the rates envisaged will make little difference to climate targets. The best approach would be a gradual, comprehensive and progressive taxation package, to reduce costs for basic needs, increase costs for surplus demand,

[52] DTI 2003 Energy White Paper
[53] Guy S and Marvin, S, 1996: 'Disconnected Policy: the Shaping of Local Energy Management': Environment and Planning C: Government & Policy Vol 14:145-158
[54] Energy Technology Support Unit, 1994: 'Renewable Energy in the UK: Harwell, ETSU & Dept of Energy

incentives for innovation and modernisation, and recycle public funds into forward investment.[55] At the national level this could be coordinated by a UK energy agency.[56]

Such progressive energy taxation would work mainly at the national level – but the deregulated market also enables new patterns of local purchasing and distribution. Many local authorities and social housing landlords are aiming at bulk purchasing for their properties, which could enable not only price reductions, but a progressive recycling of funds for further investment. The combined public sector energy spend also offers substantial bargaining power which could encourage 'green energy' markets from renewable sources or distributed sources.[57]

Sub/regional integrated energy agency

Such market transformation points the way towards a more responsive and 'post-fordist' energy industry. This would use ICT to target 'cold spots' of under-used capacity, and 'hot spots' where demand exceeds supply.[58] Demand side management (DSM) aims to coordinate demand with supply capacity, and is now a common technique – and trading of 'negawatts' in efficiency via integrated least-cost planning is now an active part of the USA energy market.[59] At present DSM is aimed at commercial ends, but it also has potential for direct benefits to consumers and the environment.

In practice consumers' actual needs are for warmth and light rather than heat or power – energy 'services' rather than energy as such. 'Energy services companies' (ESCOs) have potential to be the future one-stop providers – coordinating efficiency investment, DSM, local generation and CHP distribution.[60] At present market uncertainty undermines long term planning and investment, with technical and legal issues in defining 'savings', and development of ESCOs is slow.

All this strengthens the case for a coordinating body to implement the local energy-climate strategy in a deregulated and diversified market – a regional 'energy agency'.[61] This would coordinate between energy and climate issues (climate mitigation, adaptation and defence themes) and it would provide an interface between financiers, generators, suppliers, consumers, developers and the public sector, for both domestic and commercial applications:[62]

- broker for third-party and lease contracts for energy plant and conservation measures
- finance packages for housing upgrading and brokering for mortgage companies
- coordination of consortium purchasing and progressive pricing policy in public housing
- technical coordination and investment vehicle for city-wide CHP networks
- agency and purchasing consortium for installers and suppliers for consumers and small businesses
- promotion and technical support for low-energy demonstration projects

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[55] Elliott, D, 1997: 'Energy, Society and Environment: Technology for a Sustainable Future': London, Routledge
[56] Green Alliance 1999: 'The Case for a Sustainable Energy Agency' London, Green Alliance
[57] Elliott, D, 1997: 'Energy, Society and Environment: Technology for a Sustainable Future': London, Routledge
[58] Guy & Marvin 1996
[59] von Weizsacker, E, Lovins, A and Lovins, L.H (1997) Factor Four: Doubling Wealth, Halving Resource Use, London, Earthscan
[60] DTI 2003: Energy White Paper
[61] Local Government Association 1998: 'Energy Services for sustainable communities: the local government position' LGA (www.gov.uk/policy/energyservices)
[62] March Consulting, 1995: 'Multi-Client CHP Scheme for Trafford Park, Manchester' In: Energy Management Journal, July 1995

- comprehensive energy audits and advice to householders and small businesses

The scope of such a regional energy agency would go far beyond the current 'local energy advice centres' which cover only the last function above. In a deregulated market it could form a regional consortium for supply and distribution, with the local utility or any other in the market. Its purchasing power would enable a progressive tariff structure to encourage efficiency investment, nega-watt trading and others, while tackling energy poverty and management issues at source. It would also coordinate the climate response side of the strategy with a wider set of stakeholders as above.

6.9 Sustainable Production and Consumption

A national strategy

Up to now there has been very little engagement from regional policy in the issues of consumption and resource management. However at the national level the government published in 2003 its strategy for 'Sustainable Production and Consumption' (SCP).[63] This is more a review of possibilities than a fixed plan of action, but the main objectives include:

- "Taking a holistic approach that considers whole life-cycles of products and services, intervening to deal with problems as early as practicable in the resource/waste flow.
- Working with the grain of markets, and identifying and tackling market failures.
- Integrating SCP thinking and objectives in all policy development and implementation.
- Using a well-designed package of policy measures and following the principles of better regulation.
- Stimulating innovation in all its facets."

The document offers a thoughtful analysis of principles and policy approaches, which are then the raw materials for further development at national, local, and potentially regional level.

Policy approaches

The following sections quote from the consultation strategy:

"1. 'Decoupling' economic growth and environmental degradation.

A consultation paper being published alongside this document shows a basket of indicators to illustrate the progress being made. The evidence is that we are now successfully decoupling air and water pollution from growth in GDP and making good headway with CO_2 emissions from energy. In other areas, like waste and CO_2 emissions from transport, more progress is needed. It is important that in sectors where the costs of decoupling are high, policy instruments are sufficiently flexible to allow for different rates of improvement, avoiding significant economic or competitive penalties. When we look at data only for household consumption, the picture is less encouraging. The environmental impact of our own individual behaviour is more closely linked to consumption expenditure than the economy as a whole.

2. Focusing policy on the most important environmental impacts associated with the use of particular resources, rather than on the total level of all resource use.

Our first priority is in areas where it is clearest that the impact of resource use is pressing up against environmental limits – for example, in our long-term aim for reducing CO2 emissions by 60% by 2050, our commitment to keep water use within the limits of its replenishment, and the Landfill Directive targets to reduce landfilling of biodegradable waste by 65% by 2020.

3. Increasing the productivity of material and energy use, as part of the broader Government commitment to increase the productivity of the nation.

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[63] DTI, 2003: Sustainable Production & Consumption

We also want to support ways of meeting people's needs that are economically efficient. By encouraging patterns of supply and demand which are more efficient in the use of natural resources, we also aim to promote innovation and competitiveness. Our investment in areas like energy efficiency, water efficiency and waste minimisation, contribute to this objective.

4. Encouraging and enabling active and informed individual and corporate consumers who practice more sustainable consumption.

We need to do more to understand and exploit the potential market leverage which public bodies and large businesses can deploy, both as consumers and suppliers of goods and services, in helping to bring about more sustainable consumption patterns. We also need to find ways of making sustainable consumption attractive to the millions of diverse individuals who are often called 'the consumer'. We must move the more environmentally and socially sustainable options from the niche to the mainstream. This is a major challenge."

Regional policy implications

The question here is how much this is a regional agenda, and something that the regional organisations can promote. It has to be said that the obvious starting point – consuming less 'stuff' – is apparently opposite to mainstream economic policy and its stated goal of competitiveness and GDP growth. So the agenda here focuses on potential win-win opportunities which link economic and environmental benefits:

- Public sector purchasing and contracting is the first and foremost target. Within the restrictions placed by Best Value and similar regimes for public procurement, the inclusion of environmental/resource management criteria is potentially viable for immediate implementation, given the political will.
- Promoting innovation in manufacturing technology, to increase productivity with less impact.
- Encouraging industrial clusters with integrated materials management systems.
- Innovation in materials and waste management, to create markets for re-use, recycling and other forms of recovery.
- Promoting retail clusters and networks which encourage service economies i.e. leasing and hiring for a service level, rather than one-off material purchases.
- Promoting social economy groups and networks for sharing, re-use and recycling, where this is relevant.

Most of these focus on the production side of economic strategy, but there are clear crossovers to the issues of consumption. The government's Market Transformation programme should be implemented at regional level.

The use of regional **indicators** to monitor the decoupling of economic growth and household consumption from environmental degradation is strongly recommended. It is intended that one of the main practical results of this study will be the adoption of an Ecological Footprint indicator as an integral part of the regional strategy appraisal and reporting system.