

## Appendix

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## A.1 Glossary

**Biological capacity or biocapacity:** The total biological production capacity per year of a biologically productive space, for example inside a country. It can be expressed in “global hectares”.

**Biologically productive space:** The land and water area that is biologically productive. It is land or water with significant photosynthetic activity. Marginal areas with patchy vegetation and non-productive areas are excluded.

**Direct Material Input (DMI)** measures the input of materials directly used by the economy, that is all materials that form part of products or are used in production and consumption activities. It includes all renewable and non-renewable natural resources (apart from water) going into the domestic economy, from either domestic extraction or as imported goods, and whether or not they form part of domestic consumption or are exported to trading partners: *Domestic extraction used (DE) + (physical) imports = Direct Material Input (DMI)*.

**Domestic Material Consumption (DMC):** is defined as the total amount of materials directly used in a national economy (i.e. excluding indirect flows) and consumed by domestic actors (i.e. exports are subtracted). DMC is defined in the same way as other key physical indicators such as gross inland energy consumption. DMC equals domestic used extraction plus imports minus exports (or more simply DMI minus exports): *Direct Material Input (DMI) - (physical) exports = Direct Material Consumption (DMC)*.

**Ecological footprint:** A measure of how much productive land and water an individual, a city, a country, or humanity requires to produce the resources it consumes and to absorb the waste it generates, using prevailing technology. This land could be anywhere in the world. The ecological footprint is measured in “global hectares”.

**Ecological overshoot:** The situation when human demand exceeds nature’s supply at the local, national, or global scale.

**Equivalence factor:** A factor which translates a specific land-use area (e.g., hectares of world average cropland) into global hectares, representing biologically productive hectares with world average productivity. Each year has its own set of equivalence factors since the relative productivity of various ecosystem or land-use types varies. In a given year, all countries have the same set of equivalence factors, since they are scaled to global productivity. See also “yield factor”.

**Global hectare or gha:** 1 hectare of biologically productive space with world-average productivity. In 2002 the biosphere has 11.4 billion hectares of biologically productive space corresponding to roughly one quarter of the planet’s surface. These 11.4 billion hectares of biologically productive space include 2.0 billion hectares of ocean and 9.4 billion hectares of land. The land space is composed of 1.5 billion hectares of cropland, 3.5 billion hectares of grazing land, 3.8 billion hectares of forest land, 0.3 billion hectares of inland waters, and 0.3 billion hectares of built-up land. 1 global hectare is hence a hectare representing the average capacity of one of these 11.4 billion hectares. Thus a hectare of highly productive land represents more “global hectares” than the same surface of less productive land. Global hectares allow the meaningful comparison of the ecological footprints of different countries, which use different qualities and mixes of cropland, grazing land, and forest.

**Total Material Consumption (TMC)** is defined as the total (life-cycle-wide) material use associated with the domestic consumption activities, including indirect flows imported but minus exports and associated indirect flows. TMC equals TMR (Total Material Requirement) minus exports and their associated indirect flows: *Total Material Requirement (TMR) - (physical) exports - indirect flows associated to exports = Total Material Consumption (TMC)*.

**Total Material Requirement (TMR)** measures the total material basis of the economy. It includes all the materials used by the economy including imports, exports and estimates of hidden or ancillary flows. Although it could be used alone the estimates of indirect flows are less reliable than those for direct use and it may double count some trade flows. It is therefore best shown in conjunction with other indicators: *Direct Material Input (DMI) + unused domestic extraction + indirect flows associated to imports = Total Material Requirement (TMR)*.

**Yield factor:** A factor which describes the extent to which a land-use category of a given country (e.g. German cropland) is more productive than the world average in that same category (i.e. world average cropland). Each country has its own set of yield factors. See also “equivalence factor”.

## A.2 Basic data of the South East region

	SE	UK
<b>SOCIAL:</b>		
Total population - 2001 (000s)	8,006.9	58,836.9
Economic activity rate for people of working age (%) 2002	83.4	-
ILO unemployment rate – Spring 2002 (%)	3.9	-
Total dependent population % (under 16 and over pension age)	38.7	38.5
Net in-migration per year: 2000 (thousands)	(14 – interregional) + 4 = 18	183
Total dwellings (thousands)	3,099	23,000 (GB)
Average dwelling price (2001)	160,424	122,005 (Eng)
Standardised mortality ratio	92	100
<b>ECONOMY:</b>		
Total output: (GDP - £ million/1998)	109,797	743,314
GDP/head (1998)	13,731	12,548
Gross value added 1999 (£ per head)	15,500	13,142
Expenditure on R&D (£ million)	4,114	17,277
Household income (£ per head) UK=100	110	100
Total investment (GFCF)		
Total employees (thousands)	4,130	-
Total ind / Comm.. Floorspace (000m2)	68,273	568,909
<b>ENVIRONMENT:</b>		
Distance travelled by car per person per year (miles)	6,961	5,713 (GB)
Total energy final consumption (PJ)	9,810 (pro-rata)	72,140
Total energy production (PJ)	13,897 (pro-rata)	102,190
Total energy CO2 emissions (Gg)	72,001	529,424
Total land area (sq. km)	19,069	241,930
Change to urban use – not previously developed (hectares)	334 ha per year	6,261 (Eng) 95/98
Ecological / derelict land area		
<b>COMBINED INDICES:</b>		
economy / resource efficiency:		
£GDP / GJ per capita welfare / economy efficacy:		
m2 floorspace / £GDP per capita		
resource / welfare efficacy:		
GJ / m2 floorspace per capita		
ISEW		

### A.3 Comparison of the methodology in this study with the FLAT tool

This section provides a comparison of the methodology employed in this study with the approach employed for the development of FLAT (Footprinting for Local Authorities Tool) developed by Best Foot Forward in conjunction with SEI-Y for the Office of the Deputy Prime Minister (ODPM).

#### **Food**

The National Food Survey has been used in both approaches as the primary data for analysis. FLAT relies on the embodied energy data of LPR while the South East study includes both residual and capital energy use into the calculation. The same global yield factors have been applied.

#### **Energy**

There are similar results within both approaches. FLAT does not offer a regional breakdown and merely relies on a population proxy while within the South East project a specific regional breakdown has been undertaken, meaning a slightly higher ecological footprint. The direct energy component will always be one of the simplest components. It is no major secret that total CO<sub>2</sub> emissions are divided by 5.2 (tonnes of CO<sub>2</sub> sequestered per hectare) and multiplied by 1.35 (global equivalence factor for forests).

#### **Goods and Waste**

The South East project relies on a “bottom-up” approach based on the embodied energy of all the materials and products used by households and the commercial sector. The list of products is based on the COICOP classification as listed in the “House Expenditure Survey”. Within FLAT waste is employed as an indicator of consumption whereby recycling and lower waste generation results in a lower ecological footprint. This component within FLAT also includes construction impacts not accounted for by housing, services, agriculture or mobility infrastructure.

Finally, continuing with the theme of including other GHG emissions, CH<sub>4</sub> from landfill has been included.

#### **Transport**

There will be very little difference between the results as both approaches rely on the methodology documented in Simmons, Lewis and Barrett (2000)<sup>1</sup>. The results from the South East approach will be slightly higher because it has adopted the concept of “Emissions Land” (documented in Lenzen 2001)<sup>2</sup> as opposed to just “Energy Land”. In reality this means the inclusion of other greenhouse gases, namely CH<sub>4</sub> and N<sub>2</sub>O).

#### **Construction**

The South East project relies on a “bottom-up” approach based on the embodied energy of all the materials and products used by construction industry, based on the Viridis study of the construction industry.

Within FLAT no variation is shown between the UK regions meaning a flat figure is applied to all the regions. This will explain some of the differential along with the use of different embodied energy data.

#### **Commercial Services**

Within FLAT, energy not accounted elsewhere is categorised as nationally produced goods. Thus this category is subject to considerably more error than others as it relies on the accuracy of all other energy calculations. Within the South East project the resource consumption of the commercial sector has been allocated along with energy consumption.

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<sup>1</sup> Simmons C, Lewis K; Barrett J (2000) Two feet - Two Approaches: a component-based model of ecological footprinting. *Ecological Economics* 32:375-380

<sup>2</sup> Lenzen M, Murray SA (2001) A modified ecological footprint method and its application to Australia. *Ecological Economics* 37:229-255

## A.4 Definition of the construction industry

**Table A.4.1 Complete list of all PRODCOM items that together define the construction industry (after Viridis Report VR4<sup>3</sup>)**

<i>PRODCOM number &amp; description of primary material / product</i>
<b>Quarry products</b>
<b>141111: Marble and other building stone</b>
<b>14111133: Marble and travertine, crude or roughly trimmed</b>
<b>14111135: Marble and travertine merely cut into rectangular or square blocks or slabs of a thickness not exceeding 25cm thick</b>
<b>14111137: Marble and travertine merely cut into rectangular or square blocks or slabs of a thickness exceeding 25cm</b>
<b>14111150: Ecaussine and other calcareous monumental or building stone of an apparent specific gravity of 2.5kg/1,000cm<sup>3</sup> or more, and alabaster crude, roughly trimmed or merely cut</b>
<b>141112: Granite, sandstone, porphyry and basalt</b>
<b>14111235: Granite merely cut into rectangular (INCLUDING square) blocks or slabs of a thickness not exceeding 25cm</b>
<b>14111237: Granite merely cut into rectangular (INCLUDING square) blocks or slabs of a thickness exceeding 25cm</b>
<b>14111253: Sandstone, crude or roughly trimmed</b>
<b>14111255: Sandstone merely cut into rectangular (INCLUDING square) blocks or slabs of a thickness not exceeding 25cm</b>
<b>14111256: Sandstone merely cut into rectangular (INCLUDING square) blocks or slabs</b>
<b>14111257: Sandstone, merely cut into rectangular (INCLUDING square) blocks or slabs of a thickness exceeding 25cm</b>
<b>14111290: Porphyry, basalt and other monumental or building stone, crude, roughly trimmed or merely cut</b>
<b>14121030: Gypsum and anhydrite</b>
<b>14121050: Limestone etc.</b>
<b>141220: Chalk and Dolomite</b>
<b>14122010: Chalk</b>
<b>14122030: Dolomite, crude, roughly trimmed or merely cut into rectangular or square blocks or slabs</b>
<b>14122050: Calcined and sintered dolomite, crude, roughly trimmed or merely cut into rectangular or square blocks or slabs</b>
<b>14122070: Agglomerated dolomite INCLUDING: - tarred dolomite</b>
<b>14131000: Slate, crude, roughly trimmed or merely cut into rectangular or square blocks or slabs</b>
<b>14211150/90: Construction sands (incl. silica sands)</b>
<b>14211150: Silica sands (quartz sands or industrial sands)</b>
<b>14211190: Construction sands such as clayey sands and felspathic sands INCLUDING: - kaolinic sands</b>
<b>14211210: Gravel, pebbles, shingle and flint of a kind used for concrete aggregates, for road metalling or for railway or other ballast</b>
<b>14211230: Crushed stone of a kind used for concrete aggregates, for roadstone and for other construction use</b>
<b>14211250/90: Granules of stone</b>
<b>14211250: Granules, chippings and powder of marble</b>
<b>14211290: Granules, chippings and powder of travertine, Ecaussine, granite, porphyry, basalt, sandstone and other monumental stone</b>
<b>14211330: Slag for construction use</b>
<b>14211350: Coated roadstone (tarred macadam)</b>
<b>14221210: Bentonite etc.</b>
<b>14221250: Common clays and shales for construction use (for bricks, tiles, pipes, cement)</b>
<b>14501000: Natural bitumen and natural asphalt; asphaltites and asphaltic rocks</b>
<b>14502340: Asbestos</b>
<b>Wood products</b>
<b>20101010: Railway or tramway sleepers of wood</b>
<b>20101032/34: Coniferous wood sawn or chipped lengthwise</b>
<b>20101031: Softwood sawn or chipped lengthwise, sliced or peeled (rotary cut), finger-jointed, of a thickness</b>

<sup>3</sup> Smith RA, Kersey JR, Griffith PJ (2002) The Construction Industry Mass Balance: resource use, wastes and emissions; Viridis Report VR4; CIRIA and Viridis

**PRODCOM number & description of primary material / product****greater than 6mm****20101032: Softwood sawn or chipped lengthwise, sliced or peeled (rotary cut), of a thickness greater than 6mm, finger-jointed or sanded****20101033: Softwood sawn or chipped lengthwise, sliced or peeled (rotary cut), planed, sanded, of a thickness greater than 6mm EXCLUDING: - finger-jointed****20101034: Softwood sawn or chipped lengthwise, sliced or peeled (rotary cut) or planed, of a thickness greater than 6mm****20101035: Spruce wood****20101037: Pine wood****20101039: Softwood sawn or chipped lengthwise****20101050: Hardwood, sawn or chipped lengthwise****20101071: Tropical wood sawn or chipped lengthwise****20101077: Oak blocks****201021: Wood continuously shaped, blocks, strips or freezes****20102110: Softwood continuously shaped (tongued, grooved, rebated, chamfered, V-jointed, beaded, moulded, rounded) along any of its edges or faces****20102153: Hardwood continuously shaped (tongued, grooved, rebated, chamfered, V-jointed, beaded, moulded, rounded) along any of its edges or faces****20102155: Hardwood blocks, strips and friezes for parquet or block flooring, not assembled, continuously shaped along any of its edges or faces****201031: Wood poles****20103115: Rough softwood poles, injected or otherwise impregnated with paint, stains, creosote or other preservatives, 6-18m in length and with a circumference at the butt end greater than 45cm but less than or equal to 90cm****20103117: Poles of wood in the rough, injected or otherwise impregnated with paint, stains, creosote or other preservatives EXCLUDING: - coniferous wood 6m to 18m in length and with a circumference at the butt end of more than 45cm but not more than****20103200: Railway or tramway sleepers (cross-ties) of impregnated wood****202011/12: Plywood****20201103: Plywood consisting solely of sheets of wood with each ply not exceeding 6mm thickness, with at least one outer ply of tropical wood****20201105: Plywood consisting solely of sheets of wood with each ply not exceeding 6mm thick and with at least one outer ply of hardwood****20201109: Plywood consisting solely of sheets of wood with each ply less than or equal to 6mm thickness and with at least one outer ply of softwood****20201233: Plywood, veneered panels and similar laminated wood containing at least one outer ply of hardwood and at least one layer of chipboard****20201235: Plywood veneered panels, and similar laminated wood with at least one outer ply of hardwood INCLUDING: - blockboard, laminboard and battenboard****20201239: Plywood, veneered panels and similar laminated board with at least one outer ply of hardwood****20201253: Plywood, veneered panels and similar laminated board with at least one layer of chipboard****20201255: Plywood, veneered panels and similar laminated board INCLUDING: - blockboard, laminboard and battenboard****20201259: Plywood, veneered panels and similar laminated wood****202013: Particle board****20201333: Chipboard and similar board of wood unworked or sanded****20201335: Chipboard and similar board of wood surfaced with high pressure decorative laminates****20201337: Chipboard and similar board of wood surfaced with melamine resin impregnated paper****20201339: Waferboard, chipboard and similar board of wood INCLUDING: - oriented strand board****20201350: Chipboard and similar board of bagasse, bamboo, cereal straw, flax or hemp shives and other ligneous materials****202014: Fibreboard****20201413: Fibreboard of a density exceeding 0.8g/cm<sup>3</sup>, not mechanically worked or surface covered****20201415: Fibreboard of a density exceeding 0.8g/cm<sup>3</sup> INCLUDING: - mechanically worked or surface covered****20201433: Fibreboard of a density exceeding 0.5g/cm<sup>3</sup> but not exceeding 0.8g/cm<sup>3</sup>, not mechanically worked or surface covered****20201435: Fibreboard of a density exceeding 0.5g/cm<sup>3</sup> but not exceeding 0.8g/cm<sup>3</sup> INCLUDING: - mechanically worked or surfaced covered****20201453: Fibreboard of a density exceeding 0.35g/cm<sup>3</sup> but not exceeding 0.5g/cm<sup>3</sup>, not mechanically worked or**

**PRODCOM number & description of primary material / product****surface covered**

**20201455: Fibreboard of a density exceeding 0.35g/cm<sup>3</sup> but not exceeding 0.5g/cm<sup>3</sup> INCLUDING: - mechanically worked or surfaced covered**

**20201473: Fibreboard of a density not exceeding 0.35g/cm<sup>3</sup>, not mechanically worked or surface covered**

**20201475: Fibreboard of a density not exceeding 0.35g/cm<sup>3</sup> INCLUDING: - mechanically worked or surface covered**

**202021: Veneer sheets**

**20202113: Veneer sheets and sheets for plywood and other wood sawn lengthwise, sliced or peeled, planed, sanded or finger-jointed and as small boards for the manufacture of pencils, of a thickness not exceeding 6mm**

**20202118: Veneer sheets and sheets for plywood and other wood sawn lengthwise, sliced or peeled (rotary cut), of a thickness not exceeding 6mm**

**20202200: Densified wood**

**203011: Windows and doors of wood**

**20301110: Windows, French-windows and their frames of wood Income from installation work should be reported separately under NON PRODUCTION INCOME in Section C**

**20301150: Doors and their frames and thresholds of wood Income from installation work should be reported separately under NON PRODUCTION INCOME in Section C**

**203012: Parquet and shuttering of wood**

**20301215: Parquet panels of wood for mosaic floors**

**20301219: Parquet panels of wood**

**20301230: Shuttering of wood for concrete constructional work**

**20301250: Shingles and shakes of wood**

**Finishes, coatings and adhesive products**

**243011: Paints and varnishes**

**24301150: Paints and varnishes, based on acrylic or vinyl polymers dispersed or dissolved in an aqueous medium INCLUDING: - enamels and lacquers**

**24301170: Paints and varnishes, based on synthetic or chemically modified natural polymers dispersed or dissolved in an aqueous medium INCLUDING: - enamels and lacquers**

**243012: Other paints and varnishes**

**24301225: Paints and varnishes, based on polyesters dispersed or dissolved in a non-aqueous medium and where the weight of the solvent exceeds 50% of the weight of the solution INCLUDING: - enamels and lacquers**

**24301229: Paints and varnishes, based on polyesters dispersed or dissolved in a non-aqueous medium INCLUDING: - enamels and lacquers**

**24301230: Paints and varnishes, based on acrylic or vinyl polymers dispersed or dissolved in a non-aqueous medium and where the weight of the solvent exceeds 50% of the weight of the solution INCLUDING: - enamels and lacquers**

**24301250: Paints and varnishes, based on acrylic or vinyl polymers dispersed or dissolved in a non-aqueous medium INCLUDING: - enamels and lacquers**

**24301270: Paints and varnishes, based on synthetic or chemically modified natural polymers dispersed or dissolved in a non-aqueous medium where the weight of the solvent exceeds 50% of the weight of the solution INCLUDING: - enamels and lacquers**

**24301290: Paints and varnishes, based on synthetic or chemically modified natural polymers, dispersed or dissolved in a non-aqueous medium INCLUDING: - enamels and lacquers**

**24302253: Mastics**

**24302255: Painters' fillings**

**24302260: Non-refractory surfacing preparations**

**24302273/79: Organic composite solvents**

**24302273: Organic composite solvents and thinners used in conjunction with coatings and inks, based on butyl acetate**

**24302279: Organic composite solvents and thinners used in conjunction with coatings and inks**

**246210: Glues**

**24621013: Casein glues**

**24621015: Caseinates and other casein derivatives**

**24621020: Albumins, albuminates and other derivatives**

**24621050: Bone glues, other glues of animal origin**

**24621060: Glues based on starches, dextrans or other modified starches**

**24621070: Prepared glues and adhesives and products suitable for use as glues or adhesives, put up for retail sale as glues or adhesives in packages weighing not more than 1kg EXCLUDING: - casein, bone, starch or dextrin**

**PRODCOM number & description of primary material / product****glues**

**24621080: Adhesives based on rubber or plastic INCLUDING: - artificial resins EXCLUDING: - put up for retail sale in packages weighing 1kg or less**

**24621090: Prepared glues and other prepared adhesives EXCLUDING: - casein, bone, starch or dextrin glues - rubber or plastic adhesives - prepared glues and adhesives and products suitable for use as glues or adhesives, put up for retail sale as glues**

**24621095: Prepared glues and other prepared adhesives; products suitable for use as glues or adhesives**

**24664867: Fire-proofing and water-proofing**

**Plastic products for construction**

**252121/22: Plastic tubes, pipes and hoses**

**25212153: Rigid tubes, pipes and hoses of polymers of ethylene**

**25212155: Rigid tubes, pipes and hoses of polymers of propylene**

**25212157: Rigid tubes, pipes and hoses of polymers of vinyl chloride**

**25212170: Rigid tubes, pipes and hoses of plastics**

**25212270: Plastic fittings for tubes, pipes and hoses INCLUDING: - joints, elbows and flanges**

**252311: Plastic floor, wall and ceiling coverings**

**25231155: Floor coverings in rolls or in tiles, and wall or ceiling coverings consisting of a support impregnated, coated or covered with polyvinyl chloride**

**25231159: Floor coverings in rolls or in tiles and wall or ceiling coverings of polymers of vinyl chloride**

**25231190: Floor coverings in rolls or in tiles, and wall or ceiling coverings of plastics**

**252312: Plastic sanitary fixtures**

**25231250: Plastic baths, shower-baths and wash-basins**

**25231270: Plastic lavatory seats and covers**

**25231290: Plastic bidets, lavatory pans, flushing cisterns and similar sanitary ware**

**25231300: Plastic reservoirs, tanks and vats**

**252314: Plastic windows, doors, blinds and shutters**

**25231450: Plastic doors, windows and their frames and thresholds for doors Income from installation work should be reported separately under NON PRODUCTION INCOME in Section C**

**25231470: Plastic shutters, blinds and similar articles and parts thereof**

**252315: Plastic fittings and mountings**

**25231550: Plastic fittings and mountings intended for permanent installation in or on doors, windows, staircases, walls, roofs or other parts of buildings INCLUDING: - wall cladding, large scale shelving, balconies, balustrades, fencing, gates, gutte**

**25231590: Other builders' ware of plastic INCLUDING: - rawl plugs and other wall plugs; trunking, ducting and cable trays for electrical circuits - reservoirs, tanks, vats and similar of a capacity of 300 litres or less**

**25242400: Plastic parts for lamps**

**Glass products for construction**

**2611: Flat Glass**

**26111115: Textured/patterned, horticultural and non-wired cast or rolled flat glass (Non-wired sheets of cast glass and rolled glass, whether or not coloured throughout the mass, opacified, flashed or having an absorbent or reflecting layer, but not**

**26111130: Wired cast flat glass (Wired sheets of cast or rolled glass whether or not coloured throughout the mass, opacified, flashed or having an absorbent or reflecting layer, but not otherwise worked)**

**26111150: Profiles of cast or rolled glass (shaped during the casting process), whether or not having an absorbent or reflecting layer, but not otherwise worked**

**26111212: Non-reflective coated float glass**

**26111214: Reflective coated float glass including low emissivity and solar control, of a thickness not exceeding 3.5mm**

**26111217: Reflective coated float glass including low emissivity and solar control, of a thickness exceeding 3.5mm**

**26111230: Tinted float, screen printed, sandblasted, acid etched and other decorative (but not further processed) flat glass**

**26111280: Clear float, polished sheet and polished wired sheet glass**

**26121190: Decorative non-toughened flat glass**

**26121230/70: Safety glass**

**26121230: Architectural toughened safety glass INCLUDING: - for balustrades, internal partitions and internal doors**

**26121270: Architectural laminated safety glass**

**26121330: Multiple-walled insulating units of glass**

**PRODCOM number & description of primary material / product****2614: Glass Fibres****26141110: Glass fibre threads cut into lengths of at least 3mm but not more than 50mm (chopped strands)****26141130: Glass fibre filaments INCLUDING: - rovings****26141150: Slivers, yarns and chopped strands of filaments of glass fibres****26141170: Staple glass fibre articles****26141210: Glass fibre mats INCLUDING: - of glass wool****26141230: Glass fibre voiles INCLUDING: - of glass wool****26141250: Nonwoven glass fibre webs, felts, mattresses and boards****26141293: Glass fibres and articles thereof INCLUDING: - non-textile fibres in bulk or flocks****26141295: Pads and casings of glass fibres for insulating tubes and pipes****26141299: Glass fibre articles of textile fibres****26151200: Other glass used for building or construction purposes (other than doors or windows)**

## Ceramic products for construction

**2622: Ceramic Sanitary Fixtures****26221030: Porcelain or china sanitary fixtures INCLUDING: - sinks, wash basins, wash basin pedestals, baths, bidets, water closet pans, flushing cisterns, lavatory cisterns and urinals****26221050: Ceramic sanitary fixtures INCLUDING: - sinks, wash basins, wash basin pedestals, baths, bidets, water closet pans, flushing cisterns, lavatory cisterns and urinals****2623: Ceramic Insulators and Insulating Fittings****26231033: Ceramic electrical insulators with NO metal parts****26231035: Ceramic electrical insulators with metal parts, for overhead power transmission or traction lines****26231039: Ceramic electrical insulators with metal parts****26231053: Ceramic insulating fittings for electrical machines, appliances or equipment, containing 80% or more by weight of metallic oxides****26231055: Ceramic insulating fittings for electrical machines, appliances or equipment****2630: Ceramic Tiles and Flags****26301010: Unglazed ceramic mosaic tiles, cubes and similar articles, with a surface area of less than 49cm<sup>2</sup>****26301020: Glazed ceramic mosaic tiles, cubes and similar articles, with a surface area of less than 49cm<sup>2</sup>****26301030: Unglazed ceramic double tiles of the 'Spaltplatten' (split pavior) type****26301053: Unglazed stoneware flags and paving, hearth or wall tiles****26301055: Unglazed earthenware or fine pottery flags and paving, hearth or wall tiles****26301059: Unglazed ceramic flags and paving, hearth or wall tiles****26301071: Glazed ceramic double tiles of the 'Spaltplatten' (split pavior) type****26301073: Glazed stoneware flags and paving, hearth or wall tiles, with a face of not more than 90cm<sup>2</sup>****26301075: Glazed earthenware or fine pottery ceramic flags and paving, hearth or wall tiles, with a face of not more than 90cm<sup>2</sup>****26301079: Glazed ceramic flags and paving, hearth or wall tiles**

## Bricks and other clay-based products for construction

**26401110: Clay building bricks****26401130: Clay flooring blocks, support or filler tiles and the like****26401250: Clay roofing tiles****26401270: Clay constructional products INCLUDING: - chimney-pots, cowls, chimney liners and flue-blocks - architectural ornaments for use on buildings, walls, gates and the like - ventilator grills; clay-lath****26401300: Clay pipes, conduits, guttering and pipe fittings**

## Cement, concrete and plaster products for construction

**26511100: Cement clinker****26511210: White Portland cement****26511230: Grey Portland cement INCLUDING: - blended cement****26511250: Alumna cement****26511290: Other hydraulic cements****26521033: Quicklime****26521035: Slaked lime****26521050: Hydraulic lime****26531000: Plasters consisting of calcined gypsum or calcium sulphate INCLUDING: - for use in building - for use in dressing woven fabrics or surfacing paper - for use in dentistry****26611130: Building blocks and bricks of cement, concrete or artificial stone**

**PRODCOM number & description of primary material / product**

- 26611150: Tiles, flagstones and similar articles of cement, concrete or artificial stone**
- 26611200: Prefabricated structural components for building or civil engineering, of cement, concrete or artificial stone INCLUDING: - facing panels; interior walls; floor or ceiling sections; foundation components; pilings; tunnel sections; component**
- 26611300: Pipes of cement, concrete or artificial stone**
- 26612000: Prefabricated buildings of cement**
- 2662: Plaster Products for Construction Purposes**
- 26621050: Boards, sheets, panels, tiles and similar articles of plaster or of compositions based on plaster, faced or reinforced with paper or paperboard only**
- 26621090: Boards, sheets, panels, tiles and similar articles of plaster or of compositions based on plaster, not faced or reinforced with paper or paperboard only**
- 26631000: Ready-mixed concrete**
- 26641000: Factory made mortars**
- 2665: Fibre Cement**
- 26650001: Sheets, panels, tiles and similar articles, of asbestos cement**
- 26650002: Sheets, panels, tiles and similar articles, of natural or synthetic organic fibres**
- 26650003: Sheets, panels, tiles and similar articles, of natural or synthetic inorganic fibres INCLUDING: - glass or metallic fibres**
- 26651100: Panels, boards, tiles, blocks and similar articles of vegetable fibre, of straw or of shavings, chips, particles, sawdust or other wood waste, agglomerated with cement, plaster or other mineral binders for building, heat-insulating, sound-i**
- 26651230: Sheets, panels, tiles and similar articles, of asbestos-cement, cellulose fibre-cement, vegetable fibres, synthetic polymer, glass or metallic fibres**
- 26651250: Tubes, pipes and tube or pipe fittings, of asbestos-cement, cellulose fibre-cement, vegetable fibres, synthetic polymer, glass or metallic fibres**
- 26651290: Articles of asbestos-cement, cellulose fibre-cement, vegetable fibres, synthetic polymer, glass or metallic fibres INCLUDING: - troughs, basins, sinks; packing washers and joints; flower pots; chimney cowls**
- Stone and other non-metallic mineral products
- 26701100: Worked monumental or building stone and articles thereof, of marble, travertine and alabaster**
- 26701210: Natural stone setts, kerbstones and flagstones**
- 26701230: Natural stone tiles, cubes and similar articles, of which the largest surface area is less than 7cm<sup>2</sup>; artificially coloured granules, chippings and powder**
- 26701240: Worked calcareous monumental or building stone and articles thereof**
- 26701260: Worked monumental or building stone and articles thereof, of granite**
- 26701280: Worked monumental or building stone and articles thereof**
- 26701290: Worked slate and articles of slate or of agglomerated slate**
- 26821253: Roofing or waterproofing felts based on bitumen, in rolls**
- 26821259: Other products based on bitumen, in rolls**
- 26821290: Products based on bitumen not in rolls**
- 26821300: Bituminous mixtures based on natural and artificial aggregate and bitumen or natural asphalt as a binder**
- 26821630: Mixtures and articles of heat insulating, sound insulating or sound absorbing mineral materials**
- Metal products for construction
- 281100: Constructional steel work and products**
- 28110001: Constructional steel work USED AS PRINCIPAL STRUCTURAL ELEMENTS FOR BUILDINGS INCLUDING: - angles, channels, I and H sections, tubes and plates used as beams, columns, bracing wind posts and trimmers**
- 28110002: Iron or steel products used in buildings or ships (BUT NOT FORMING THE PRINCIPAL STRUCTURAL ELEMENTS) and other structural steel work INCLUDING: - floors, landings, balustrades and stairs, gates; assembled fencing, railings or barriers; duc**
- 281110: Iron or steel prefabricated buildings**
- 28111030: Iron or steel or predominantly iron or steel prefabricated buildings, such as sheds, garages, greenhouses, conservatories, holiday homes or industrial plant room, whether or not equipped with electrical wiring or fittings, machinery or other**
- 28111050: Aluminium or predominantly aluminium prefabricated buildings, such as sheds, garages, greenhouses, conservatories, holiday homes or industrial plant room, whether or not equipped with electrical wiring or fittings, machinery or other equipment**
- 28112100: Iron or steel bridges and bridge-sections**
- 28112200: Iron or steel towers and lattice masts**

**PRODCOM number & description of primary material / product**

- 28112310: Iron or steel equipment for scaffolding, shuttering, propping or pit-propping INCLUDING: - pit head frames and superstructures, adjustable/ telescopic props, tubular props (prop shafts), extensible coffering beams, tubular scaffolding and s**
- 28112330-60: Other structures of iron or steel**
- 28112330: Weirs, sluices, lock-gates, fixed landing stages, fixed docks and other maritime and waterway structures of iron or steel**
- 28112340: Structures solely or principally of iron or steel sheet comprising two walls of flat or profiled sheet with an insulating core, often referred to as sandwich panels**
- 28112350: Structures solely or principally of iron or steel sheet (whether profiled or not), for the interior or exterior of buildings, ships and the like INCLUDING: - ductwork, frames, walls, roofs and cladding, lintels, metal profiles**
- 28112360: Iron or steel structures or parts of structures; iron or steel plates, rods, angles, shapes, sections, tubes and the like, prepared for use in structures**
- 28112370: Aluminium structures and parts of structures; aluminium plates, rods, profiles, tubes and the like, prepared for use in structures INCLUDING: - bridges and bridge-sections - towers and lattice masts - roofs, roofing frameworks - balustrades**
- 28121030/50: Doors and windows**
- 28121030: Iron or steel doors, thresholds for doors, windows and their frames Income from installation work should be reported separately under NON PRODUCTION INCOME in Section C**
- 28121050: Aluminium doors, thresholds for doors, windows and their frames Income from installation work should be reported separately under NON PRODUCTION INCOME in Section C**
- 2822: Central Heating Radiators and Boilers**
- 28221130: Cast iron radiators and parts thereof for central heating**
- 28221150: Iron or steel radiators and parts thereof for central heating**
- 28221200: Central heating boilers**
- 28221300: Parts for central heating boilers**
- 28229000: Repair and maintenance of domestic and non-domestic central heating boilers**
- 2863: Locks and Hinges**
- 28631230: Base metal cylinder locks used for doors of buildings**
- 28631250: Base metal locks used for doors of buildings**
- 28631410: Base metal hinges**
- 28631440: Base metal mountings, fittings and similar articles suitable for buildings**
- 28631460: Base metal mountings, fittings and similar articles for doors, staircases, windows, blinds, coachwork, saddlery, trunks, chests, suitcases or similar travel goods, caskets or coffins INCLUDING: - horse brasses and other fittings for harness**
- 28631470: Base metal automatic door closers**
- 2874: Fasteners, Screw Machine Products, Chain and Spring**
- 28741113: Iron or steel screws, turned from bars, rods, profiles or wire, of solid section, of a shank thickness not exceeding 6mm**
- 28741115: Iron or steel screws and bolts for fixing railway construction material**
- 28741117: Iron or steel screws and bolts without heads**
- 28741123: Stainless steel slotted and cross-recessed screws with heads**
- 28741125: Iron or steel slotted and cross-recessed screws with heads**
- 28741127: Stainless steel hexagon socket head screws**
- 28741129: Iron or steel hexagon socket head screws**
- 28741131: Stainless steel hexagon bolts with heads**
- 28741133: Iron or steel hexagon bolts with heads, with a tensile strength of less than 800MPa**
- 28741135: Iron or steel hexagon bolts with heads, with a tensile strength of 800MPa or more**
- 28741139: Iron or steel bolts with heads**
- 28741153: Iron or steel coach screws**
- 28741155: Iron or steel wood screws**
- 28741157: Iron or steel screw hooks and screw rings**
- 28741173: Stainless steel self-tapping screws**
- 28741175: Iron or steel self-tapping screws**
- 28741183: Iron or steel nuts turned from bars, rods, profiles, or wire, of solid section, of a hole diameter not exceeding 6mm**
- 28741185: Stainless steel nuts**
- 28741187: Iron or steel nuts INCLUDING: - self-locking nuts**
- 28741190: Iron or steel threaded articles**

**PRODCOM number & description of primary material / product****2875: Other fabricated metal products**

**28752737: Iron or steel non-mechanical ventilators, guttering, hangers, stays, fittings for electric wiring and similar articles used in the building industry**

**28752741: Iron or steel sheet perforated buckets and similar articles used to filter water at the entrance to drains**

Cabling, wiring, lighting

**3130: Insulated Wire and Cable**

**31300001: Insulated coaxial cables and other coaxial cables and other coaxial electric conductors for data and control purposes (NOT assembled with connectors)**

**31300002: Insulated coaxial cables and other coaxial cables and other coaxial electric conductors for data and control purposes, assembled with connectors**

**31300003: Insulated electric conductors used for telecommunications, for a voltage not exceeding 80V (NOT assembled with connectors)**

**31300004: Insulated electric conductors used for telecommunications, assembled with connectors, for a voltage not exceeding 80V**

**31300005: Insulated electric conductors for data and control purposes, for a voltage not exceeding 80V (NOT assembled with connectors)**

**31300006: Insulated electric conductors for data and control purposes, assembled with connectors, for a voltage not exceeding 80V**

**31300007: Insulated electric conductors, for a voltage exceeding 80V but not exceeding 1,000V (NOT assembled with connectors)**

**31300008: Insulated electric conductors, assembled with connectors, for a voltage exceeding 80V but not exceeding 1,000V**

**31301130: Insulated winding wire lacquered or enamelled**

**31301150: Insulated winding wire INCLUDING: - anodised**

**31301200: Insulated coaxial cables and other coaxial electric conductors for data and control purposes whether or not fitted with connectors**

**31301330: Insulated electric conductors used for telecommunications whether or not fitted with connectors, for a voltage not exceeding 80 V**

**31301350: Insulated electric conductors for data and control purposes whether or not fitted with connectors, for a voltage not exceeding 80 V**

**31301370: Insulated electric conductors whether or not fitted with connectors, for a voltage exceeding 80V but not exceeding 1,000V**

**31301400: Insulated electric conductors for a voltage exceeding 1,000V**

**31301500: Optical fibre cables made up of individually sheathed fibres whether or not assembled with electric conductors or fitted with connectors**

**3150: Lighting Equipment and Electric Lamps**

**31501510: Fluorescent hot cathode discharge lamps, with double ended cap**

**31501530: Fluorescent hot cathode discharge lamps**

**31501553: Mercury vapour discharge lamps**

**31501556: Sodium vapour discharge lamps other than ultraviolet lamps**

**31501559: Discharge lamps**

**31501570: Ultraviolet or infrared lamps; arc lamps**

**31502400: Illuminated signs, illuminated name-plates and the like INCLUDING: - road signs**

**31502530: Chandeliers and other electric ceiling or wall lighting fittings**

**31503430: Electric lamps and lighting fittings, of plastic and other materials, of a kind used for filament lamps and tubular fluorescent lamps**

**31504100: Parts for electric filament or discharge lamps INCLUDING: - sealed beam lamp units - ultraviolet or infrared lamps - arc lamps**

**31504250: Parts of lamps and lighting fittings and illuminated signs and name-plates**

## A.5 Results presented in Combined Nomenclature classification

This Material Flow Analysis study is a contribution to the “Mass Balance Framework” that has been devised by Forum for the Future. The Forum approach is organised by Combined Nomenclature (CN) coding, which is a list of commodities (materials and products) used to track imports and exports, primarily for excise purposes, but it provides a ready-made classification that is widely used in industry<sup>4</sup>.

This chapter includes tables that represent the results from the MFA and EF calculations according to CN classification. Most of these results have been presented in Chapter 8. However, the tables presented below provide additional information as they contain more detailed information. Also, MFA and EF results for consumer and public services have been included below.

**Table A.5.1 Codes and descriptions for the presentation of MFA and EF results following the CN classification (result table rows)**

CN sections and codes	CN description of materials and products
<b>Sect. I Live animals; animal products</b>	
01	Live animals
02	Meat and edible meat offal
03	Fish and crustaceans, molluscs and other aquatic invertebrates
04	Dairy produce; birds' eggs; natural honey; edible products of animal origin
05	Products of animal origin not elsewhere specified or included
<b>Sect. II Vegetable products</b>	
06	Live trees and other plants; bulbs, roots and the like; cut flowers and ornamental foliage
07	Edible vegetables and certain roots and tubers
08	Edible fruit and nuts; peel of citrus fruits or melons
09	Coffee, tea, mate and spices
10	Cereals
11	Products of the milling industry; malt; starches; inulin; wheat gluten
12	Oil seeds and oleaginous fruits; miscellaneous grains, seeds and fruit; industrial or medical
13	Lacs; gums, resins and other vegetable saps and extracts
14	Vegetable plaiting materials; vegetable products not elsewhere specified or included
<b>Sect. III Animal or vegetable fats and oils and their cleavage products</b>	
15	Animal or vegetable fats and oils and their cleavage products
<b>Sect. IV Food products</b>	
16	Preparations of meat, fish or crustaceans, molluscs or other aquatic invertebrates
17	Sugars and sugar confectionery
18	Cocoa and cocoa preparations
19	Preparations of cereals, flour, starch or milk; pastrycooks' products
20	Preparations of vegetables, fruit, nuts or other parts of plants
21	Miscellaneous edible preparations
22	Beverages, spirits and vinegar
23	Residues and waste from the food industries; prepared animal fodder
24	Tobacco and manufactured tobacco substitutes
<b>Sect. V Mineral products</b>	

<sup>4</sup> See <http://www.massbalance.org/>

CN sections and codes	CN description of materials and products
25	<i>Salt; sulphur; earths and stone; plastering materials, lime and cement</i>
26	<i>Ores, slag and ash</i>
27	<i>Mineral fuels, mineral oils and products of their distillation; bituminous substances; mineral</i>
<b>Sect. VI Products of the chemical or allied industries</b>	
28	<i>Inorganic chemicals: organic or inorganic compounds of precious metals, of rare-earth metals,</i>
29	<i>Organic chemicals</i>
30	<i>Pharmaceutical products</i>
31	<i>Fertilizers</i>
32	<i>Tanning or dyeing extracts; tannins and their derivatives; dyes, pigments and other colouring</i>
33	<i>Essential oils and resinoids; perfumery, cosmetic or toilet preparations</i>
34	<i>Soaps, organic surface-active agents, washing preparations, lubricating preparations, artificial</i>
35	<i>Albuminous substances; modified starches; glues; enzymes</i>
36	<i>Explosives; pyrotechnic products; matches; pyrophoric alloys; combustible materials</i>
37	<i>Photographic or cinematographic products</i>
38	<i>Miscellaneous chemical products</i>
<b>Sect. VII Plastics and rubber and articles thereof</b>	
39	<i>Plastics and articles thereof</i>
40	<i>Rubber and articles thereof</i>
<b>Sect. VIII Hides and skins; articles of leather etc.</b>	
41	<i>Hides and skins (other than furskins) and leather</i>
42	<i>Articles of leather; saddlery and harness; travel goods, handbags and similar containers</i>
43	<i>Furskins and artificial fur; articles thereof</i>
<b>Sect. IX Wood and articles of wood etc.</b>	
44	<i>Wood and articles of wood; wood charcoal</i>
45	<i>Cork and articles of cork</i>
46	<i>Wickerwork and basketwork</i>
<b>Sect. X Paper and paperboard; pulp of wood etc.</b>	
47	<i>Pulp of wood or of other fibrous cellulosic material; waste and scrap of paper or paperboard</i>
48	<i>Paper and paperboard; articles of paper pulp, paper or paperboard</i>
49	<i>Books, newspapers, pictures and other products of the printing industry</i>
<b>Sect. XI Textiles and textile articles</b>	
50	<i>Silk</i>
51	<i>Wool, fine and coarse animal hair; yarn and fabrics of horsehair</i>
52	<i>Cotton</i>
53	<i>Other vegetable textile fibres; paper yarn and woven fabrics of paper yarn</i>
54	<i>Man-made filaments</i>
55	<i>Man-made staple fibres</i>
56	<i>Wadding, felt and nonwovens; special yarns; twine, cordage, rope and cable and articles</i>
57	<i>Carpets and other textile floor coverings</i>
58	<i>Special woven fabrics; tufted textile products; lace; tapestries; trimmings; embroidery</i>
59	<i>Impregnated, coated, covered or laminated textile fabrics; articles for technical use</i>
60	<i>Knitted or crocheted fabrics</i>
61	<i>Articles of apparel and clothing accessories, knitted or crocheted</i>
62	<i>Articles of apparel and clothing accessories, not knitted or crocheted</i>
63	<i>Other made up textile articles; sets; worn clothing and worn textile articles; rags</i>
<b>Sect. XII Footwear, headgear, umbrellas etc.</b>	
64	<i>Footwear, gaiters and the like; parts of such articles</i>

CN sections and codes	CN description of materials and products
65	<i>Headgear and parts thereof</i>
66	<i>Umbrellas, sun umbrellas, walking-sticks, seat-sticks, whips, riding-crops and parts thereof</i>
67	<i>Prepared feathers and down and articles made of feathers or of down; artificial flowers; articles</i>
<b>Sect. XIII Articles of stone, plaster, cement, asbestos, mica or similar materials; Ceramic products; Glass</b>	
68	<i>Articles of stone, plaster, cement, asbestos, mica or similar materials</i>
69	<i>Ceramic products</i>
70	<i>Glass and glassware</i>
<b>Sect. XIV Natural or cultured pearls, precious or semi-precious stones, precious metals</b>	
71	<i>Natural or cultured pearls, precious or semi-precious stones, precious metals, jewellery, coin</i>
<b>Sect. XV Base metals and articles thereof</b>	
72	<i>Iron and steel</i>
73	<i>Articles of iron or steel</i>
74	<i>Copper and articles thereof</i>
75	<i>Nickel and articles thereof</i>
76	<i>Aluminium and articles thereof</i>
77	<i>(reserved for possible future use in the harmonized system)</i>
78	<i>Lead and articles thereof</i>
79	<i>Zinc and articles thereof</i>
80	<i>Tin and articles thereof</i>
81	<i>Other base metals; cermets; articles thereof</i>
82	<i>Tools, implements, cutlery, spoons and forks, of base metal; parts thereof of base metal</i>
83	<i>Miscellaneous articles of base metal</i>
<b>Sect. XVI Machinery and mechanical appliances; electrical machinery and equipment and parts thereof</b>	
84	<i>Nuclear reactors, boilers, machinery and mechanical appliances; parts thereof</i>
85	<i>Electrical machinery and equipment and parts thereof; sound recorders and reproducers, TV</i>
<b>Sect. XVII Vehicles, aircraft, vessels and associated transport equipment</b>	
86	<i>Railway or tramway locomotives, rolling-stock and parts thereof; railway or tramway track</i>
87	<i>Vehicles other than railway or tramway rolling-stock, and parts and accessories thereof</i>
88	<i>Aircraft, spacecraft, and parts thereof</i>
89	<i>Ships, boats and floating structures</i>
<b>Sect. XVIII Optical, photographic, cinematographic, measuring, checking, precision, medical or surgical</b>	
90	<i>Optical, photographic, cinematographic, measuring, checking, precision, medical or surgical</i>
91	<i>Clocks and watches and parts thereof</i>
92	<i>Musical instruments; parts and accessories for such articles</i>
<b>Sect. XIX Arms and ammunition; parts and accessories thereof</b>	
93	<i>Arms and ammunition; parts and accessories thereof</i>
<b>Sect. XX Miscellaneous manufactured articles</b>	
94	<i>Furniture; medical and surgical furniture; bedding, mattresses, mattress supports, cushions</i>
95	<i>Toys, games and sports requisites; parts and accessories thereof</i>
96	<i>Miscellaneous manufactured articles</i>
<b>Sect. XXI Works of art, collectors' pieces and antiques</b>	
97	<i>Works of art, collectors' pieces and antiques</i>
98	<i>Complete industrial plant exported in accordance with commission regulation (eec) no 518/79</i>
99	<i>(reserved for special uses determined by the competent Community authorities)</i>

CN sections and codes	CN description of materials and products	
	Water not	Other

## Overall Results

Table A.5.2 MFA and EF results for consumption in the South East in 2000, broken down by CN 2-digit groups<sup>5</sup>

CN code (2-digit level)	Direct Material Consumption (DMC) (‘000 t)	Total Material Consumption (TMC) (‘000 t)	CO <sub>2</sub> Emissions (‘000 t)	Ecological Footprint (EF) (‘000 gha)	EF per capita (gha/cap)
<b>Section I</b>	<b>1,385</b>	<b>8,389</b>	<b>10,350</b>	<b>7,787</b>	<b>0.960</b>
0200 00 00	284	2,212	3,825	2,628	0.324
0300 00 00	73	1,967	1,264	1,208	0.149
0400 00 00	1,028	4,210	5,261	3,951	0.487
					-
<b>Section II</b>	<b>1,160</b>	<b>3,723</b>	<b>3,115</b>	<b>1,172</b>	<b>0.144</b>
0600 00 00	19	27	14	94	0.012
0700 00 00	711	2,306	1,498	511	0.063
0800 00 00	391	1,123	1,399	434	0.053
0900 00 00	21	227	182	112	0.014
1100 00 00	18	40	22	21	0.003
					-
<b>Section III</b>	<b>34</b>	<b>152</b>	<b>117</b>	<b>232</b>	<b>0.029</b>
1500 00 00	34	152	117	232	0.029
					-
<b>Section IV</b>	<b>3,801</b>	<b>14,941</b>	<b>14,459</b>	<b>6,767</b>	<b>0.834</b>
1600 00 00	154	1,936	2,783	822	0.101
1700 00 00	55	172	120	68	0.008
1800 00 00	27	156	184	202	0.025
1900 00 00	651	2,296	1,846	965	0.119
2000 00 00	384	1,472	1,280	512	0.063
2100 00 00	107	765	917	588	0.072
2200 00 00	911	3,482	2,872	845	0.104
2300 00 00	228	2,492	1,372	647	0.080
2400 00 00	7.9	47	24	18	0.002
					-
<b>Section V</b>	<b>77,514</b>	<b>109,380</b>	<b>76,662</b>	<b>19,358</b>	<b>2.385</b>
2500 00 00	53,374	73,988	4,303	1,113	0.137
2700 00 00	24,140	35,393	72,359	18,244	2.248
					-
<b>Section VI</b>	<b>15,737</b>	<b>32,152</b>	<b>25,427</b>	<b>6,589</b>	<b>0.812</b>
2900 00 00	11	57	49	13	0.002
3000 00 00	14	140	73	29	0.004
3200 00 00	252	1,861	1,727	447	0.055
3300 00 00	24	82	72	19	0.002
3400 00 00	121	414	364	94	0.012
3500 00 00	5.4	29	25	6.6	0.001
3800 00 00	15,310	29,571	23,117	5,981	0.737

<sup>5</sup> Section subtotals do not necessarily add up to the overall total as they are not double-counting corrected.

<b>CN code</b> <b>(2-digit level)</b>	<b>Direct Material Consumption (DMC)</b> <b>(‘000 t)</b>	<b>Total Material Consumption (TMC)</b> <b>(‘000 t)</b>	<b>CO<sub>2</sub> Emissions</b> <b>(‘000 t)</b>	<b>Ecological Footprint (EF)</b> <b>(‘000 gha)</b>	<b>EF per capita</b> <b>(gha/cap)</b>
					-
<b>Section VII</b>	<b>1,198</b>	<b>5,884</b>	<b>4,437</b>	<b>1,177</b>	<b>0.145</b>
3900 00 00	613	3,210	2,637	682	0.084
4000 00 00	34	128	76	49	0.006
					-
<b>Section VIII</b>	<b>30</b>	<b>233</b>	<b>100</b>	<b>26</b>	<b>0.003</b>
4100 00 00	1	90	39	10	0.001
4200 00 00	29	143	61	16	0.002
					-
<b>Section IX</b>	<b>2,692</b>	<b>6,693</b>	<b>2,322</b>	<b>670</b>	<b>0.083</b>
4400 00 00	2,692	6,693	2,322	670	0.083
4500 00 00	0	0	0	0	0.000
					-
<b>Section X</b>	<b>3,666</b>	<b>17,600</b>	<b>11,247</b>	<b>8,017</b>	<b>0.988</b>
4800 00 00	322	1,521	595	515	0.063
4900 00 00	789	4,606	1,899	1,376	0.170
	-	-	-	-	-
<b>Section XI</b>	<b>255</b>	<b>2,941</b>	<b>1,796</b>	<b>574</b>	<b>0.071</b>
5100 00 00	-	36	18	4.6	0.001
5200 00 00	22	738	368	157	0.019
5400 00 00	-	23	20	5.2	0.001
5500 00 00	13	163	150	39	0.005
5800 00 00	21	197	95	48	0.006
6100 00 00	0.8	-	-	-	-
6300 00 00	22	290	145	62	0.008
					-
<b>Section XII</b>	<b>29</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>
6400 00 00	29	-	-	-	-
					-
<b>Section XIII</b>	<b>8,032</b>	<b>10,442</b>	<b>2,276</b>	<b>589</b>	<b>0.073</b>
6800 00 00	5,871	6,459	1,064	275	0.034
6900 00 00	1,614	2,102	446	116	0.014
7000 00 00	548	1,882	765	198	0.024
					-
<b>Section XIV</b>	<b>3.11</b>	<b>3.11</b>	<b>-</b>	<b>-</b>	<b>-</b>
7100 00 00	3.11	3.11	-	-	-
					-
<b>Section XV</b>	<b>1,884</b>	<b>22,028</b>	<b>3,952</b>	<b>1,022</b>	<b>0.126</b>
7200 00 00	559	4,275	454	117	0.014
7300 00 00	978	7,956	2,540	657	0.081
7400 00 00	7	2,627	-	-	-
7600 00 00	95	2,063	404	104	0.013
8300 00 00	22	175	56	14	0.002
					-
<b>Section XVI</b>	<b>329</b>	<b>7,390</b>	<b>4,919</b>	<b>1,568</b>	<b>0.193</b>
8400 00 00	157	3,409	1,989	662	0.082
8500 00 00	63	2,760	1,452	523	0.064
					-
<b>Section XVIII</b>	<b>1.87</b>	<b>6.60</b>	<b>2.61</b>	<b>0.68</b>	<b>0.000</b>
9000 00 00	1.87	6.60	2.61	0.68	0.000
					-
<b>Section XX</b>	<b>96</b>	<b>593</b>	<b>428</b>	<b>111</b>	<b>0.014</b>

CN code (2-digit level)	Direct Material Consumption (DMC) (‘000 t)	Total Material Consumption (TMC) (‘000 t)	CO <sub>2</sub> Emissions (‘000 t)	Ecological Footprint (EF) (‘000 gha)	EF per capita (gha/cap)
9400 00 00	17	52	17	4.4	0.001
9600 00 00	79	541	411	106	0.013
					-
<b>Water</b>	<b>1,697,919</b>	<b>763,657</b>	<b>368</b>	<b>96</b>	<b>0.012</b>
<b>Other (not specified)</b>	<b>1,149</b>	<b>1,791</b>	<b>378</b>	<b>98</b>	<b>0.012</b>
<b>OVERALL TOTAL (double-counting corrected)</b>	<b>87.8 Mt</b>	<b>211 Mt</b>	<b>158 Mt</b>	<b>55.3 million gha</b>	<b>6.82 gha/cap<sup>a)</sup></b>
<b>OVERALL TOTAL PER CAPITA</b>	<b>10.8 t/cap</b>	<b>26.0 t/cap</b>	<b>19.5 t/cap</b>	<b>6.82 gha/cap<sup>a)</sup></b>	

a) This number for the Ecological Footprint does not include (non-transport related) built land area in the South East which accounts for another 0.10 gha/cap.

## Household Durables

The numbers for electrical equipment can be presented in two ways: either as the basic materials they are made of (plastics, metals, glass, etc.) or as the final product under CN codes 84 and 85. The approach in this study was to allocate consumption to basic materials, i.e. the numbers under CN 84 and 85 are given as extra information only.

Table A.5.3 Direct Material Consumption (DMC) of durable items in the South East in 2000

CN code	CN description	Households	Households	Households	Commercial Sector <sup>a)</sup>
		Cars (‘000 t)	Furniture+ (‘000 t)	Electr. Equipm. (‘000 t)	Electr. Equipm. (‘000 t)
	<b>Total Direct Material Consumption (DMC)</b>	<b>508.0</b>	<b>393.7</b>	<b>201.7</b>	<b>222.9</b>
	<b>Double-counting Correction</b>	<b>-</b>	<b>-</b>	<b>- 98.3</b>	<b>- 108.7</b>
	<b>Total DMC (double-counting corrected)</b>	<b>508.0</b>	<b>393.7</b>	<b>103.4</b>	<b>114.3</b>
25	Salt; sulphur; earths and	-	2.54	-	-
27	Mineral fuels, mineral oils	28.7	-	-	-
29	Organic chemicals	-	10.5	-	-
30	Pharmaceutical products	-	2.17	-	-
32	Tanning or dyeing	-	-	0.45	0.53
35	Albuminous substances;	-	5.44	-	-
39	Plastics and articles	53.4	30.3	16.8	29.1
40	Rubber and articles	27.6	6.43	-	-
41	Hides and skins (other	-	0.95	-	-
44	Wood and articles of	-	61.9	-	-
45	Cork and articles of cork	-	0.015	-	-
48	Paper and paperboard;	-	126.2	4.11	4.54
52	Cotton	-	21.7	-	-

CN code	CN description	Households	Households	Households	Commercial Sector <sup>a)</sup>
		Cars (‘000 t)	Furniture+ (‘000 t)	Electr. Equipm. (‘000 t)	Electr. Equipm. (‘000 t)
55	Man-made staple fibres	-	13.0	-	-
58	Special woven fabrics;	-	21.1	-	-
69	Ceramic products	-	1.21	-	-
70	Glass and glassware	16.6	6.05	8.53	7.43
72	Iron and steel	276.4	39.8	41.7	47.6
74	Copper and articles	5.84	-	1.12	0.42
75	Nickel and articles thereof	-	-	-	-
76	Aluminium and articles	53.8	-	3.35	1.27
83	Miscellaneous articles of	-	-	-	-
84	Nuclear reactors, boilers,	-	-	(62.0) <sup>b)</sup>	(94.9) <sup>b)</sup>
85	Electrical machinery and	-	-	(36.4) <sup>b)</sup>	(13.7) <sup>b)</sup>
<b>not specified Other</b>		<b>45.7</b>	<b>44.5</b>	<b>27.3</b>	<b>23.3</b>

a) Extra information only. MFA and EF accounts of electrical equipment in the commercial sector are included in the category “Consumer Services”.

b) Extra information only. These volumes are accounted for in the basic material categories of the CN classification.

Table A.5.4 Total Material Consumption (TMC) of durable items in the South East in 2000

CN code	CN description	Households	Households	Households	Commercial Sector <sup>a)</sup>
		Cars (‘000 t)	Furniture+ (‘000 t)	Electr. Equipm. (‘000 t)	Electr. Equipm. (‘000 t)
	<b>Total Material Consumption (TMC) (double-counting corrected)</b>	<b>6,375</b>	<b>2,366</b>	<b>3,829</b>	<b>2,367</b>
25	Salt; sulphur; earths and	-	2.55	-	-
27	Mineral fuels, mineral oils	29.2	-	-	-
29	Organic chemicals	-	56.8	-	-
30	Pharmaceutical products	-	12.5	-	-
35	Albuminous substances;	-	29.3	-	-
39	Plastics and articles	55.7	174	5.45	6.03
40	Rubber and articles	41.9	37.1	-	-
41	Hides and skins (other	-	4.68	-	-
44	Wood and articles of	-	524	-	-
45	Cork and articles of cork	-	0.46	-	-
48	Paper and paperboard;	-	616	26.0	28.7
52	Cotton	-	282	-	-
55	Man-made staple fibres	-	74.9	-	-
58	Special woven fabrics;	-	197	-	-
69	Ceramic products	-	1.74	-	-
70	Glass and glassware	22.8	16.5	-	-
72	Iron and steel	2,685	293	-	-
74	Copper and articles	2,627	-	-	-
76	Aluminium and articles	851	-	-	-
84	Nuclear reactors, boilers,	-	-	1,681	1,728
85	Electrical machinery and	-	-	2,116	604
	<b>not specified Other</b>	<b>62.9</b>	<b>44.5</b>	<b>-</b>	<b>-</b>

a) Extra information only. MFA and EF accounts of electrical equipment in the commercial sector are included in category 6: “Consumer Services”.

Table A.5.5 CO<sub>2</sub> emissions of the consumption of durable items in the South East in 2000

CN code	CN description	Households Furniture+ (‘000 t)	Households Electr. Equipm. (‘000 t)	Comm. Sector <sup>a)</sup> Electr. Equipm. (‘000 t)
<b>Total CO<sub>2</sub> Emissions (double-counting corrected)</b>		<b>1,128</b>	<b>2,104</b>	<b>1,357</b>
25	Salt; sulphur; earths and	0.017	-	-
29	Organic chemicals	49.3	-	-
30	Pharmaceutical products	10.97	-	-
35	Albuminous substances;	25.42	-	-
39	Plastics and articles thereof	153.2	4.79	5.30
40	Rubber and articles thereof	32.59	-	-
41	Hides and skins (other than	2.01	-	-
44	Wood and articles of wood;	221.1	-	-
45	Cork and articles of cork	0.21	-	-
48	Paper and paperboard;	234.6	11.1	12.3
52	Cotton	140.4	-	-
55	Man-made staple fibres	65.8	-	-
58	Special woven fabrics; tufted	94.9	-	-
69	Ceramic products	0.30	-	-
70	Glass and glassware	7.36	-	-
72	Iron and steel	90.0	-	-
84	Nuclear reactors, boilers,	-	1,008	980.5
85	Electrical machinery and	-	1,080	359.4

a) Extra information only. MFA and EF accounts of electrical equipment in the commercial sector are included in category 6: “Consumer Services”.

Table A.5.6 Ecological Footprint of household durable items in the South East in 2000

CN code	CN description	Household s Furniture (gha)	Households Electr. Equipm. (gha)	Commercial Sector <sup>a)</sup> Electr. Equipm. (gha)	EF per capita Household Durables (gha/cap)
<b>Total Ecological Footprint (double-counting corrected)</b>		<b>556,304</b>	<b>678,433</b>	<b>522,017</b>	<b>0.152</b>
25	Salt; sulphur; earths and	4			0.000001
29	Organic chemicals	12,744			0.0016
30	Pharmaceutical products	2,839			0.0003
35	Albuminous substances;	6,577			0.0008
39	Plastics and articles	39,626	1,240	1,371	0.0050
40	Rubber and articles thereof	15,387			0.0019
41	Hides and skins (other than	521			0.0001
44	Wood and articles of wood;	126,564			0.016
45	Cork and articles of cork	72			0.00001
48	Paper and paperboard;	202,111	7,479	8,267	0.026
52	Cotton	60,016			0.0074

CN code	CN description	Household	Households	Commercial Sector <sup>a)</sup>	EF per capita
		Furniture (gha)	Electr. Equipm. (gha)	Electr. Equipm. (gha)	Household Durables (gha/cap)
55	Man-made staple fibres	17,034			0.0021
58	Special woven fabrics;	47,554			0.0059
69	Ceramic products	77			0.00001
70	Glass and glassware	1,903			0.0002
72	Iron and steel	23,274			0.0029
<b>Section Machinery and mechanical</b>		-	669,713	512,379	0.083

a) Extra information only. MFA and EF accounts of electrical equipment in the commercial sector are included in category 6: "Consumer Services".

Table A.5.7 Energy and real land EF analysis of the consumption of durable items in households in the South East in 2000

3: Man. Durables	Energy Land EF	Real Land EF	Unit
Material/Product	Household Durables		
<b>Furniture + floor covering</b>			
Furniture	201.3	229	'000 gha
Floor covering	93.0	32.9	'000 gha
<b>Subtotal EF</b>	<b>294</b>	<b>262</b>	<b>'000 gha</b>
<b>Subtotal EF per capita</b>	<b>0.036</b>	<b>0.032</b>	<b>gha/cap</b>
<b>Electrical equipment</b>			
Large electrical appliances	341.8	-	'000 gha
Small electrical appliances	60.7	-	'000 gha
IT equipment	39.1	-	'000 gha
Telecommunications equipment	34.30	-	'000 gha
Radios and TVs	108	-	'000 gha
Lights	2.26	-	'000 gha
Fire equipment	0.871	-	'000 gha
Toys	12.24	-	'000 gha
Electric tools	70.4	-	'000 gha
Electr. equipm. packaging	4.11	4.61	'000 gha
<b>Subtotal EF</b>	<b>674</b>	<b>4.61</b>	<b>'000 gha</b>
<b>Subtotal EF per capita</b>	<b>0.083</b>	<b>0.0006</b>	<b>gha/cap</b>

## Household Consumables

For some of these items the average material breakdown could be worked out and was used to calculate the Ecological Footprint. The volumes of basic materials is given as extra information (but must not be double-counted with the volumes of products). The numbers for the total in Table A.5.8 take this double-counting issue into account.

Table A.5.8 MFA and EF results for consumable household items in the South East in 2000

CN code	CN description	DMC (‘000 t)	TMC (‘000 t)	CO <sub>2</sub> Emissions (‘000 t)	EF (gha)	EF per capita (gha/cap)
	<b>Total</b>	<b>1,772</b>	<b>11,604</b>	<b>5,680</b>	<b>2,972,745</b>	<b>0.37</b>
06	Live trees and other plants; bulbs,	19	27	14	93,858	0.012
23	Residues and waste from the food	228	2,492	1,372	646,870	0.080
24	Tobacco and manufactured tobacco	7.9	47	24	17,661	0.002
30	Pharmaceutical products	12	127	62	26,607	0.003
33	Essential oils and resinoids;	24	82	72	18,616	0.002
34	Soaps, organic surface-active	121	414	364	94,069	0.012
38	Miscellaneous chemical products	90	308	270	69,952	0.009
39	Plastics and articles thereof	84	478	235	60,834	0.007
40	Rubber and articles thereof	-	49	43	33,148	0.004
41	Hides and skins (other than	-	85	37	9,508	0.001
42	Articles of leather; saddlery and	29	143	61	15,891	0.002
48	Paper and paperboard; articles of	116	398	143	166,904	0.021
49	Books, newspapers, paper products	789	4,606	1,899	1,375,711	0.170
Sect. XI	Textiles and textile articles	75	895	495	190,856	0.024
50	Silk	-	0.44	0.38	98	0.000
51	Wool, fine and coarse animal hair;	-	36	18	4,620	0.001
52	Cotton	-	456	228	97,317	0.012
54	Man-made filaments	-	23	20	5,153	0.001
55	Man-made staple fibres	-	89	84	21,846	0.003
61	Articles of apparel and clothing	1	-	-	-	-
63	Other made up textile articles; sets;	22	290	145	61,822	0.008
64	Footwear, gaiters and the like; parts	29	-	-	-	-
70	Glass and glassware	19	367	53	13,613	0.002
71	Natural or cultured pearls, precious	3.1	3.1	-	-	-
72	Iron and steel	36	432	99	25,495	0.003
76	Aluminium and articles thereof	8.8	104	24	6,130	0.001
90	Optical, photographic,	1.87	6.60	2.61	675	0.00008
96	Miscellaneous manufactured	79	541	411	106,314	0.013
not	Other	0.11	0.30	0.13	35	0.000004

Table A.5.9 Energy and real land EF analysis of the consumption of consumable items in households in the South East in 2000

<b>4: Man. consumables</b>	<b>Energy Land EF</b>	<b>Real Land EF</b>	<b>Unit</b>
<b>Material/Product</b>	<b>Household Consumables</b>		
<i>Baby equipment</i>	8.58	-	'000 gha
<i>Baby toiletries/disposables</i>	56.9	-	'000 gha
<i>Books</i>	56.8	91.1	'000 gha
<i>Clothing</i>	90.7	38.4	'000 gha
<i>Cosmetics and hair products</i>	18.6	-	'000 gha
<i>Detergents, cleaning mat.</i>	143	-	'000 gha
<i>Footwear</i>	26.1	18.7	'000 gha
<i>HH consumable packaging</i>	155.9	83.6	'000 gha
<i>Horticultural products</i>	3.62	90.2	'000 gha
<i>Leather and travel goods</i>	15.9	-	'000 gha
<i>Magazines and periodicals</i>	16.1	33.9	'000 gha
<i>Medicines</i>	16.6	10.5	'000 gha
<i>Newspapers and magazines</i>	174.9	369	'000 gha
<i>Pet food</i>	356.0	292	'000 gha
<i>Photography</i>	0.187	-	'000 gha
<i>Soft furnishings</i>	37.4	24.4	'000 gha
<i>Stationery</i>	191.4	307	'000 gha
<i>Tobacco</i>	6.15	11.51	'000 gha
<i>Toilet paper</i>	37.09	129.8	'000 gha
<i>Toiletries and soap</i>	60.97	-	'000 gha
<b>Subtotal EF</b>	<b>1,473</b>	<b>1,500</b>	<b>'000 gha</b>
<b>Subtotal EF per capita</b>	<b>0.181</b>	<b>0.185</b>	<b>gha/cap</b>

### Consumer Services (Commercial Services)

This category includes resource consumption of the following service sectors: Retailing, Hotel and Catering, Communications, Banking and Finance, Insurance, Recreation and Other. All these services are available for both consumers and businesses. For this reason Category 6 combines all services, i.e. it also includes material consumption through business services (for which a separate Category (8) has been set up). All indicators show that the highest impact in this category comes from the consumption of paper and paper products, of which 2.1 million tonnes were consumed by commercial services in the South East in 2000.

Table A.5.10 MFA and EF results for consumer services in the South East in 2000

<i>CN code</i>	<i>CN description</i>	<i>DMC</i> ( <i>'000 t</i> )	<i>TMC</i> ( <i>'000 t</i> )	<i>CO<sub>2</sub></i> <i>Emissions</i> ( <i>'000 t CO<sub>2</sub></i> <i>equivalent</i> )	<i>EF</i> ( <i>gha</i> )	<i>EF per</i> <i>capita</i> ( <i>gha/cap</i> )
	<i>Totals</i> ( <i>double-counting corrected</i> )	5,278	21,824	15,053	8,436,650	1.04
		-	-	-	-	-
<i>Section IV</i>	<i>Food products</i>	1,274	2,124	3,062	2,099,605	0.26
<i>Section VII</i>	<i>Plastics and rubber and</i>	501	2,215	1,566	405,073	0.050
<i>44</i>	<i>Wood and articles of wood;</i>	103	290	211	54,671	0.007
<i>Section X</i>	<i>Paper and paperboard; pulp of</i>	2,140	8,825	7,332	5,131,701	0.63
<i>Section XI</i>	<i>Textiles and textile articles</i>	104	1,157	830	214,697	0.026
<i>Section XV</i>	<i>Base metals and articles</i>	167	4,516	379	97,926	0.012
<i>Section XVI</i>	<i>Machinery and mechanical</i>	99	1,211	1,340	346,640	0.043
<i>not specified</i>	<i>Other</i>	890	1,485	334	86,336	0.011

Table A.5.11 Energy and real land EF analysis of consumer services in the South East in 2000

<b>6: Consumer Services</b>	<i>Energy Land</i> <i>EF</i>	<i>Real Land EF</i>	<i>Unit</i>
<i>Material/Product</i>			
<i>Retailing</i>	254	170	<i>'000 gha</i>
<i>Hotel and catering</i>	899	1,388	<i>'000 gha</i>
<i>Communications</i>	260	63.5	<i>'000 gha</i>
<i>Banking and finance</i>	590	806	<i>'000 gha</i>
<i>Insurance</i>	464	633	<i>'000 gha</i>
<i>Recreation</i>	155	125	<i>'000 gha</i>
<i>Other (commercial)</i>	1,272.0	1,357	<i>'000 gha</i>
<i>Subtotal EF</i>	3,894	4,542	<i>'000 gha</i>
<i>Subtotal EF per capita</i>	0.480	0.560	<i>gha/cap</i>

Table A.5.11 as well as Figure A.1 show the EF of commercial sectors by type of EF land. Real land requirements are higher than those for energy land. Again, this is due to the high level of paper consumption.

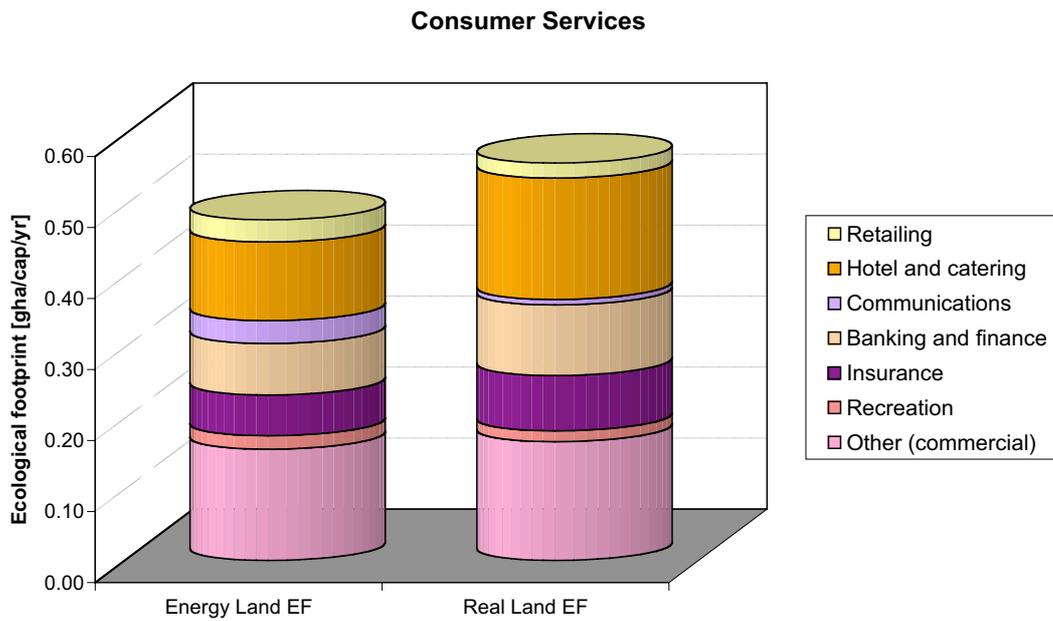


Figure A.1 Energy and real land EF analysis of consumer services in the South East in 2000

## Public Services

This category includes material consumption of public administration, a breakdown of which is given in Table A.5.12. Clearly, the consumption of paper (and paperboard) has the highest environmental impact: it accounts for 88% of the EF of this section (0.12 of 0.14 gha/cap). The use of timber (and forest area) for paper production is also the reason for a relatively high real land footprint of public services (see Table A.5.13).

Table A.5.12 MFA and EF results for public services in the South East in 2000

CN code	CN description	DMC (‘000 t)	TMC (‘000 t)	CO <sub>2</sub> Emissions (‘000 t CO <sub>2</sub> equivalent)	EF (gha)	EF per capita (gha/cap)
<b>Totals (double-counting corrected)</b>		<b>699,194</b>	<b>4,070,030</b>	<b>2,114,161</b>	<b>1,174,082</b>	<b>0.14</b>
<b>Section VII</b>	<b>Plastics and rubber and</b>	<b>50,362</b>	<b>330,807</b>	<b>157,304</b>	<b>40,696</b>	<b>0.005</b>
<b>44</b>	<b>Wood and articles of wood;</b>	<b>30,060</b>	<b>130,459</b>	<b>61,964</b>	<b>16,031</b>	<b>0.002</b>
<b>Section X</b>	<b>Paper and paperboard;</b>	<b>414,893</b>	<b>2,647,736</b>	<b>1,421,370</b>	<b>994,851</b>	<b>0.123</b>
<b>Section XI</b>	<b>Textiles and textile articles</b>	<b>21,292</b>	<b>336,324</b>	<b>170,297</b>	<b>44,057</b>	<b>0.005</b>
<b>Section XV</b>	<b>Base metals and articles</b>	<b>53,540</b>	<b>416,013</b>	<b>121,069</b>	<b>31,321</b>	<b>0.004</b>
<b>Section XVI</b>	<b>Machinery and mechanical</b>	<b>10,116</b>	<b>10,116</b>	<b>137,538</b>	<b>35,582</b>	<b>0.004</b>
<b>not specified</b>	<b>Other</b>	<b>118,931</b>	<b>198,574</b>	<b>44,619</b>	<b>11,543</b>	<b>0.001</b>

Table A.5.13 Energy and real land EF analysis of public services in the South East in 2000

9: Public Services	Energy Land EF	Real Land EF	Unit
	<i>Public Administration</i>		
<b>Subtotal EF</b>	<b>547</b>	<b>627</b>	<b>'000 gha</b>
<b>Subtotal EF per capita</b>	<b>0.067</b>	<b>0.077</b>	<b>gha/cap</b>

## A.6 Footprint Scenario Outlines

### Footprint scenario outlines

Below are the headings of the footprint scenarios, and their equivalents in the contextual scenarios:

- **'FACTOR 0'**: i.e. where current trends of exponential growth in material consumption are unchanged. This equates to **'Market rules'**: 'American model' with an economic growth dynamic: deregulation & liberalisation, corporate globalisation, big government, cultural rigidity, wealth-poverty divisions, technological and environmental change and hazard as generator of market opportunities, in a business-led framework. (*UK Foresight equivalent - 'world markets'*).
- **'FACTOR 1'**: i.e. where current levels of material consumption are maintained, as a balance between rising affluence and resource management. **'Global governance'**: 'European model' with a governance and institutional dynamic: networks for social & economic organisation: rational management of technological / environmental opportunities & risks for social responsibility within a strong state framework. (*'global sustainability'*).
- **FACTOR 2**: i.e. a 25-50% fall in material consumption over the time span of 50 years. This is seen as the result of environmental disruption, economic stagnation and social polarisation, more than any policy goals. **Regional autonomy**: 'Environmental model' of vulnerability and hazard: environmental & technological change & risk as generator for social & economic change: in a context of dysfunctional & divisive problems, insecurity, paranoia, competition. (*'national enterprise'*).
- **FACTOR 4**: i.e. a 50-75% reduction in material consumption. This is the result of progress on all fronts, in an ideal case scenario: political, economic, technological, social and cultural. **Local communities**: 'Communitarian model' of social cohesion, self-determination, local economy, cultural diversity, moderate technological & environmental change as generator for social solutions (*'local stewardship'*).

## A.7 Scenario storylines

### F-0: Hi-growth, 'World markets' storyline

#### 2000–2010

In the first decade of the new millennium, there is a spirit of optimism and 'going places' for much of the SE. Major city centres and deprived communities see redevelopment, with continued growth of the service and leisure industries. The SE continues to struggle, however, with the problems of success – congestion, overheating and shortage of essential workers. The socially excluded also remain so, as almost unseen patterns of poverty and deprivation regroup and relocate, and there are new and powerful sub-cultures based on drug-use, media images, and alienation from the accelerating race of the global economy.

The SE regional parliament is formed in 2010, although for many it appears to be a cynical cover for the national strings which pull it, and the corporate firms which run it. Over the decade many large firms in the SE economy are bought out, restructured and asset-stripped, as the new American and Asian owners find that English unskilled labour is now competitive with that in Malaysia or Mexico. Meanwhile there is a kind of silent withdrawal by many of the unskilled who find organised crime more lucrative and fulfilling than assembly lines or 'sweat-shop' services: the new ICTs offer endless opportunities for internet scams, cyber-sex and public service frauds.

#### 2010–2020

On the ground, the knowledge based economy turns out to increase congestion rather than solve it, and transport turns out to be the symbol and pressure point of a market-driven society. 2010 sees the first major charging schemes for vehicle entry to cities, and this helps to accelerate out-of-town developments. The privatisation of trunk roads and new links is completed by 2015 with ownership dominated by 'Roadtrack plc': road pricing is increasingly focused on wealthy retail and cultural centres, to be accessed by exclusive 'first class' links and patrolled by security firms, while retail and business parks suffer continuous gridlock. By 2015 the next generation 'pica-hertz' ICT provides in-car virtual access to almost any variety of work or leisure, so that congestion is seen as an experience more than a problem. While public transport struggles, the two-tier network increases accident and crime rates, excludes lower income groups and segregates many inner city areas.

This year also sees the opening of the first 'integrated' urban development in the SE, with an 'exclusive' self-contained town of 100,000 people built over a major shopping and leisure mall on the M4 / M25 / Heathrow hub. In 2018 the first full-immersion fantasy football game is released, and the virtual reality booths are the centrepieces of a new set of leisure and retail malls. The addictive power of cyber-games, cyber-sex and cyber-gambling lead quickly to strict controls, and as a result the most powerful cyber-games go underground as with drug-related crime, with a similar allure for youth sub-cultures.

#### 2020–2030

'Modernisation' of the education, health, and employment sectors results in extensive privatisation, creating a two-tier system with a widening gap between private and publicly provided services. In 2025 a crisis boils over on pensions: life expectancy increases with new but costly anti-ageing drugs, and this combines with the preference of the private sector for younger staff. Pension funds are also affected by global financial meltdowns similar to the SE Asian crisis of the late 1990s, and extreme weather conditions with escalating damage and insurance costs. The loss of confidence increases the volatility of global markets which are increasingly disconnected from any real production.

The SE parliament takes on new powers in 2022, as the UK government begins to pass economic functions to the regions, the European Commission and its 'big three' corporate backers. These corporations step into the pensions problem with a scheme for 'personal share-equity', trialled in the SE, where each individual operates as a kind of limited company throughout their lifespan, raising stock market finance for their youth and old age. By 2029 this is established across the UK as the new 'cost-effective' model of social provision. However further

global instability then precipitates a wave of liquidations, which brings many older and poorer people to a state of virtual economic slavery. The SE is now firmly established on a 3-track economy – a handful of global corporations with their high-skill services, regional firms built on a low-wage economy, and a booming black economy in illicit cyber-games and organised fraud.

A new tension arises in the cities between areas of gradual decay, and those which saw comprehensive regeneration, although now run on a free market basis. Road privatisation gave developers control of access to the new inner city villages, creating a network of ghettos with an ‘added value’ logic. Some of the displaced migrated out of the inner cities in search of safer places to live and, hopefully, work, and make-shift camps formed on brownfield sites in the Thames Estuary, generating conflicts with local inhabitants.

### **2030–2040**

In 2033 the corporate take-over of the SE public services was completed on the steps of Guildford town hall as the CEOs sign an historic ‘ethical charter’ promising service standards to their customers, in a city centre which was sealed off by privatised police from the surrounding demonstrations of anarchists and ecologists. This came only days after a major near miss on the fifth runway at Heathrow, which helped to clinch the long-awaited plan to rebuild a much larger airport on an artificial island in the Thames Estuary, linked by high-speed rail across the region. In 2035 the largest ever urban development plan was announced by the regeneration divisions of the ‘big three’ corporations, to rebuild large parts of the marginal areas in the Thames Gateway. This used cash from the assets of the to buy out the remainder, so giving corporate ownership of both property and public services in many urban areas. The first phases of the plan generated much conflict which surfaced in urban riots and sabotage, and the response by the big three was to widen their security and surveillance operations on the basis of national security.

### **2040–2050**

In a decade of relative stability and affluence, at least in the UK and EU, social conflict was not far below the surface. The SE region as the engine of the UK economy became more entrepreneurial in many respects, it was still hamstrung by congestion, and undermined by foreign ownership. Despite all the ‘schemes’ and ‘programmes’, political and economic power continued to centralise in London with the SE as its living quarters, generating a negative spiral for other regions outside the loop of skills and influence.

In a decade of relative stability and affluence, at least in the UK and EU, social conflict was not far below the surface. Affluence itself seemed unstable, producing ever greater gridlocks, urban smog, carcinogenic scares and water shortages, while public services seemed more inefficient and more expensive. ‘Time pollution’ was a buzzword for the ever-faster competition work and leisure, so a backlash movement revived ‘old-fashioned’ slower ways, in gardening, cycling, handwriting and repairing.

Meanwhile the eco-activists stepped up their cyber-sabotage, with a major hit in 2042 when the SE corporate IT network was temporarily disabled. New forms of social democracy were once again debated in public, and the big corporations made a show of bringing politicians and community groups onto their boards. Meanwhile the suburban majority tried to maintain a semblance of normality by paying increasing sums to private security firms and educational consultants, using the latest technology to create secure enclaves.

### **Technology potential**

In this alternative ‘branch point’, the acceleration of ICT development becomes the prime enabler of global capitalism with a power and speed never imagined before. The instantaneous connection of producers to consumers accelerates the flow and complexity of global capital, to a point where every step on every street by every person is an economic activity. This leads towards immense conflict between global capital constantly inventing new business models, and local or black economies constantly inventing new currencies and markets to protect against the global tigers, whether legal or illegal.

The global ICT producer-consumer chains rely on complete knowledge of all activities and preferences in time and space: their gateways and middlemen hold enormous power to make or break global enterprises in a matter of hours. As limitless and instantaneous information is available, the keys to success and competitiveness are in

innovation and confidentiality, both by producers and consumers. This leads rapidly towards a world of paranoia and secrecy -- micro-bugs hidden in consumer items, global positioning, retina and fingerprinting surveillance and counterfeit, and elaborate jamming and encryption procedures as essential steps to every business deal and private activity. Commercial cyber-war becomes a daily reality, as competitive advantage in a hyper-gearred economy comes through first-mover and first-strike action.

## F-1 Business as usual: ‘Global governance’ storyline

### **2000–2010**

The first years of the new century open with a full scale test of the ‘third way’ balance of markets and state. Health, education and other services desperate for private money open up the gates, so that by 2005 all new public facilities are privately financed. The regional administration increases its powers and takes on other public services, handed over by government which sees them as liabilities, and sets up a string of private companies, mostly financed by the SE partnership sponsors, of which the largest are Manchester Airport and Manchester United. But for most public services there is mounting consumer pressure, media exposure and legal challenges, so many companies are in turn looking for new models for social stakeholding, often with the handing over of share equity, directorships or trust funds to public or community bodies. The winners in many cases are the NGOs which offer a combination of both modes – in 2010, this is clinched by Friends of the Earth with a contract for ‘materials management’ of the 50 million tonne Greater Manchester waste mountain.

Behind this regrouping of the ‘third way’ is a series of technological initiatives centred on the ‘cyber-net’, a kind of mobile internet with far greater built-in intelligence. This enables practical real-time connections between consumer demands, producer supply chains, political representation and cultural lifestyles. These can be targeted to individuals through voice-recognition and holographic reconstruction, and delivered through mobile positioning technology. This opens the door to the beginning of a far-reaching transformation of public decision-making and business supply chains.

### **2010–2020**

The potential of the cyber-net turns out in practice to need a high level of real-time surveillance and monitoring, and this leads to a backlash. Consumers and producers go to great lengths to invent local currencies, obtain black market goods and generally conceal their activities from the system. In 2013 there is a ‘clean-up’ operation targeting tax-dodgers, which sees about 10% of the SE population on tax-related charges. The local and regional authorities are then besieged when it emerges that a quarter of their staff are implicated in some kind of corruption or evasion, and the ensuing chaos is an opportunity both for organised crime, and for a new breed of activist community groups.

This combines with a period of international instability: as Russia and Turkey join the ‘outer’ EU there is a wave of illegal migrants coming westwards: climate change brings new disasters to Africa and Asia: a series of epidemics and new tropical diseases sweeps western Europe: and ethnic stress leads to disorganised looting. Meanwhile the volatility of stock markets means that global corporations can only survive by money-laundering operations, and have diminishing interest in producing goods or services. The new technology turns out to bring new risks as the cyber-net is sabotaged or subverted, often by religious or cultural fanatics who despise its universal surveillance and aggressive advertising.

### **2020–2030**

Social and political tensions come to a head in 2025 as the complex corruption trials reach their verdicts: regional and local authorities are only saved by the EU which under-writes the finances, and by the large business-minded NGOs who step in as the least worst alternative. The somewhat tarnished ‘third way’ is re-invented yet again as public bodies compete for public attention and trust, in competition with the new global media and the latest cyber-net entertainment: this culminates in a year-long sponsored cyber-net debate in 2027 which aims, unsuccessfully, to reach public consensus on a new social model.

On the ground, the cities and the countryside show turmoil and change, as wealthy communities defend their privileges against the incomers, and as poor communities continue to re-invent local economies as a means of bypassing surveillance and taxation. The middle classes make their own connections between public and private values – for instance as urban school ratings are found to underpin property values, there is huge financial pressure for speculative investment in educational trusts, and similar connections are replicated in other services. Rural areas are transformed by the re-invention of parish and district councils as private trusts, offering membership benefits in education, health and public transport, and this helps to accelerate the movement of urban dwellers to eco-village enclaves.

### **2030–2040**

On the map the restructuring region shows the repopulation of the countryside and central city areas, and the hollowing out of the suburbs. Many regeneration areas are normalised, but many also contain subcultures where eco-activists combine with white-collar criminals and religious fanatics. However many things do not change – these developments emerge almost unseen and side by side with traditional communities and lifestyles, as much ‘normal’ life appears to go on regardless. The region’s knowledge-based global industries trade on the continuing advantage of English language and media, while the local producers and service sector have evolved a set of regional and local currencies as a defence against volatile global markets.

Whatever the motives for these, they find themselves under attack by the EU in 2038, in a huge programme of ‘competitiveness and cohesion’ which opens up protected markets. Local currencies and even community time-banks are seen as tax dodges and anti-trade, and declared illegal, and this ironically drives many social and community activities into non-monetary and criminal trading. Despite the innovation and diversity of the new organisations, there is much tension between local, regional, national and EU, and the fallout brings down the SE administration.

### **2040–2050**

As the SE enters a decade of instability echoed elsewhere in Europe, the regional corporations wait in the wings for the opportunity to promote their version of economic and social stability through the discipline of the market, combined with a ruthless surveillance and counter-insurgency operation. They are thwarted by 5 years of environmental catastrophes, which sees widespread droughts, storms, floods, epidemics and carcinogenic scares. A way forward is found in 2048 by the global insurance market which sets up integrated regional consortiums for health, education, environmental protection and others. These are classic ‘third way’ organisations aiming to combine the energy of the market with the stability of the public sector: for a flexible premium they guarantee a full range of ‘security’ packages depending on what the customer will afford, replacing the bankrupt remnants of former public services. Once in control of public services, they widen their stakeholding in order to buy off the most influential social groups, and then begin to reconstruct the cities with a carefully ordered ‘sorting and stacking’ of wealth and poverty.

### **Technology potential**

An acceleration in ICT development holds out the promise of a new era – a rational and benign organisation of society and the economy. Politics, management, public services and business activity all benefit from universal information, total accountability and instantaneous knowledge on producers and consumers, and on preferences and values, and this leads towards rising levels of welfare and social responsibility across the developed world. The downside is a kind of info-cratic labyrinth, where much energy and enterprise go into making the hyper-complex systems work, and then creating ways to beat them.

The complex balance of public, private and NGO organisations continues to replicate itself through the cybernet: in the 2030s this moves to a nano-tech platform, bringing forward the possibilities of neural implants and apparently telepathic communication. The result is that the boundaries between public, private and civic modes of organisation become increasingly blurred. Businesses are beset with social responsibilities, public bodies are forced by entrepreneurial challenges. Civic and voluntary organisations are quick to spot the opportunities, and take on many of the roles and activities of private and public sectors. This brings opportunities, where for instance the new health and education providers use ICT to its full in diagnosis, treatment, healthy living and

life-long learning programmes. It also brings new forms of conflict, where the designers and managers of such systems are then brokers and inter-mediaries for financial and political power.

## F-2: low growth, ‘regional autonomy’ storyline

### 2000–2010

As the new shape of the SE Region begins to take shape, many long running problems of unemployment and dereliction seem on the point of being solved. Large inner city areas are re-colonised, poorer communities find new economic activity, and rural areas become home to a new and diverse range of communities.

But then the power of nature begins to show its teeth. For several years running there are wildly uncertain weather patterns, as the sudden melting of the arctic ice creates new and complex cycles which baffle climate scientists. The SE sees its first real water shortages for 100 years as a year-long drought is then followed by catastrophic flooding, washing out much of the arable soil of the region. The next year sees a malaria epidemic, for which the health service is quite unprepared, followed by an invasion of dangerous super-wasps, rumoured to be the result of a genetic experiment. At the same time a common food preservative is shown to be a long-term carcinogenic, whose effects are accelerated by GM soya. There is a sudden increase in mortality and morbidity in the cities, which are now hot and fetid, and a sudden exodus of the wealthy from most urban areas to remote rural areas, where prices suddenly multiply. These nouveau migrants rapidly construct new internet-based lives with jobs, schools, services and entertainment, venturing out occasionally in sealed and armoured cars. In the cities, organized crime spreads rapidly, aided by the demoralized and easily corrupted public sector, in an atmosphere of fear and paranoia.

### 2010–2020

The pressure from climate, toxic and epidemic stress increases. Many coastal areas are no-go zones as frequent storms have forced a retreat, while many upland areas are barren and eroded. Common plastics and solvents are now found to be carcinogenic, and dust contaminated with pvc fibres is the cause of a new asthma epidemic. Meanwhile the IT and bio-technology which is brought forward to combat these stresses itself carries new risks. Bio-engineered cancer cures are found by cloning of stem cells, but after a few years the results are quite unpredictable, and many patients are forced to hide their deformities. ICT systems are increasingly the only way to run businesses or organisations, but also vulnerable to crime and sabotage. All security is now based on retinal scanning and other bio-recognition, leading to a wave of ‘bio-kidnapping’ where victims are forced to use their identifiers. The computer games industry brings out a new range of total immersion experience, at first only for the wealthy, but taken up by those who can least afford it, with addictive potential similar to that of heroin.

### 2020–2030

The reaction of the UK government and the newly constituted SE parliament to these stresses is a knee-jerk swing to the authoritarian right. In the SE large city authorities are empowered to use ‘reasonable force’ in controlling disorder, and equip privatised riot squads with the latest hardware and software, which homes in automatically on ‘cultural deviance’. Cities are now divided into gated communities, with electronic barriers to keep people outside the remaining wealthy areas and contained inside poorer areas, leaving organised crime to flourish in between. The countryside is hot, windy and dusty, much productive agriculture having given way to mutant species, except for that in the wealthy enclaves. The SE is now home to a number of ‘branch plants’ of Malaysian and Brazilian multi-national corporations, but global instability causes these firms to regroup almost annually, resulting in large scale redundancy. The region’s thousands of knowledge-based micro-firms experience 5-yearly devastating crashes where only the fastest and leanest survive in the accelerating pace of change.

## 2030–2040

The ‘mother of all floods’ hits the SE, as a rising sea coincides with hurricane force winds, inundating most coastal areas. Most of the devastation follows after, as toxic metals and solvents leach from industrial plants and pesticide-filled soil, and then as new strains of malaria and other old and new diseases spread. Special colonies are set up on Merseyside to contain cancer amputees and the cyber-clones – life-prolonged humans who extend their senses through hooking up with molecular computers.

## 2040–2050

While the climate stabilises temporarily many people demonstrate their longing for security and stability on the streets and in neighbourhood groups. Over the decade a new political party takes shape around the local economy movement, making inroads on organised crime, and regaining control of public services. The devastation of four decades of environmental and technological disaster has created a new climate of moderation and cooperation, as the region slowly begins to rebuild its shattered fabric.

### Technology potential

What if the pace of change in ICT accelerated? Continuing current trends would see the speed and capacity of computing doubling every 18 months or less, with drastic and unpredictable effects on society and the economy. The limits of silicon technology are crossed between 2020 and 2030, firstly with molecular computing, then with bio-computing using neural implants, and finally in 2040 with quantum computing. This latter turns upside down the concept of reality, and produces a world where the real and virtual are each parts of the same continuum, at least as far as information applications are concerned.

This enables the connectivity of global markets to be taken to extremes, with astronomical flows of virtual currency and markets, and global-scale brands and huge corporations appear and disappear by the hour. Almost all physical processes are automated but constant innovation results in huge wastage and confusion. In politics, former patterns of decision-making and divisions between public and private sectors are replaced with continuous assessment of needs and wants, beamed from the neural implants of consumers. Cyber-net commerce also enables alternative local, regional and corporate currencies to run side by side, complicating global markets and with great opportunities for sabotage. There are multiple virtual realities, chemical and drug realities, bio-engineered states, mystical and other subculture realities. All organisations and networks are super-fluid and transparent, and mental illness grows rapidly as many cannot cope with the confusion and complexity.

## F-4: Green scene: ‘Local community’ storyline

### 2000–2010

The UK’s position sitting on the edge of the Euro-zone helps to bring about a golden decade of affluence and cultural creativity: the cities are reclaimed, the economy booms, and a one-nation politics prevails for the populist centre – in this case the affluent, mobile, suburban, service sector. However there are tensions in the one nation model – the ethnic, youth, elderly, uneducated and others feel excluded, and these tensions are often sharper in the SE than elsewhere.

2006 brought a silent convulsion – a football star turned prophet pointed out the emptiness of modern life, and a deep longing for meaning and identity sweeps across affluent suburbia. This coincided with ominous environmental changes: the melting of the arctic ice results in a rapid cooling of the SE climate, and the first of many accidents from the genetic food trials brought an invasion of mutant weeds. This swing towards ecological and community ideals produces a local election landslide for the Green party in 2009, who captured the centre vote with a defensive agenda. Protectionist walls went up around urban communities, with tariffs on imports and controls on migration, and bureaucratic checks on local trading schemes.

### 2010–2020

Over the next decade many social institutions were re-invented by networks and collectives, using new methods of consensus building and social debate. Businesses were re-engineered as zero-waste life-cycle service operators: local governments were restructured into NGO-type institutions with direct citizen participation and

decision by consensus. In urban areas the long-awaited ecological dream starts to take shape – a new breed of high density urban clusters arranged around public transport nodes, with strong collective spirit which enable people to share space and facilities. Many semi-autonomous ecological villages were built in countryside areas, where inhabitants used the internet to work, shop, and educate themselves, owning property and businesses through cooperative structures. Transport systems functioned without congestion as demand at long last balanced supply. The worsening winters seemed to foster a cooperative spirit, and in 2018 the freezing and rationing of the SE water supply summed up the war-effort mentality. An anti-materialistic spirit seemed on the surface to define the new Britain with its diverse regions, globally and locally connected.

### **2020–2030**

As the ecological dream rolled out, so did its internal contradictions: just as the first wave of ecological urban development was completed, the divisions between rich and poor were sharpened by the global restructuring of industry and finance. Over several decades a myriad of social economy schemes and local currencies emerged in the effort to protect against global instability, and many of these encouraged social cohesion and cooperation in neighbourhoods and communities. However there was much economic wastage in the trading and conversion between them, and in the gaps were opportunities for a new generation of middlemen and traders, often immensely wealthy social renegades. In 2028 there was a run on the regional currency which caused a domino effect, and much local economic activity faltered. Many adults were able to re-join the global economy as unskilled branch plant labour, but others could not or would not, and carried on trading local services on a somewhat tarnished basis of mutual aid.

### **2030–2040**

As suppliers of computers and other essential products withdrew to the ‘hard’ euro-dollar global currency, the ensuing shortages encouraged organised crime and sabotage. When in 2033 the EU restructured its agricultural support package there were demonstrations in the rural SE: for some these were an opportunity to rebuild the ecological dream, and for others an opening for new and more sophisticated global-local markets. A period of instability followed, as global markets clashed head on with local and regional trading structures, combined with increasing climate hazards and public health risks. The cities which for decades had been the destination of ‘returnees’ seeking the benefits of collective living, working and childcare, suddenly became quite hostile and dangerous: while those in the countryside put up electronic barriers and used their LETS credits to employ armed security forces. Suburban dwellers were able to deal with both worlds, using global currencies for goods and local currencies for services, and their normality was fiercely defended with ‘exclusive’ housing tenures and shopping membership clubs. In 2039 the first fully private new town was completed near Preston, financed by Manchester Airport, where access was solely by invitation from the ‘community’, and this seemed to send a wave of aspiration and dissent around the region.

### **2040–2050**

The tension between community-based networks, public government and private markets reached a new balance, with a Compact between the EU, the SE regional authority, large employers, and the representatives of the community sector, for the joint delivery of services and employment. In practice there were difficulties with the burgeoning numbers of sub-cultures – religious, ethic, artistic, cyber and countless other lifestyles, each spawning local currencies, membership networks, operating companies, elected bodies and third sector-type trusts at every level. Social, cultural and political diversity became almost a fetish and an end in itself, with the quest for meaning and identity realised through creativity and cultural difference – a region of a thousand islands. Civic participation was boosted with a newly formed regional parliament in 2049, using cyber-net technology to link over 500 ‘parties’ with over 100,000 other organizations and networks in real-time agenda-setting, priority choice and decision-making. The communitarian dream had finally been realised by bringing on board the best of technological innovation, rational management and the energy of the market.

In 2050, looking back over the first half of the 21<sup>st</sup> century we see how attitudes and activities have changed – walking, cycling, writing, artistic and spiritual pursuits have replaced the exploitative and materialistic nature of

late 20<sup>th</sup> century life. This ‘sustainable communities’ scenario is not without tensions and contradictions – but it does show the positive potential of social change and community cohesion.

### **Technology potential**

What if the ICT potential was taken forward by a new pattern of community activity, both local and global? The next generation internet turns out to be the ‘cyber-net’, with vastly increased power and advanced learning and self-organising capacity, a universal medium for all communications, work and lifestyle. This enables a regeneration of community values and personal relations, and of the authentic over the manufactured and virtual. ICT is a perfect medium for this, enabling people to share interests, problems and potentials in a way never before realised. Every individual and every organisation operates as of right an integrated suite of ICT facilities: not only websites and newsgroups, but real-time personal profiling and neural networking, in mobile and virtual reality modes.

The effects are many. It enables new forms of connectivity in social life based on neural networks. It also enables people to set up businesses, to recycle goods, to trade services, to organise specialist activities, and to share experiences on a self-organising basis. It transforms the inertia of local politics into an active arena where wishes and desires, problems and potentials, and visions and actions would all be combined in interactive space. Global capital will in many cases be superfluous to providing services at the local level, as these will self-organise on a reciprocal basis on the LETS model, bypassing the need for mainstream currency as a motivator for action and investment.