Matter 1C/South East England Regional Assembly

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Matter 1C: Climate Change and Resource Consumption

1C.1: Does the Plan take sufficient account of the implications of Climate Change? Does Policy CC2 provide appropriate guidance to stakeholders on the measures that should be taken to mitigate the effects of climate change and to adapt to risks and opportunities? Is this guidance carried forward into subsequent policies, including on transport and renewable energy?

1. The predicted effects of climate change on the South East are broadly as follows:

    - Warmer, wetter winters;
    - Hotter, drier summers;
    - Increased incidence of extreme events (including severe storms);
    - Sea level rise and storm surges.

2. Climate change is addressed as a cross cutting issue for the Plan and for the future development of the region. Placing Policy CC2 at the front of the Plan sends a clear message about the importance of this issue, and the need for all policies in the Plan to promote mitigation of (addressing the causes) and adaptation to (responding to the effects) climate change.

3. Policy CC2 sets out a range of measures to achieve this. This was informed through consultation with the South East Climate Change Partnership that produced climate change principles to be used in formulating policy and actions. In order to provide more detailed guidance on each of these measures, the Assembly developed a specific Climate Change Mitigation and Adaptation Implementation Plan[1]. It was developed by consultants on behalf of the Assembly and as part of the Interreg IIIB ESPACE project (European Spatial Planning – Adapting to Climate Events). Its status is best described as advisory and it is intended to complement the full South East Plan Implementation Plan by providing more detailed guidance to a wide range of audiences (including the Assembly itself) on actions necessary to achieve the measures set out in Policy CC2.

4. Many of the recommendations of the Climate Change Mitigation and Adaptation Implementation Plan and the measures proposed in Policy CC2 are reflected in the topic specific policies of the Plan, particularly regarding mitigation through reducing emissions of greenhouse gases:

    - Spatial Strategy: focus on urban areas and in particular the regional hubs offering access to a range of services, employment and housing opportunities, and transport options;
    - Communications and Transport: the objectives and policies seek to encourage non-car modes and to reduce the need to travel and journey lengths, promoting use of short sea shipping and rail freight, and acknowledge

[1] http://www.southeast-ra.gov.uk/southeastplan/plan/march_2006/implementation_plan/climate_change_implementation_plan-300306-v2.pdf

that growth at Gatwick and Heathrow would lead to further emissions of greenhouse gases;
- Housing: Policy H5 seeks to reduce the environmental impact of housing through sustainable design and construction;
- Waste and Minerals: through seeking to minimise landfill and increasing recycling of waste and so to improve efficiency of resource use and reduce emissions of methane and carbon dioxide.

5. The policies for Sustainable Natural Resource Management (NRM1-6 and EN1-6) provide more specific details, including adaptation responses to the effects of climate change.

6. Policies NRM1 and 2 have been informed by modelling work undertaken by the Environment Agency and water companies that takes account of potential climate change effects on water resources. The policies seek to improve water efficiency in new development and to ensure that new resources are developed in time to serve new development.

7. Policy NRM3 addresses flood risk, a key issue as the probability and severity of flooding could increase with predicted climate change. Adaptation measures promoted include avoidance of development in areas of highest risk, incorporation of sustainable drainage systems (to improve water storage and slow run-off), and creation of larger flood storage schemes and where possible managed realignment of coastal or fluvial defences. The latter options will be informed by Catchment Flood Management Plans and Shoreline Management Plans, and the importance of consistency between these different types of spatial plans is made clear in the policy and text.

8. Policies EN1-EN6 provides detailed guidance on energy efficiency and of renewable energy. These aim to dramatically increase the amount of renewable energy generation in the region, driven in part by the need to reduce emissions and consumption of fossil fuels.

9. These policies are complemented by the revised Implementation Plan (policies D4 and D5) which attempts to influence behaviour by specifying actions relating to transport as well as energy efficiency and renewable energy in both new and existing developments. These policies are viewed favourably by the Sustainability Appraisal (SA) which states that ' *The actions relating to micro-generation for new and existing homes, council tax rebates as a mechanism for encouraging improved energy efficiency, targeting energy conservation awareness and education, and the actions relating to 'smart metering' are all significant actions supported by the* [Revised] *Implementation Plan'.* This also reflects the findings of research carried out on behalf of the Assembly (Annex A), which specifies that *'the existing housing stock of 3.4 million dwellings represents the largest opportunity for meeting climate emissions and resource efficiency targets.'* The SA also concludes that with regard to climate change and transport '*Section D4 of the* [Revised] *Implementation Plan recognises the need for actions to support and improve Public Transport and to enable behavioural change.'*

1C.2: Is the regional target for the reduction in CO_2 emissions appropriate and justified (Policy CC2)? Is it clear how this might be achieved, and is there a means of ensuring that new development is not unduly penalised compared with existing development? Would it be appropriate to set additional and/or more specific targets?

1. The regional target reflects the national goal which is listed in the Government's Sustainable Development Strategy[2]. Reducing emissions is key to helping to reduce the ecological footprint of the region and, in common with the target for ecological footprint (below), it is appropriate to set such a target for the region to provide the context and direction for policy and action.

2. It is necessary to acknowledge that the Plan, and the Assembly in its wider role, has limited influence over its achievement. However, where influence can be exerted it should be. This applies in particular to ensuring that the pattern and type of development helps to reduce carbon emissions.

3. DTI now publishes energy consumption at regional scale[3], and DEFRA has prepared regional estimates of carbon dioxide emissions[4]. Measuring the effects (potential or actual) of policies at regional scale, however, will be very difficult. The most demonstrable benefit can be attributed to Policies EN1-EN6[5]. An assessment undertaken on behalf of the Assembly estimated that full delivery of the regional renewable energy targets at 2026 could lead to annual savings of approximately 1.6 million tonnes of carbon dioxide through offsetting fossil fuel use. The South East Plan proposes an amendment to Policy EN1 requiring incorporation of renewable energy to provide at least 10% of the development's energy demand. This is intended to further reduce carbon emissions from new developments, building on experience and practice being developed by a number of local authorities across England (see Library Document ENr1 and matter 4B.3).

4. End user carbon dioxide emissions from households account for approximately 28% of the national total, with transport and industry accounting for a similar proportion and the rest largely due to commercial and public sector[6]. Much larger savings could therefore be delivered through adoption of high energy efficiency standards in building design combined with efficient energy generation and distribution including combined heat and power and district heating (Policy EN2) and building-integrated micro-generation (Policy EN1 and Revised Implementation Plan Policy D5). Adoption of Building Research establishment environmental ratings systems (EcoHomes and BREEAM), especially "excellent" standards could result in significant savings. It is estimated that this could be up to 2.25 tonnes carbon equivalent per household per year for homes built to EcoHomes "Excellent" standards over and above homes built to existing

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[2] DEFRA (2005) *Securing the Regions Future* Available at: http://www.sustainable-development.gov.uk/publications/documents/securing-the-regions-futures.pdf#search=%22securing%20the%20regions%20future%22

[3] http://www.dti.gov.uk/energy/statistics/regional/index.html

[4] http://www.defra.gov.uk/environment/statistics/globatmos/galocalghg.htm

[5] Advice from Future Energy Solutions to support policies EN1-6 and the Partial Review of RPG9 (2003)

[6] http://www.defra.gov.uk/environment/statistics/globatmos/kf/gakf07.htm

standards[7]. The policies in the Plan (NRM1, EN1, CC4) seek to encourage building to such higher standards, with influence exerted through use of supplementary planning documents, design briefs in support of development control and conditions / agreements. The proposed Code for Sustainable Homes, based on the BREEAM system, is expected to further encourage such standards. These measures and those proposed in the Revised Implementation Plan are consistent with the findings of research carried out on behalf of the Assembly (Annex A) which lists the benefits in terms of reduced Ecological Footprint (and hence carbon dioxide emissions) of each of these measures.

5. Research also shows that while new development is important, a much bigger priority is the improvement of the existing building stock, both residential and commercial. However the planning system only has statutory powers over new developments and material alterations. Even there, its influence is limited as other mechanisms, particularly Building Regulation, control the fabric and performance of buildings and also apply to some refurbishment works.

6. Greater gains will also be achieved through national fiscal and regulatory measures that influence behaviour, choices and practice, including building standards. The achievement of the gains will depend on the success of measures such as the Energy Efficiency Commitment and the work of bodies such as the Energy Saving and Carbon Trusts. As detailed under IC.1 the Revised Implementation Plan also recommends some of the required measures to achieve behavioural change including the strengthening of building regulations requiring higher levels of energy efficiency.

7. The Assembly has also commissioned further advice on how the Plan and the Assembly in its wider role can stabilise and reduce the region's ecological footprint (see IC.3 below), including reducing greenhouse gas emissions as these are a major contributory factor to the footprint. The findings of this research are detailed in Annex A. Other research[8] suggests that there may also be merit in the development of targets that are: specific to individual organisations and sectors, and capable of ownership or influence by individual bodies.

1C.3: Is the objective of stabilising the ecological footprint of the Region by 2016 and reducing it by 2026 appropriate and realistically achievable, bearing in mind the results of the Sustainability Appraisal (Policy CC3)? If not, what changes are required?

1. It is valid and necessary to include such an objective and target in the regional spatial strategy in order to set a clear direction and context for development of the region. As a result a similar target is also included within SEEDA's draft Regional Economic Strategy (RES). However, it is acknowledged that the South East Plan and the planning system more generally, can only influence certain activities that will contribute to the delivery of the target. Much more will be

[7] RSPB (2005) Resource savings and Ecohomes. Unpublished discussion paper September 2005; derived from evidence in: DEFRA (2004) Study into the environmental impacts of increasing the supply of housing in the UK.
[8] AEAT (2006) The Feasibility of Regional and Sub Regional Carbon Reduction Targets for the South East – A Report to Government Office South East and the South East England Energy Partnership

dependent on other measures including stronger fiscal and regulatory measures from central government that will influence practice, behaviour and choices.

2. Ecological footprint is an indicator and communication tool that provides an estimate of how much 'bio-productive' land and water area is required to support our lifestyles, – including consumption of resources and assimilating wastes and emissions such as carbon dioxide. Ecological footprint is expressed in terms of "global hectares" (gha) and "global hectares per person" (gha/cap). The ecological footprint of the South East population has been calculated as approximately 6.3 gha/cap, the highest in the UK[9]. This equates to 25 times the actual land area. The highest contributions to the ecological footprint are from food and agriculture (1.14 gha/cap), transport (1.26 gha/cap) and domestic energy and construction (1.3 gha/cap) comprising 70% of the total.

3. Research undertaken on behalf of the Regional Assembly (summarised in Annex A) indicates that the ecological footprint of the region is growing at a rate of approximately 0.068 gha/cap/year or 1.1% per year. The research aims were to identify measures through which the South East Plan, and the Regional Assembly in its wider role, could help achieve the target through coordination, enabling and encouragement of others.

4. It concluded that the activities directly influenced by the Plan, (energy demand and energy used in construction and property, and travel) so called "urban development" factors are estimated as contributing 40% of the overall ecological footprint, and this is growing at 0.025gha/cap/year. Most (80%) of this growth is due to energy use and emissions from travel including aviation.

5. The analysis indicates that in order to contribute to the target, new housing development needs to be built too much higher standards of energy efficiency than required by the Building Regulations. Building to BREEAM "Excellent" standards is necessary as a minimum to deliver savings of 0.001gha/cap/year, with BedZed "zero energy" standards delivering twice as much but still only 10% of the total target. Adoption of wider sustainable construction practices including use of low impact materials and methods (reducing embodied energy, transport, and waste disposal) increase performance further.

6. The Plan also includes policies that seek to influence and improve standards of resource efficiency in new development (including EN1, NRM1, CC4, W1, W2, M1, M2) development of renewable energy (EN1-EN6), and transport choices (D4). The spatial strategy of the Plan is to focus development on hubs in which a greater range of services, including transport, are centred, so as to try to reduce the need to travel and make best use of previously developed land. Each of these measures has the potential to contribute to the target of stabilising and reducing the Ecological Footprint.

7. Existing stock offers a much greater opportunity to reduce the footprint as well as carbon dioxide emissions, but, as has been explained, is difficult to influence.

[9] WWF et al (2006) Counting Consumption: CO2 emissions, material flows and Ecological Footprint of the UK by region and devolved country.

In addition, other factors beyond the scope of the Plan or the Assembly will influence achievement of the target. The associated actions will require a step change in coordination, partnership and forward investment. The actions and those responsible for delivery should be the subject of further research carried out by the Assembly and SEEDA.

8. The Revised Implementation Plan already recognises that delivery of broad objectives of the Plan will depend on changing behaviour and choices of other organisations and individuals. This is acknowledged in the SA of the Revised Implementation Plan. Whereas the SA of the Draft South East Plan concluded that the Plan was not in a position to stabilise or reduce the ecological footprint the SA of the Revised Implementation plan states that '*The* [Revised] *Implementation Plan provides a basis to assist the region in achieving a reduction or stabilisation of its ecological footprint'* However it also acknowledges the urgent need '*to address the issues of resource efficiency, demand management and behavioural change more robustly*' and that this will require *'joint-working with SEEDA and other regional partners to maximise influence on key agencies and Government Departments.'*

1C.4: Does the Plan set out a coherent strategy and set of policies that will assist in controlling and reducing the ecological footprint, particularly in respect of influencing behavioural change?

1. The proceeding sections detail how the Plan's policies are set out in the context of improving resource efficiency. The spatial strategy aims to focus development in the most sustainable locations and the Plan also includes policies that seek to influence and improve standards of resource efficiency in new development, the development of renewable energy and encourage more sustainable transport choices.

2. The planning system clearly has limited influence over personal behaviour, and corporate responsibility. However there is a growing potential to influence, inspire, incentivise, enable, encourage, collaborate in partnership with other bodies, at every scale from the region to the neighbourhood, not only as general advice but as specific objectives and actions.

3. The policies in the plan are complemented by the revised Implementation Plan and policies D4, D5 and D6 which have explored ways to influence behaviour, in particular related to transport, energy efficiency, renewable energy and waste.

4. As a result the SA of the Revised Implementation Plan notes that the need for behavioural change *'was acknowledged in the Draft Plan but has been developed quite considerably during the preparation of the* [Revised] *Implementation Plan.'*

Annex A

IMPLEMENTATION OF THE ECOLOGICAL FOOTPRINT TARGETS IN THE SOUTH EAST

A submission to the Examination In Public on the South East Plan, November 2006

Sub-matter 1C 'CLIMATE CHANGE AND RESOURCE CONSUMPTION'

Draft v0.3, 13-10-06

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1. Scope of this submission

This note is a response to the 'Preliminary Matters' Sub-matter 1C, raised by the Examination In Public on the South East Plan, 2006.

It is based on recent research on the 'Stabilisation of the ecological footprint in the South East'[10]: and proposed research on the 'Implementation of the ecological footprint target'. The Annex shows a summary of the work in progress.

The questions raised by the Panel are summarized here:

Targets: are these appropriate, justified and realistically achievable, and are more detailed targets needed? (IC2).
Policies: is there a coherent strategy and set of policies? Can the objectives be firmly embedded in the Plan, and how do these relate particularly to behavioural change? (IC3/4).

2. Objectives, targets & priorities

2.1 Goals and targets

Firstly, it should be clear that the three cross-cutting policies IC2, 3 and 4, are overlapping and inter-dependent:

CC2 – climate change: this is focused on emissions from production and infrastructure, directly within the region.
CC3 – resource efficiency: as defined by the eco-footprint, this is a broader measure focused on consumption, which includes climate emissions, resource use and other impacts, direct and/or indirectly anywhere in the world.
CC4 – sustainable construction: this is focused on the transformation of the construction sector, which has the largest single impact on both climate emissions and resource efficiency.

The climate emissions regional target for 2016 is a modest extension from the UK Climate Change Programme (CCP) target for 2010: meanwhile the target for 2026 is still to be specified. We assume here that a 'best practice' regional target for 2026 is consistent with the Integrated Regional Framework objective 12, and the 2050 UK target of -60% reduction on 1990 levels. This implies a year on year reduction rate of about -2%, which leads to a -33% reduction by 2026.

In contrast, the national 'business as usual' projection is for continuing climate emissions with minor variations from their current rate.[11]

[10] Centre for Urban & Regional Ecology (2005) *Stabilizing the Ecological Footprint of the South East Region:* a report to SEERA.
[11] DTI, 2006: *UK Energy & CO2 Emissions projections: updated to 2020*

The resource efficiency target is to ***'stabilize'*** current growth trends in 10 years, and thereafter ***'reduce'*** the overall eco-footprint. The Plan does not yet specify the rate of reduction after 2016. Again, we assume here that the SE regional 'best practice' goal would aim to support national policy with a similar reduction level to that of climate emissions, i.e. a reduction rate of at least -2% year on year. And again, there is a large gap between this and the 'business as usual' growth projection, at over +1% per year.

In summary, the Plan proposes apparently modest targets for 2016. But it is clear that to achieve these and then continue on the same path to 2026 and beyond, needs an accelerated 'best practice' portfolio of policies and programmes, to improve on the 'business as usual' projections.

There is much uncertainty on these projections, and uncertainty on the effects of various policy options.

2.2 Policy priorities & trends

The relative priorities of the key sectors can be identified in terms of their proportion of the total eco-footprint. These are shown with their estimated 'default' growth trends in eco-footprint, projected over 20 years to 2026.[12]

Firstly, the 'built environment' sectors which are the main focus of spatial strategy:

Domestic construction and energy use: 20% of the total: 14% growth.
Of this, new construction over the Plan period amounts to about 3% of the total (at the proposed rate of housebuilding).
Surface passenger transport: 15% of total: 33% projected growth.
Air travel (business and leisure): 6% of the total, but a very high 150% projected growth.[13]
Public services, mainly in the form of property: 6% of total: 6% growth

'Environmental services' sectors can be considered separately: each involves spatial issues, infrastructure issues and economic issues. In the case of municipal waste management there is also an agenda for public service delivery and procurement.

Energy supply: the DTI 2006 'central' projections are assumed as the trend
Waste management: the EU Directive targets are assumed as the trend
Water supply: this takes a minor proportion of the total footprint and is not within the current study.

There are further sectors which are equally important to the overall policy goal, but which are less directly involved in spatial planning policy:

[12] As detailed in the Annex, these are calculated on a 'consumer responsibility' basis, i.e. allocated to types of household consumption, based on regional data from the REAP modelling system.
[13] Air travel impacts in this study are calculated on the consumer responsibility for the total journey, not only landing/takeoff as in the national accounts.

Food chain (incl agriculture, packaging, distribution): 18% of total: 21% growth
Manufacturing & consumer products: 14% of total: 14% growth
Consumer services (incl commercial buildings and transport): 9% of total: 14% growth.

2.3 Stabilizing the eco-footprint

The previous research on 'Stabilizing the Eco-Footprint'[14] showed that the eco-footprint of the South East is higher than any other region, and growing at about **0.068** gha/cap per year. This is an average growth rate of over 1% per annum, with a doubling time of about 60 years. The portion of this growth caused by the built environment / transport is **0.025** gha/cap per year, roughly 40% of the total growth.

In order to ***stabilize*** or ***offset*** this growth rate of 0.025 gha/cap per year by 2016, various policies were assessed for savings over the 'business as usual' projection:[15]

"40 percent house" programme for upgrading the existing housing stock: savings of **0.005** gha/cap per year.

All new housebuilding to be at the Eco-Homes 'excellent' standard: with savings of **0.001** gha/cap per year.

Low impact "sustainable" construction to be phased in for all housebuilding: giving savings of **0.005** gha/cap per year.

Low impact "sustainable" construction and energy efficiency programme for old / new commercial, industrial, and public buildings: savings of **0.008** gha/cap per year.

Road traffic containment: aims to stabilize growth in road traffic with a rapid shift to public transport, and promotion of fossil fuels: savings of **0.006** gha / cap per year.

If these 'best practice' policies and programmes continued to develop and gain momentum through the Plan period and beyond, then the SE region would support the national long term targets for climate emissions and resource efficiency.

3. Implementation

3.1 The SE Plan mandate

The key question for achieving these targets through the Plan is the scope of the powers and resources of SEERA, and its role as Regional Planning Body.

[15] This assumes a clear distinction between the 'business as usual' and the 'best practice' projection: which is not always clear in practice.

The mandate as in the 2004 Planning & Compulsory Purchase Act and the 1998 Regional White Paper of 1998, provides a statutory regional framework which covers all LDFs and LTPs. While this is strictly focused on "development" i.e. new building and land use change, there is a wider practical role of 'coordination', 'enabling' and 'encouragement' for the actions of member authorities and associated bodies. While the scope of such coordination is still to be tested in legal and financial terms, it may hinge on the scope of 'development' – in the narrow sense of new building, or the wider sense of the existing and new built environment. For the latter, there is a wider range of opportunities for the SE Plan to achieve its resource efficiency objectives:

As directly mandated: coordination of spatial strategy of member authorities, and other sub-regional groups.
Coordination of member authority procurement & contracting.
Coordination of member authority fiscal policies & investment programmes.
Coordination of policies & programmes of regional agencies, particularly SEEDA
Coordination of national government / agency investment and procurement.
Lobbying of national government policy and regulation.
Accelerated promotion of national policy and best practices.
Public-private partnerships for investment and infrastructure.
Incentives, facilitation and awareness raising in various forms, to encourage behaviour change by the private sector, community sector and households.

It is not simple to identify the precise scope and impact of coordination by the Plan, as much depends on the cooperation and capacity of many other bodies. The summary of policy options below is based on experience of 'best practices' from elsewhere, and assumes reasonable levels of such cooperation.

In particular the revised 'Pre-conditions' for the Implementation Plan centre on increased public investment and private sector contributions.[16] While major changes in public spending may be outside the scope of the Plan, there are many micro-economic measures which may be coordinated by the SE Plan (e.g. recycling of local parking charges into bus investment). The proposed research on implementing the eco-footprint targets aims to look closely at the options, while avoiding major changes in the public sector finance.

3.2 Domestic energy efficiency

The existing housing stock of 3.4 million dwellings represents the largest opportunity for meeting climate emissions and resource efficiency targets. If the total stock was fully upgraded with basic energy efficiency measures on a 20 year programme, the savings could be 0.06 gha/cap by 2026, or 1% of the total eco-footprint.

The most effective policy would be the "40% house" upgrading programme, combined with demolition and replacement of a third of existing housing, with all

[16] SEERA (2006): *Delivering the SE Plan – implementation plan for EIP*: Section 2.4

new housing at zero or very low energy standard.[17] This rate of demolition and replacement at three times the existing rate, may be challenging: but it would offer great opportunities for rebuilding more 'sustainable communities' in both environmental, and economic and social terms. If the existing stock was upgraded to the full "40% house" specification, but without any increase in demolition, the savings would be lower at 0.14 gha/cap to 2026, or 2.5% of the total eco-footprint.

New housing: by 2026 this is only 16% of the total housing stock, and is by nature more efficient than existing. If new housing was built to the Eco-Homes 'excellent' standard the saving would be around **0.02** gha/cap by 2026, or 0.3% of the total eco-footprint. If new housing was built to the zero energy "BedZed" standard, the saving would be about 1% of the total eco-footprint by 2026.

To achieve these targets in both new and existing housing, the Plan may consider specifying a range of incentives within the planning / building regulation system:

Best practice standards beyond building regulations as the norm, i.e. Eco-Homes 'Excellent': the forthcoming 'Code for Sustainable Homes': and the 'Gold Standard' for refurbishment.
Use of planning conditions to encourage co-generation and distributed heat, as the default preferred mode of utility supply in new developments.
Use of S106 and / or Planning Gain Supplement to encourage new building supply from renewable sources.
Area regeneration to include for partnership energy services companies (ESCOs) for combining supply and demand management.
Publication of detailed energy performance and cost data to guide purchasers, landlords and tenants.

The Plan may consider a wider set of policies for various financial incentives, in partnership with others:

Public procurement and contracting criteria by public and social landlords.
Partnerships with lenders for differential rates for energy efficient housing.
Grant and subsidy regimes for rehabilitation and regeneration to reflect energy and resource efficiency.
Grant and subsidy regimes to schools and other public services to reflect energy and resource efficiency.
Sponsor pilot schemes for 'domestic tradable quotas' in carbon emissions:
Future opportunities in differentiating council tax to provide incentives for upgrading of existing properties.

3.3 Property & construction

While commercial, industrial and public buildings are less in the policy frame, their combined impact is greater than residential buildings, and the challenge is greater in dealing with a huge variety of shapes, sizes and conditions.

[17] Boardman, B et al (2005) *The "40% house".* Oxford University Environmental Change Unit. This is proposed as necessary to meet the UK's 2050 climate emissions targets.

For energy demand in property, there are opportunities in upgrading the existing stock efficiency by 20% over 20 years, and building new stock to the BREEAM 'very good' standard. The result would be a saving of **0.08** gha/cap by 2026, or over 1% of the total eco-footprint.

For construction, to fully implement the policies under CC4 would involve a 20 year programme of training and dissemination across the industry, all its supply chains, and all design and engineering activity:

Housing construction: a programme of low impact design, specification and demolition waste recycling. Although there is little clear evidence on construction trends and impacts, the savings over 20 years could be up to **0.1** gha/cap, or 1.5% of the total eco-footprint.
Property construction: there is a similar logic to domestic construction: the potential efficiency gains are lower, but the volume of construction is higher. The result could be savings of approx **0.12** gha/cap by 2026, or 2% of the total eco-footprint.

To achieve these targets will need clear incentives in regulation and public policy:

'Code for Sustainable Homes', planning instruments, building regulations and all grants and subsidies, to provide clear incentives so that the highest standards of construction best practice become the norm.
Building and engineering specifications to encourage recycled and low-impact materials.

There are also opportunities for financial incentives:

Public procurement and contracting to select tenders by whole life costing, as set out in CC4, and construction environmental performance criteria.
Differential business rates to reflect energy performance and tenants' future energy bills.
Grant and subsidy regimes to schools and other public services to reflect construction performance.

In partnership with SEEDA and others there would be opportunities for market development policies:

Industry cluster and targeted support for construction firms supplying low impact designs and materials.
Demonstration best practices showing low impact construction for housing and property.
Larger construction and refurbishment programmes to specify and provide market development for low-impact supply chains.

3.4 Transport

The agenda for 'sustainable transport' is clear, but the reality is a fragmented public transport system, and a complex poly-centric region. Various policy packages for lowering the impact of private cars depend basically on public investment and consumer acceptance. The eco-footprint target itself depends on alternative fuel and vehicle technology, more than modal shift, but this is marginal to the scope of the Plan. Therefore the proposed options are at two levels:

Traffic stabilization programme: this relatively moderate scenario assumes that the growth in road traffic is slowed to the point at which it balances the increase in vehicle efficiencies, so that its EF growth is zero. To compensate, public transport provision would be increased by 5% per year. The overall savings over baseline projections would be approx **0.12** gha / cap by 2026, or 2% of the eco-footprint total.
Green transport programme: this more wide-ranging agenda takes on mode shift, car sharing, demand management, alternative fuels promotions, walking, cycling etc. the result would be that road traffic reduces at -2.0% per year, while public transport increases at 7.0% per year. This could result in savings of up to **0.24** gha/cap by 2026, or 4% of the total eco-footprint.

Air travel is the most rapidly growing sector of all, and any reduction in supply or demand growth will be challenging.[18] Therefore any 'green air travel' scenario is quite speculative here. If we assume a combination of demand management and enhanced efficiency, there could be a savings trend of **0.24** gha/cap by 2026 over the baseline growth, a contribution of 4% of the total eco-footprint. However this is thought to be outside the scope of the Plan.[19]

The transport policy options centre on spatial planning and micro-fiscal incentives, without depending on major increases in public funding:

Public procurement and contracting specifications based on employer's green travel plans.
Building regulation and planning permission to encourage accessibility planning and low impact transport to the maximum possible.
Public in-house employers' car parking charges / offsets to reflect total impacts, with incentives for alternative modes.
Recycling of parking / other charges to low impact transport initiatives including:
Demand-responsive minibuses and other public transport
Cycling networks and parking provision
Community –based or employer-based car clubs.

[18] Aviation impacts are calculated on the 'consumer' basis, e.g. not including international hub passengers at Heathrow, but including flights by SE residents from other regions.
[19] There may be constraints on further growth at Heathrow and other airports as proposed by the draft Plan: however by allocating impacts on the consumer principle, growth trend impacts would be likely to continue at other airports in other regions.

3.5 Environmental services

The current research assumes national projections of energy supply, as in the Energy Review (DTI, 2006). The SEERA target for 16% of regional electricity demand is challenging as the SE region is starting from a low baseline of renewable sources. However in practice this development of renewable sources will replace part of the nuclear power capacity which is expected to be de-commissioned by 2026: i.e. the effect of this renewable development is already included in the baseline growth trend. Higher rates of renewables developments are likely to be integrated with buildings via PV panels, heat pumps or other emerging technologies, which are accounted for in the building energy options above.

The materials and products in the waste stream represent an 'in principle' opportunity cost to the region, of about 8% of the total eco-footprint. The baseline forecast includes for continuation of current trends in municipal / commercial / industrial waste: against these the current targets of the SE Waste Strategy would represent nearly 30% reduction by 2025, basically through future minimization. There is also a potential of 10% reduction in this eco-footprint via comprehensive re-use, recycling and other recovery. If this could be achieved within the Plan timescale, the savings over the baseline projection would be in the order of **0.02** gha / cap by 2026, i.e. 0.3% of the total eco-footprint.

3.6 Food chains

The eco-footprint of the food chain is estimated at nearly 20% of the total, and is growing rapidly at over 1.5% per year, due to the globalization and industrialization of food production. There is potential for this growth to be stabilized, through a combination of a shift to vegetarian and organic diets, less wastage and regional production. While food is mainly a lifestyle and health issue, there is a new policy agenda with regional and niche food markets as generators for rural development. A 20-year sustainable food programme would aim to reduce food imports, increase organic and vegetarian food, and reduce packaging: this could result in a saving trend of up to **0.3** gha / cap by 2026, or 5% of the total eco-footprint.

The Plan may consider more detailed policies to encourage local food markets and supply chains. These may include rural land use, agricultural conversions, organic / low impact cultivation, and smallholdings. Partnerships with SEEDA, Natural England and other agencies will enhance these policies, and there are opportunities for partnerships with major retailers and distributors.

3.7 Other consumption

This category covers all manufactured items, products and services. Again there appears to be a high rate of growth of 1.5-2% per year, due to the globalization and industrialization of production, coupled with the increase in disposable income, the rate of obsolescence, and the sheer volume of consumption and wastage. Reducing this diversity of consumption will be the most challenging of all policy targets and the most difficult to forecast. We can anticipate the potential for moving towards

stabilization of this growth, to be achieved via the agenda set out in the UK Sustainable Consumption and Production strategy. If such a programme was successful at stabilizing this growth over a 20 year period the savings would be in the order of **0.3** gha/cap by 2026, or 5% of the total eco-footprint.

4 Recommendations

If we assume that the short term 'stabilization' targets are followed up in line with the national targets for 2050, there are major challenges ahead. While there are some easy 'win-win' options, the accelerated 'best practice' portfolio would require a step-change in coordination, partnership and forward investment. As a first step a further research programme is proposed to investigate in detail:

a) where the Plan's high level goals can be extended to more specific objectives
b) which further policies may be needed to achieve those objectives
c) what programmes can be specified to implement the policies.

5 Annex:

5.1 Summary of SEERA actions

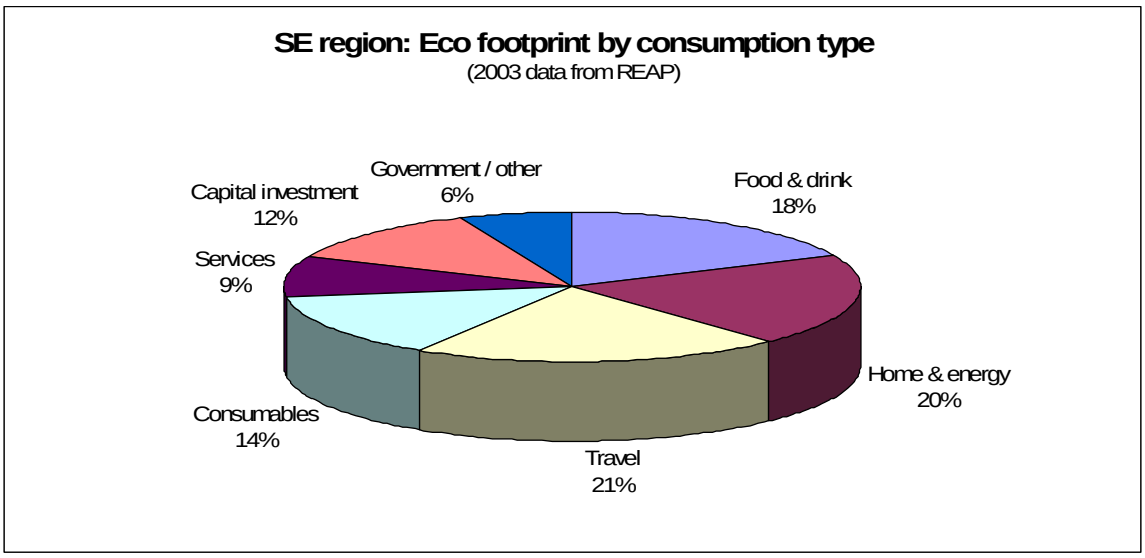
The table summarizes the scope of the SE Plan to achieve its objectives in resource efficiency in the key sectors:

I	Spatial planning / regulation	Fiscal measures & other financial	Procurement & market development	Infrastructure & investment	Education & social marketing
BUILT ENVIRONMENT					
existing housing	extensions / rehab beyond Regs	LA / RSL partnerships:		Regeneration partnerships	monitoring systems: schools programmes
new housing	EcoHomes 'excellent' via S106 agreement	LA / RSL partnerships:	direct procurement		
existing property	extensions / rehab beyond Regs	LA / business partnerships		Regeneration partnerships	
new property	BREEAM 'excellent' via S106 agreement	LA / business partnerships	public buildings		
construction supply chain			direct / indirect procurement & contracting specs	LA recycling centres:	
TRANSPORT					
highways / parking	LA parking policy	LA parking policy		LA parking policy	
other car initiatives	social car club support	social car club support			social car club support
bus / taxi	accessibility planning			responsive bus networks	schools initiatives
rail / LRT		development incentives		partnership rail investment	
demand reduction	green travel plans	green travel plans	green travel plans		green travel plans
air travel	national govt lobby			virtual travel infrastructure	
FOOD CHAIN					
Farming	low-impact dwelling policies				
food production			public catering procurement		
retail & catering					healthy diet advice

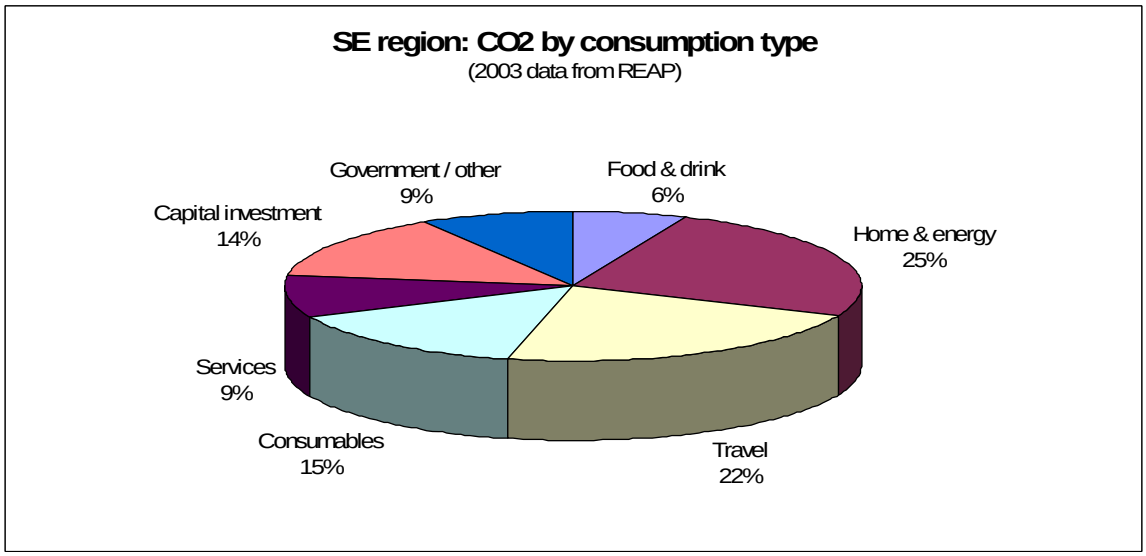
5.2 Summary of climate emissions & resource use

	Eco footprint (gha/cap)	Eco footprint % of total	CO2 Emissions (tonnes / capita)	UK Average CO2 Emissions (tonnes / capita)
Home & energy	3.37	20%	3.10	1.26
Travel	2.94	21%	2.44	1.30
Food & drink	0.85	18%	0.87	1.14
Consumables	1.98	14%	1.46	0.89
Services	1.20	9%	0.90	0.55
Capital investment	1.87	12%	1.87	0.76
Government / other	1.16	6%	1.16	0.40
Total	13.37	100%	11.81	6.29

5.3 Eco-footprint baseline



5.4 CO2 emissions baseline



5.5 Eco-footprint trends