Thames RBD

Article 5 economic analysis of water use supporting document
Water Framework Directive
Article 5

Economic Analysis of Water Use

Supporting Document
Thames River Basin District

March 2005
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1 Introduction

1.1 Article 5 reporting requirements

This report is a supporting document to the Article 5 report for the Thames River Basin District (RBD). It provides contextual economic and cost recovery information that provides background to the Article 5 report on the Thames RBD.

This report provides information relevant to the reporting guidance of the Water Framework Directive (WFD)\(^1\). The report summarises work undertaken on behalf of the Economic Advisory Stakeholder Group (England and Wales) and the UK Economics Steering Group for the WFD\(^2\). It takes account of various guides and other documentation produced through the Common Implementation Strategy (CIS) including the recent ECO1 Reporting Sheet produced by the European Commission\(^3\). In line with this latest guidance, the following areas are covered in the report:

- An overview of the socio-economic importance of water uses in the Thames RBD;

- An assessment of the current level of cost recovery for water services for households, agriculture and industry, with some indication of a first picture of cross subsidies;

- Information relating to how the cost recovery analysis was carried out and how it may be improved in the future; and

- A summary of the work completed to date to establish a base-line scenario including details of work required in the future, particularly covering more complex sectors.

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\(^2\) Annex 1 provides a summary of related outputs including the reports on *The Economic Importance and Dynamics of Use, Cost Recovery and Incentive Pricing and Cost-Effectiveness Analysis and Developing a Methodology to Assess Disproportionate Costs*.

\(^3\) Other relevant guidance includes the WATECO guidance and the Information Sheets produced by the Eco1 and Eco2 drafting groups of working group 2B of the CIS.
1.2 Structure of the report

This report contains the following sections:

- Driving forces: This section sets out the socio-economic characteristics of the Thames RBD and provides forecasts for population, number of households, output (in gross value added terms) and employment to 2015;
- Pressures: This section reports on the attempts to link economic information with the most important activities for the characterisation of water bodies and the associated risk assessment;
- Water services and cost recovery: This section presents information received from the Office of Water Services (Ofwat) on public water supply and sewerage services within the Thames RBD in terms of financial cost of water services. Details are also provided on the level of environmental expenditure by the companies within the RBD;
- Cost-effectiveness: This section details the progress made towards ensuring cost-effectiveness in implementing the Programme of Measures (PoMs). The gaps that exist are also identified; and
- Improving knowledge and the information base: The final section sets out a research programme to support further work under the WFD.
1.3 Data sources

A number of data sources have been used in compiling this document. Information on the economic importance of water uses and their dynamics has been taken from the report on the *Economic Importance and Dynamics of Water Use Relevant for River Basin Characterisation* (ref 1). This report includes a comprehensive review of data sources relevant to the economic analysis of water use, profiles of the main sectors associated with pressures in water bodies and contextual information supplied by a number of interested stakeholder groups in the form of stakeholder templates. Information relevant to this report was provided by:

- British Ports Association and United Kingdom Major Ports Group;
- WaterVoice;
- British Hydropower Association;
- Royal Society for the Protection of Birds (RSPB); and
- British Waterways.

Sector profiles were compiled for:

- Power generation;
- Petrochemicals;
- Other chemicals;
- Metal manufacturing;
- Paper industry;
- Other manufacturing;
- Extractive industries;
- Quarries and aggregates;
- Transport;
- Public water supplies;
- Private water supplies;
- Wastewater treatment; and
- Recreation.
Economic forecasts for the most important activities related to water uses have been produced by Experian Business Strategies Ltd, based on output and employment information from the Office of National Statistics (ONS). Full forecasts for this RBD are provided in Annex 2. Further information related to relevant trends in the agriculture sector has been provided in a study undertaken by Cambridge University on behalf of the Environment Agency (ref 2).

Information related to the recovery of the costs of water services has been taken from the report on Cost Recovery and Incentive Pricing (CRIP) (ref 3) with updated information provided by Ofwat and the Environment Agency following the Final Determination of Water Prices for the period 2005 to 2010.

Information relevant to the analysis of the cost-effectiveness of actions to be taken under the PoMs within River Basin Management Plans (RBMPs) has been taken from the report entitled Cost-Effectiveness Analysis and Developing a Methodology for Assessing Disproportionate Costs (ref 4). This has been supplemented with a review of progress in implementing the UK Collaborative Research Programme on River Basin Management Planning Economics (CRP).

Throughout the report various descriptions of geographical areas are used e.g. ward, local authority district, etc. A definition of these can be found in Annex 1. All data and forecasts have been undertaken at RBD level. To do this, all wards have been allocated to RBDs. Where alternative geographic areas are used this is clearly noted.
2 Driving forces

This section provides an overview of the socio-economic characteristics of the economy of the Thames RBD relevant to the economic importance and dynamics of water uses. It includes the following information:

- General profile: Presents an introduction to the Thames RBD in terms of location, major urban centres and distinguishing characteristics;

- Population and households: Presents an outline of the historical change in the Thames RBD population, number of households and population per household. This information assists in understanding the levels of domestic water use specific to the RBD;

- Economy: Output and employment levels are used to assess the Thames RBD economy. Using historical trend data the areas of the economy that have expanded or contracted in recent years are identified. This allows an appreciation of the key sectors that are driving the economy of the Thames RBD;

- Other socio-economic characteristics: Presents information for the Thames RBD specifically relating to the level of deprivation, the level of the working age population claiming Job Seeker Allowances (available to those unemployed persons who are both available for and actively seeking work) and the level of working age population with no qualifications. This information helps to build an understanding of the potential need for Government intervention; and

- Area based initiatives: Presents area based initiatives specific to the Thames RBD arising from Government area based policies. Some of these initiatives are focused on the Government’s Sustainable Communities Programme.
2.1 General profile

The Thames RBD covers an area of approximately 16,133 km$^2$ across parts of the South East, London, South West, East Midlands and West Midlands Government Office Regions.

London is England’s capital city and, including both inner and outer London, has a population of 7,172,091. It is the largest city within all of the RBDs considered.

London dominates much of the economic activity in the Thames RBD. The general shift in the UK away from manufacturing industries towards a more services based economy has been led by London. London’s economy extends across a wide range of specialised service activities with particular strengths in the finance, professional and business services, travel, culture and communications sectors 1.

In recent decades there has been considerable decentralisation of the London economy, leading to rapid growth in employment and services in the wider South East. This trend has supported the rapid growth in cities such as Reading.

In addition to London the RBD encompasses the following main urban settlements:

- Swindon (population 180,051);
- Luton (187,371);
- Oxford (population 134,248);
- Reading (population 143,096);
- Maidstone (population 138,948);
- St Albans (129,000); and
- Crawley (population 99,744).

The ‘M4 Corridor’ extends from Cardiff to London, much of which is included within the Thames RBD, notably Swindon, Reading, Maidenhead, Slough, Uxbridge and London. There is a particular concentration of high technology industries based along the M4 Corridor.

Figure 2.1 shows the boundary of the Thames RBD and indicates the principal urban settlements. Regional Development Agency (RDA) boundaries have been included.

1 London’s Place in the UK Economy, Corporation of London, 2001
RDAs are non-departmental public bodies. There are nine RDAs in the English Regions and their primary role is to promote economic development in their region. The RDAs were established under the *Regional Development Agencies Act 1998*.

RDA boundaries have been included as these are the most relevant regional policy areas from an economic point of view. The most relevant economic information is also available on a RDA basis, not a RBD basis. The six RDAs covering the Thames RBD are: East Midlands Development Agency, East of England Development Agency, Advantage West Midlands, London Development Agency, South East of England Development Agency and South West of England Development Agency.

**Figure 2.1: Thames RBD and RDA boundaries**

For additional context, the location of the Thames RBD within England and Wales is illustrated in Figure 2.2 is shown overleaf.
Figure 2.2: Thames RBD location map
2.2 Population and households

Table 2.1 indicates the Thames RBD population in 1995 and 2002 based on NOMIS Ward 2002 datasets\(^1\). The percentage changes in the Thames RBD are compared against the average percentage changes for all RBDs.

The Thames RBD population increased by over 650,000 between 1995 and 2002. This growth rate is significantly above the average population growth rate across all RBDs.

There was a 10.2 per cent increase in households during the period, again a growth rate above the average for all RBDs.

The number of households within the RBD influences levels of water use. With no change in population, water use per capita will generally increase if the number of households increases. The size of households in the Thames RBD has declined since 1995.

Table 2.1: Thames RBD population, number of households and population per household

<table>
<thead>
<tr>
<th></th>
<th>1995</th>
<th>2002</th>
<th>Percentage change 1995-02</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Population (000s)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thames</td>
<td>13,139.0</td>
<td>13,794.2</td>
<td>Thames 5.0</td>
</tr>
<tr>
<td>All RBDs</td>
<td></td>
<td></td>
<td>All RBDs 2.1</td>
</tr>
<tr>
<td><strong>Households (000s)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thames</td>
<td>5,214.6</td>
<td>5,748.4</td>
<td>Thames 10.2</td>
</tr>
<tr>
<td>All RBDs</td>
<td></td>
<td></td>
<td>All RBDs 6.9</td>
</tr>
<tr>
<td><strong>Population per household</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thames</td>
<td>2.5</td>
<td>2.4</td>
<td>Thames -3.7</td>
</tr>
<tr>
<td>All RBDs</td>
<td></td>
<td></td>
<td>All RBDs -4.5</td>
</tr>
</tbody>
</table>

Source: Experian Business Strategies Ltd

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\(^1\) The UK’s web-based database of labour market statistics, see www.nomisweb.co.uk
2.3 Economy

To understand the economy of the Thames RBD changes in output and employment are considered between 1995 and 2002. Both output and employment have been broken down into broad industry categories based on 30 Standard Industrial Classification (SIC) codes. Employment and output categories are also broken down into more detailed SIC codes. The disaggregated codes were chosen on the basis of an assessment of the main activities associated with pressures on water quality, including pressures from abstraction, discharges and hydromorphology as revealed by the Environment Agency’s *Pressures and Impact Analysis*.

Detailed information on output and employment categories is provided in Annex 2.

2.3.1 Output

Table 2.2 illustrates output for the Thames RBD by the 30 SIC codes. The summation of these 30 SIC categories provides a measure of the total output of the Thames RBD in value added terms. Total output was £271.4 billion in 2002.

Between 1995 and 2002 output from the Thames RBD increased by almost £62 billion, which equates to a growth rate of 3.8 per cent per annum, which is above the average rate for all RBDs of 2.9 per cent per year.

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1 This work will be built upon in later stages of the risk assessment. It is based on the identification of correspondences between the lists of activities which have been associated with pressures (for example through the analysis of the National Abstraction Licensing Database and Charges for Discharges Database) with Standard Industrial Classification categories. Analysis reveals that correspondence is highly variable across the main activity-pressure categories.
Table 2.2: Thames RBD (2002) output ranked by 30 SIC categories

<table>
<thead>
<tr>
<th>Rank</th>
<th>SIC category</th>
<th>Output 2002 (£ millions at 2000 prices)</th>
<th>Per cent of total output</th>
<th>Per cent average all RBDs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Business services</td>
<td>53761.7</td>
<td>19.8</td>
<td>13.4</td>
</tr>
<tr>
<td>2</td>
<td>Banking &amp; insurance</td>
<td>23801.1</td>
<td>8.8</td>
<td>5.9</td>
</tr>
<tr>
<td>3</td>
<td>Wholesale &amp; distribution</td>
<td>19300.1</td>
<td>7.1</td>
<td>7.5</td>
</tr>
<tr>
<td>4</td>
<td>Other services</td>
<td>18296.6</td>
<td>6.7</td>
<td>5.3</td>
</tr>
<tr>
<td>5</td>
<td>Transport</td>
<td>17009.4</td>
<td>6.3</td>
<td>5.4</td>
</tr>
<tr>
<td>6</td>
<td>Other financial &amp; business services</td>
<td>15741.8</td>
<td>5.8</td>
<td>4.2</td>
</tr>
<tr>
<td>7</td>
<td>Retailing</td>
<td>15071.9</td>
<td>5.6</td>
<td>6.1</td>
</tr>
<tr>
<td>8</td>
<td>Health</td>
<td>14477.7</td>
<td>5.3</td>
<td>6.7</td>
</tr>
<tr>
<td>9</td>
<td>Construction</td>
<td>14356.2</td>
<td>5.3</td>
<td>6.0</td>
</tr>
<tr>
<td>10</td>
<td>Education</td>
<td>12343.3</td>
<td>4.5</td>
<td>5.8</td>
</tr>
<tr>
<td>11</td>
<td>Communications</td>
<td>11655.3</td>
<td>4.3</td>
<td>3.6</td>
</tr>
<tr>
<td>12</td>
<td>Public administration &amp; defence</td>
<td>11256.9</td>
<td>4.1</td>
<td>5.5</td>
</tr>
<tr>
<td>13</td>
<td>Hotels &amp; catering</td>
<td>8914.9</td>
<td>3.3</td>
<td>3.4</td>
</tr>
<tr>
<td>14</td>
<td>Paper, printing &amp; publishing</td>
<td>8504.6</td>
<td>3.1</td>
<td>2.6</td>
</tr>
<tr>
<td>15</td>
<td>Chemicals</td>
<td>4479.7</td>
<td>1.7</td>
<td>2.0</td>
</tr>
<tr>
<td>16</td>
<td>Electrical &amp; optical equipment</td>
<td>4030.7</td>
<td>1.5</td>
<td>1.9</td>
</tr>
<tr>
<td>17</td>
<td>Gas, electricity &amp; water</td>
<td>3878.7</td>
<td>1.4</td>
<td>2.0</td>
</tr>
<tr>
<td>18</td>
<td>Food, drink &amp; tobacco</td>
<td>3225.1</td>
<td>1.2</td>
<td>2.4</td>
</tr>
<tr>
<td>19</td>
<td>Transport equipment</td>
<td>2215.9</td>
<td>0.8</td>
<td>1.9</td>
</tr>
<tr>
<td>20</td>
<td>Machinery &amp; equipment</td>
<td>1936.2</td>
<td>0.7</td>
<td>1.5</td>
</tr>
<tr>
<td>21</td>
<td>Metals</td>
<td>1758.7</td>
<td>0.6</td>
<td>1.9</td>
</tr>
<tr>
<td>22</td>
<td>Other manufacturing</td>
<td>1165.0</td>
<td>0.4</td>
<td>0.9</td>
</tr>
<tr>
<td>23</td>
<td>Rubber &amp; plastics</td>
<td>1002.7</td>
<td>0.4</td>
<td>0.9</td>
</tr>
<tr>
<td>24</td>
<td>Agriculture, forestry &amp; fishing</td>
<td>850.2</td>
<td>0.3</td>
<td>1.0</td>
</tr>
<tr>
<td>25</td>
<td>Minerals</td>
<td>566.5</td>
<td>0.2</td>
<td>0.6</td>
</tr>
<tr>
<td>26</td>
<td>Textiles &amp; clothing</td>
<td>477.0</td>
<td>0.2</td>
<td>0.6</td>
</tr>
<tr>
<td>27</td>
<td>Wood &amp; wood products</td>
<td>370.0</td>
<td>0.1</td>
<td>0.3</td>
</tr>
<tr>
<td>28</td>
<td>Other mining</td>
<td>344.8</td>
<td>0.1</td>
<td>0.3</td>
</tr>
<tr>
<td>29</td>
<td>Oil &amp; gas extraction</td>
<td>318.9</td>
<td>0.1</td>
<td>0.1</td>
</tr>
<tr>
<td>30</td>
<td>Fuel refining</td>
<td>291.6</td>
<td>0.1</td>
<td>0.3</td>
</tr>
<tr>
<td></td>
<td><strong>Total Thames 2002 RBD output</strong></td>
<td><strong>271 403.2</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The Business services sector is the largest contributor to the output for the Thames RBD, contributing almost one fifth. Banking & insurance is also a key contributor. These two sectors are large due to the importance of London as a business and finance centre.

Sectors which provide significantly above average contributions to the output of the Thames RBD include:

- Business services;
- Banking & insurance;
- Other services;
- Communications; and
- Transport.
Figure 2.3 indicates the sectors with the most significant change in output between 1995 and 2002.

Figure 2.3: Changes in output in the Thames RBD, 1995 to 2002

The greatest change in terms of value was in the Business services sector which grew by almost £22 billion.

Figure 2.4 below illustrates the percentage change in output between 1995 and 2002 for the sectors illustrated in Figure 2.3. Business services, which had the largest increase in value terms, grew by 68 per cent during this period. The largest percentage increase was in the Communications sector. Output from this sector increased by 88 per cent between 1995 and 2002.

Source: Experian Business Strategies Ltd

0.0 5.0 10.0 15.0 20.0 25.0
Change, £ Billions

Construction
Transport
Wholesale & distribution
Retailing
Other services
Banking & insurance
Communications
Business services
2.3.2 Employment

Business services, Retailing and Health are the three most significant employment sectors for the Thames RBD. The presence of London within the Thames RBD is likely to have influenced the dominance of the Business services and Retailing employment sectors.

Sectors that provide significantly above average levels of employment for the Thames RBD include:

- Business services;
- Retailing;
- Wholesale & distribution;
- Hotels & catering;
- Transport; and
- Banking & insurance.

The number of employees in each of the 30 SIC categories is illustrated in Table 2.3 below. Further detail on the employment in the most important water use related disaggregated SIC categories are provided in Annex 2.
<table>
<thead>
<tr>
<th>Rank</th>
<th>SIC Category</th>
<th>Employment (000s)</th>
<th>Per cent of total employment</th>
<th>Per cent average all RBDs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Business Services</td>
<td>1386.9</td>
<td>24.7</td>
<td>13.3</td>
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<tr>
<td>2</td>
<td>Retailing</td>
<td>709.1</td>
<td>12.6</td>
<td>10.9</td>
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<td>3</td>
<td>Health</td>
<td>592.2</td>
<td>10.5</td>
<td>10.6</td>
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<td>Wholesale &amp; distribution</td>
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<td>8.7</td>
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<td>5</td>
<td>Education</td>
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<td>6</td>
<td>Hotels &amp; catering</td>
<td>466.3</td>
<td>8.3</td>
<td>6.7</td>
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<td>7</td>
<td>Other services</td>
<td>431.3</td>
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<td>5.2</td>
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<td>Banking &amp; insurance</td>
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<td>Transport</td>
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<td>10</td>
<td>Public &amp; administration &amp; defence</td>
<td>327.8</td>
<td>5.8</td>
<td>5.4</td>
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<td>Other financial &amp; business services</td>
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<td>2.6</td>
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<td>12</td>
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<td>4.3</td>
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<td>Communications</td>
<td>181.0</td>
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<td>Paper, printing &amp; publishing</td>
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<td>1.8</td>
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<td>0.8</td>
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<td>Minerals</td>
<td>12.7</td>
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<td>0.5</td>
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<td>27</td>
<td>Wood &amp; wood products</td>
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<td>0.2</td>
<td>0.3</td>
</tr>
<tr>
<td>28</td>
<td>Oil &amp; gas extraction</td>
<td>4.5</td>
<td>0.1</td>
<td>0.1</td>
</tr>
<tr>
<td>29</td>
<td>Other mining</td>
<td>2.9</td>
<td>0.1</td>
<td>0.2</td>
</tr>
<tr>
<td>30</td>
<td>Fuel refining</td>
<td>2.9</td>
<td>0.1</td>
<td>0.1</td>
</tr>
<tr>
<td></td>
<td>Total employment Thames RBD</td>
<td>7001.1</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: Experian Business Strategies Ltd

Between 1995 and 2002, the number of people employed in the Thames RBD has increased by 101,040 or 16.9 per cent. This growth equates to a rate of 2.3 per cent per annum.

The major changes in employment are illustrated in Figure 2.5 below. In terms of numbers of employees the largest growth sector between 1995 and 2002 has been in the Business services sector which has increased by approximately 385,000.
Figure 2.5: Change in employment, Thames RBD, 1995 to 2002

Business services: 38%
Hotels & catering: 37%
Other services: 32%
Retailing: 17%
Education: 20%
Other financial & business services:
Health: 12%
Construction: 27%

Source: Experian Business Strategies Ltd

Figure 2.6 details the percentage change in employee numbers between 1995 and 2002 for the sectors illustrated in Figure 2.5. The Business services sector grew at the greatest rate, increasing employment by 38 per cent.
2.4 Other socio-economic characteristics

Apart from output and employment, there are a number of other indicators that present important economic information on the distribution of wealth and economic opportunities in a region. These include information on deprivation (which includes information on relative income, employment, health, education, housing and child poverty), unemployment and qualifications. Information on Government area based policies is also presented. These provide an indication of Government programmes that may impact on development in the RBD, and therefore may have an impact on water use.

2.4.1 Deprivation indices

Using the *Indices of Multiple Deprivation for England and Wales* produced by the Office of National Statistics (ONS), a collation of the 50 most deprived and the 50 least deprived wards by RBD can be used as an indicator of deprivation within each of the RBDs. It should be noted, however, that ward boundaries are not consistent with RBD boundaries. Consequently, some of the most/least deprived wards may be in more than one RBD.

The Index of Multiple Deprivation is comprised of six parameters:

- Income;
- Employment;
- Health deprivation and disability;
- Education, skills and training;
- Housing; and
- Geographical access to services.

According to the 2000 index, the Thames RBD was home to 31 of the least deprived wards in England and Wales. These included the areas of St Albans, Hertsmere, Woking, Bromley, Elmbridge, Mole Valley and Sevenoaks. There were, however, three Thames RBD wards amongst the 50 most deprived wards. These were mostly in the Tower Hamlets area of London.

2.4.2 Claimant count and qualifications

The Thames RBD crosses several administrative districts and therefore a single district cannot be used as a proxy to assess the level of unemployment in the RBD. Instead, Job Seeker Allowance (JSA) claimant count as a proportion of working age population has been assessed for the major centres within the Thames RBD.

To measure qualifications the percentage of the working age population within the Thames RBD without any qualifications is assessed for the same major centres within the RBD.
London dominates much of the economic activity within the Thames RBD and therefore is considered in more detail. London contains 34 Local Authority Districts (LADs). There is considerable variety between the LADs in terms of claimant count and qualifications. The following LADs demonstrate this variety.

**Table 2.4: Claimant count and qualifications for London LADs**

<table>
<thead>
<tr>
<th>Local Authority District</th>
<th>Claimant count (percentage)</th>
<th>Percentage of working age population with no qualifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barking and Dagenham</td>
<td>3.3</td>
<td>23.3</td>
</tr>
<tr>
<td>Camden</td>
<td>3.7</td>
<td>10.8</td>
</tr>
<tr>
<td>Greenwich</td>
<td>3.8</td>
<td>13.5</td>
</tr>
<tr>
<td>Hackney</td>
<td>5.2</td>
<td>22.3</td>
</tr>
<tr>
<td>Islington</td>
<td>4.9</td>
<td>17.8</td>
</tr>
<tr>
<td>Kensington and Chelsea</td>
<td>2.1</td>
<td>6.4</td>
</tr>
<tr>
<td>Tower Hamlets</td>
<td>5.6</td>
<td>26.6</td>
</tr>
<tr>
<td>Wandsworth</td>
<td>2.6</td>
<td>7.1</td>
</tr>
<tr>
<td>London average</td>
<td>3.2</td>
<td>13.9</td>
</tr>
<tr>
<td>UK average</td>
<td>2.2</td>
<td>15.1</td>
</tr>
</tbody>
</table>

Source: NOMIS

London has an above average level of JSA claimants. The level of claimants ranges from over 5 per cent in Hackney and Tower Hamlets to below the UK average in Kensington and Chelsea.

There is also a large variance in the percentage of working age population with no qualifications from just 6.4 per cent in Kensington and Chelsea to 26.6 per cent in Tower Hamlets.

Outside of London, claimant count and the extent of the working age population without qualifications is considered in the following LADs.

**Table 2.5: Claimant count and qualifications for LADs outside London, Thames RBD**

<table>
<thead>
<tr>
<th>Local Authority District</th>
<th>Claimant Count (percentage)</th>
<th>Percentage of working age population with no qualifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oxford</td>
<td>1.5</td>
<td>9.5</td>
</tr>
<tr>
<td>Reading</td>
<td>2.1</td>
<td>11.3</td>
</tr>
<tr>
<td>Swindon</td>
<td>1.7</td>
<td>9.3</td>
</tr>
<tr>
<td>Crawley</td>
<td>1.3</td>
<td>7.1</td>
</tr>
<tr>
<td>Stevenage</td>
<td>1.6</td>
<td>12.5</td>
</tr>
<tr>
<td>Luton</td>
<td>2.8</td>
<td>14.6</td>
</tr>
<tr>
<td>Slough</td>
<td>2.9</td>
<td>17.4</td>
</tr>
<tr>
<td>Hemel Hempstead</td>
<td>1.5</td>
<td>11.5</td>
</tr>
<tr>
<td>UK</td>
<td>2.2</td>
<td>15.1</td>
</tr>
</tbody>
</table>

Source: NOMIS
Outside of London there is less range in both the level of claimant count and the percentage of working age population with no qualifications. In terms of claimant count the highest percentage of JSA claims is in Luton whilst the smallest percentage is in Crawley.

With the exception of Slough, with 17.4 per cent, all of the LADs considered had a percentage of working age population with no qualifications below the UK average. Crawley has the lowest percentage at below half of the UK average.
2.5 Area based initiatives

Area based initiatives (ABIs) represent the main source of geographically targeted Government interventions into the economy and communities in England. An appreciation of the extent and coverage of ABIs is therefore important in understanding the Government led dynamics of the RBD’s economy. While ABIs remain very significant sources of change, there is an increasing trend towards mainstreaming area based policies (so that main Government programmes help to fulfil the ABI objectives).

Figure 2.7 shows the main renewal initiatives and activities in the Thames RBD: Sustainable Communities Growth Areas; the Neighbourhood Renewal Fund (NRF); New Deal for Communities; and Urban Regeneration Companies.

The relationship between ABIs and pressures and impacts in terms of the RBD will not always be clear. There are complex interactions between the initiatives, main Government programmes, the wider economy and environment policy. They remain, however, an important component of the socio-economic profile of areas and will need to be considered in the further development of characterisation and risk assessment particularly in terms of the baseline and the subsequent development of PoMs.

As the Figure 2.7 reveals, although areas of the Thames RBD are very wealthy there are also significant issues of deprivation. High concentrations of the 10 per cent Most Deprived Super Output Areas are located within the RBD, in particular around central and eastern London.

Large areas of London are eligible for funding as part of the NRF, which aims to enable England's 88 most deprived authorities, in collaboration with their Local Strategic Partnership, to improve services, narrowing the gap between deprived areas and the rest of the country¹. Such an initiative will encourage residents to neighbourhoods, thus increasing localised levels of water use. This could have an impact on the level of water use within the Thames RBD.

To the north and east of London the dominating ABIs for the Thames RBD are the Government’s Sustainable Communities Growth Areas, for example the Thames Gateway growth area. This programme aims to deliver additional housing and infrastructure in a sustainable way. These areas are expected to see substantial additional growth in housing over the period to 2012.

Outside of London an Urban Regeneration Company covers the area around Swindon, ‘The New Swindon Company.'

¹ Neighbourhood Renewal Unit, ODPM website.
Figure 2.7: Area based initiatives, Thames RBD
2.6 Trends in the Thames RBD economy

Forecasts for the Thames RBD have been conducted by Experian Business Strategies Ltd up to 2015. Forecasts have been undertaken for population, households, output and employment.

The Experian forecasts were developed specifically for the economic analyses completed for the WFD. They represent the only nationally consistent RBD based forecasts of the main economic parameters. In addition to the standard sectoral splits, additional sub-sectors have been forecast for output and employment based on the results of the analysis of impacts and pressures in the River Basin Characterisation (RBC). Discussions with stakeholders reveal in many cases that these forecasts could be improved upon as they may not have been able to take into account some sector specific parameters relating to likely future trends. Further work on rationalising these forecasts is planned.

2.6.1 Population and households

The Thames RBD population is forecast to increase significantly between 2002 and 2015, at a rate greater than the average across all RBDs. This is due, in part, to the Sustainable Communities growth areas within the RBD.

An increase in the number of households is forecast, linked in part to the Sustainable Communities plan. An increase of over 830,000 houses is anticipated, this is an average of 64,000 houses per year between 2002 and 2015.

The population per household in the Thames RBD is forecast to continue to decline between 2002 and 2015 in line with the average trend across all RBDs. Since smaller households tend to have higher per capita water use, this trend may increase overall water consumption.

Table 2.6: Forecast change in population, households and population per household, Thames RBD, 2002-15

<table>
<thead>
<tr>
<th></th>
<th>2002</th>
<th>2015</th>
<th>Percentage Change 2002-15</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population (000s)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thames</td>
<td>13,794.2</td>
<td>15,026.8</td>
<td>Thames 8.9</td>
</tr>
<tr>
<td>All RBDs</td>
<td></td>
<td></td>
<td>All RBDs 4.6</td>
</tr>
<tr>
<td>Households (000s)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thames</td>
<td>5,748.4</td>
<td>6,581.0</td>
<td>Thames 14.5</td>
</tr>
<tr>
<td>All RBDs</td>
<td></td>
<td></td>
<td>All RBDs 11.2</td>
</tr>
<tr>
<td>Population per household</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thames</td>
<td>2.4</td>
<td>2.2</td>
<td>Thames -4.8</td>
</tr>
<tr>
<td>All RBDs</td>
<td></td>
<td></td>
<td>All RBDs -5.9</td>
</tr>
</tbody>
</table>

Source: Experian Business Strategies Ltd
2.6.2 Output

The economy of the Thames RBD is forecast to increase output over £140 billion between 2002 and 2015. This is an increase of 52 per cent, which equates to a growth rate of 3.3 per cent per annum. The main growth sectors in terms of value are illustrated in Figure 2.8. The largest output growth is anticipated to be in the Business services sector, which is forecast to increase by over £50 billion during the period.

The Manufacturing sector is forecast to record overall growth. However, within the Manufacturing sector, several sub-sectors are forecasted to decline. This is considered in more detail in Section 3.2 of this report.

**Figure 2.8: Forecast change in output, Thames RBD, 2002 to 2015**

![Bar chart showing forecast change in output, Thames RBD, 2002 to 2015. Business services show the largest increase, followed by Communications, Banking & insurance, Other financial & business services, Health, Retailing, Wholesale & distribution, and Manufacturing.]

Source: Experian Business Strategies Ltd

Figure 2.9 illustrates the percentage growth rates for the sectors illustrated in Figure 2.8. Business services, the sector anticipated to increase by the greatest value, is forecast to increase by 93 per cent between 2002 and 2015. The highest rate of growth is forecast in the Communications sector.
2.6.3 Employment

Within the Thames RBD employment is forecast to increase by almost 700,000. This equates to a growth rate of 0.74 per cent per annum. Figure 2.10 indicates the sectors forecasted to have the most significant changes in employment.

Business services is the largest growing sector in terms of employment within the Thames RBD between 2002 and 2015. The sector is forecast to increase employment by 360,000 by 2015.

Source: Experian Business Strategies Ltd
Figure 2.10: Forecast change in employment, Thames RBD, 2002 to 2015

Figure 2.10 outlines the percentage change in employee numbers between 2002 and 2015 for the sectors illustrated in Figure 2.10. The fastest growth is anticipated to be in the Communications sector which is forecast to increase employment by 33 per cent.

Figure 2.11: Forecast percentage change in employment, Thames RBD, 2002 to 2015

A full list of forecasts for both employment and output for the Thames RBD is attached in Annex 2. This contains a greater level of disaggregation of SIC codes based on the analysis of impacts and pressures.
These trends are consistent with the Regional Economic Strategies of the regions within which the Thames RBD is located (South East and East of England) as well as the Economic Development Strategy for London. In the South East the RES (Regional Economic Strategy for South East England 2002 – 2012) identifies eleven clusters which have major significance for the future of the region. These are based on emerging technologies (pharmaceuticals, biotechnology and healthcare, information and communication technologies, media/creative industries, and environmental technologies), major employment concentrations (tourism and leisure, freight transport and logistics, construction and property services, financial and professional services, and land based industries) and high value added manufacturing (advanced engineering (including automotive), aerospace and defence, and marine technologies). Areas likely to see significant priority in terms of development include the Thames Gateway Kent area (comprising Dartford, Gravesham, Medway and Swale) with a focus on brownfield regeneration as part of Europe’s largest redevelopment activity.

In the case of the East of England the Regional Economic Strategy (Shared Vision: the Regional Economic Strategy for the East of England) identifies a number of innovative clusters including life sciences (London-Norwich Corridor), environmental technologies (Essex) and multimedia (London-Hertfordshire). Significant development areas in the region supporting these clusters and wider RES aims include the Thames Gateway South Essex (TGSE) area (part of the wider Thames Gateway area). TGSE includes the areas of Castle Point, Thurrock and part of Basildon and Rochford. 55,000 new jobs are projected for this area in the period 2001 to 2021. Similarly growth opportunities are being prioritised in the London–Stansted–Cambridge–Peterborough corridor which includes the towns of Stansted/Harlow, and Stevenage and the Milton Keynes-South Midlands growth area which includes parts of Luton and Dunstable.

In London, the strategy for economic development is set out in the Economic Development Strategy (Sustaining Success Developing London’s Economy). The underlying spatial strategy is to manage London’s growth within its current boundaries, protecting green land and minimising negative impacts on neighbouring regions. Significant development issues arise in relation to the impacts of the Sustainable Communities Plan and the growth areas it identifies in London (the Thames Gateway and London-Stansted-Cambridge corridor) and the issues posed by the development of the ‘western wedge’, extending from west London to the Thames Valley, and the area south from Croydon to Crawley/Gatwick and Brighton. The London Plan identifies six different types of place with particular importance to economic development and regeneration. These include twenty-eight opportunity areas (able to accommodate substantial new jobs), fourteen areas for intensification (able to support a greater density of employment), a number of areas of regeneration (covering the most deprived wards), the network of 1,400 town centres including areas of international significance as well as local importance), the

1 http://www.seeda.co.uk/res/docs/RES_Main_Web.pdf
2 http://www.eeda.org.uk/embedded_object.asp?docid=1002978
suburbs (covering two-thirds of the capital’s total land area and providing a range of employment and other opportunities) and sixty-two strategic employment locations, which provide for London’s strategic industrial requirements and comprise locations for industry and warehousing.
3 Pressures

This section presents information on water use, covering the main pressure categories related to abstractions, discharges and hydromorphological alterations. This information has been assembled on the basis of the analysis of impacts and pressures. There are currently limits to the extent to which specific activities (e.g. farming) can be linked to pressures (e.g. morphology). This is a main component of future work on characterisation, which will improve the analysis in later years. The following analysis is based on currently available information on an RBD basis where this is possible. These sections should be read in conjunction with the River Basin Characterisation (RBC) risk analysis to provide a better understanding of the main activities associated with pressures in this RBD.

3.1 Characteristics of water use

3.1.1 Abstractions

Abstractions from water bodies are undertaken for a number of purposes, including providing drinking water for households and use of water in industrial processes.

Table 3.1 illustrates the Thames RBD abstractions by purpose in order of magnitude. The basis for abstractions analysis is the Environment Agency’s 2001 water abstraction dataset. This dataset was originally derived from the National Abstraction Licensing Database (NALD). The abstraction source’s annual total has been expressed as a daily rate (megalitres per day), however it should be noted that these daily figures do not reflect seasonal variations in water use

For all abstraction sources, estimated returns to watercourses are excluded. Some industries, in particular the electricity industry, use water for cooling purposes and return the water to its source after it has been used. The table also excludes abstractions from saline estuaries and coastal waters, which is a substantial source of cooling water for some power stations. For these industries, total abstractions are higher than those presented in Table 3.1.

The way in which water is abstracted can vary. This can also impact on water status. Low flow schemes can reduce the impact of abstractions on the environment. These schemes present costs to water companies.

The Environment Agency has developed sustainable abstraction levels which are going to be applied to water companies in the next business planning period, 2005-10. In future years, sustainability reductions are likely to impact on abstraction levels.

1 This data relates to abstractions within the RBD area. It does not cover abstractions from other RBDs which are used within the RBD (and vice versa) as a result of bulk supply arrangements.
The main water abstractions in the Thames RBD are by the water, power, manufacturing and agriculture industries. Abstractions by water companies supply water for both household and non-household consumption, which include some industrial and commercial uses, as well as consumption by schools, hospitals, etc.

Table 3.1: Thames RBD abstractions

<table>
<thead>
<tr>
<th>SIC section</th>
<th>SIC description</th>
<th>Further description</th>
<th>Volume (Ml/d)</th>
<th>Per cent of total Thames RBD abstractions</th>
</tr>
</thead>
<tbody>
<tr>
<td>E41.00</td>
<td>Collection, purification and distribution of water</td>
<td>Public Water Supply (total abstracted)</td>
<td>4340.91</td>
<td>93.35%</td>
</tr>
<tr>
<td>E40.10</td>
<td>Production and distribution of electricity</td>
<td>Power Generation</td>
<td>201.32</td>
<td>4.33%</td>
</tr>
<tr>
<td>D</td>
<td>Manufacturing</td>
<td>General Industry (Manufacturing)</td>
<td>41.42</td>
<td>0.89%</td>
</tr>
<tr>
<td>A01</td>
<td>Growing of crops; market gardening; horticulture: Farming of animals</td>
<td>Spray Irrigation included</td>
<td>25.94</td>
<td>0.56%</td>
</tr>
<tr>
<td>L</td>
<td>Public Administration &amp; defence, Education, Health</td>
<td>Public Administration &amp; defence, Education, Health</td>
<td>12.09</td>
<td>0.26%</td>
</tr>
<tr>
<td>O (excluding O92)</td>
<td>Other community, social and personal</td>
<td>Other (including Environmental)</td>
<td>10.52</td>
<td>0.23%</td>
</tr>
<tr>
<td>P</td>
<td>Private households with employed persons</td>
<td>Other Potable Uses</td>
<td>7.95</td>
<td>0.17%</td>
</tr>
<tr>
<td>O92</td>
<td>Recreational, cultural and sporting activities</td>
<td>Recreation (including sports)</td>
<td>3.54</td>
<td>0.08%</td>
</tr>
<tr>
<td>F</td>
<td>Construction</td>
<td>Construction</td>
<td>2.77</td>
<td>0.06%</td>
</tr>
<tr>
<td>C</td>
<td>Mining and quarrying</td>
<td>Mining &amp; Aggregates</td>
<td>2.73</td>
<td>0.06%</td>
</tr>
<tr>
<td></td>
<td>Amenity</td>
<td>Amenity</td>
<td>0.61</td>
<td>0.01%</td>
</tr>
<tr>
<td>H</td>
<td>Hotels and restaurants</td>
<td>Hotels, Public Houses and Conference centres</td>
<td>0.39</td>
<td>0.01%</td>
</tr>
<tr>
<td>E41.00</td>
<td>Collection, purification and distribution of water</td>
<td>Licensed transfers for PWS</td>
<td>0.00</td>
<td>0.00%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>4650.19</td>
<td>100%</td>
</tr>
</tbody>
</table>

Note: Abstractions are from freshwater bodies only (i.e. they exclude tidal and coastal waters) and are not adjusted for water returned to the local environment.

Figure 3.1 provides a graphical representation of this information.
3.1.2 Discharges

Discharges into water bodies also have important impacts on water status.

Table 3.2 below summarises the main categories of consented discharges for the Thames RBD. The table shows the number of consents rather than volumes. The major sources of discharges for the Thames RBD are related to the treatment of sewage. The number of such consents is in part a function of the number of households in the Thames RBD and the level of household water use.
Table 3.2: Number of consented discharges for the Thames RBD

<table>
<thead>
<tr>
<th>Discharge</th>
<th>Number of consents</th>
<th>Percentage of total consents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sewage – treated effluent</td>
<td>3627</td>
<td>77.68%</td>
</tr>
<tr>
<td>Sewage treatment works</td>
<td>363</td>
<td>7.77%</td>
</tr>
<tr>
<td>Sewage – undefined</td>
<td>308</td>
<td>6.60%</td>
</tr>
<tr>
<td>Trade – treated effluent</td>
<td>167</td>
<td>3.58%</td>
</tr>
<tr>
<td>Trade – fish aquaculture</td>
<td>27</td>
<td>0.58%</td>
</tr>
<tr>
<td>Unknown</td>
<td>27</td>
<td>0.58%</td>
</tr>
<tr>
<td>Trade – cooling water (direct)</td>
<td>26</td>
<td>0.56%</td>
</tr>
<tr>
<td>Trade – groundwater – as raised</td>
<td>22</td>
<td>0.47%</td>
</tr>
<tr>
<td>Trade – site drainage (contaminated S/W)</td>
<td>15</td>
<td>0.32%</td>
</tr>
<tr>
<td>Paper and pulp manufacturing processes</td>
<td>11</td>
<td>0.24%</td>
</tr>
<tr>
<td>Trade – undefined</td>
<td>9</td>
<td>0.19%</td>
</tr>
<tr>
<td>Petroleum processes</td>
<td>9</td>
<td>0.19%</td>
</tr>
<tr>
<td>Trade – filter backwash</td>
<td>8</td>
<td>0.17%</td>
</tr>
<tr>
<td>Other – surface water (uncontaminated)</td>
<td>7</td>
<td>0.15%</td>
</tr>
<tr>
<td>Sewage – storm effluent</td>
<td>7</td>
<td>0.15%</td>
</tr>
<tr>
<td>Combustion processes</td>
<td>6</td>
<td>0.13%</td>
</tr>
<tr>
<td>Non-ferrous metals</td>
<td>4</td>
<td>0.09%</td>
</tr>
<tr>
<td>Trade – potable water</td>
<td>4</td>
<td>0.09%</td>
</tr>
<tr>
<td>Undefined</td>
<td>3</td>
<td>0.06%</td>
</tr>
<tr>
<td>Trade – leachate</td>
<td>3</td>
<td>0.06%</td>
</tr>
<tr>
<td>Recovery processes</td>
<td>2</td>
<td>0.04%</td>
</tr>
<tr>
<td>Trade – condensate water</td>
<td>2</td>
<td>0.04%</td>
</tr>
<tr>
<td>Trade – fish aquaculture</td>
<td>2</td>
<td>0.04%</td>
</tr>
<tr>
<td>Trade – plants aquaculture</td>
<td>2</td>
<td>0.04%</td>
</tr>
<tr>
<td>Acid processes</td>
<td>1</td>
<td>0.02%</td>
</tr>
<tr>
<td>Other – groundwater (as raised)</td>
<td>1</td>
<td>0.02%</td>
</tr>
<tr>
<td>Sewage – crude effluent</td>
<td>1</td>
<td>0.02%</td>
</tr>
<tr>
<td>Sewage – swimming pool contents</td>
<td>1</td>
<td>0.02%</td>
</tr>
<tr>
<td>Trade – aquaculture</td>
<td>1</td>
<td>0.02%</td>
</tr>
<tr>
<td>Trade – Boiler blowdown</td>
<td>1</td>
<td>0.02%</td>
</tr>
<tr>
<td>Trade – minewater</td>
<td>1</td>
<td>0.02%</td>
</tr>
<tr>
<td>Trade – purge effluent</td>
<td>1</td>
<td>0.02%</td>
</tr>
<tr>
<td>Total</td>
<td>4669</td>
<td>100%</td>
</tr>
</tbody>
</table>

Source: Environment Agency, 2004
3.1.3. Hydromorphology

Physical alterations to transitional or coastal waters can cause habitat damage or loss, resulting in a loss of, or decline in, species. These waters can be affected by land reclamation, shoreline reinforcement or physical barriers such as flood defences, barrages and sluices. Activities such as navigation, some types of commercial fishing and dredging can also damage physical habitats.

Where the presence of a hard defence is not currently impacting the status of a water body, consideration must be given as to how, or if, defences are likely to cause a deterioration in those elements that define Status, and thus impact on the objectives of the WFD. Of particular concern is the phenomenon of coastal squeeze, where rising sea levels meet an artificial fixed landward boundary and cause or exacerbate the erosion of saltmarsh.

There can also be morphological alterations in inland waters, including those due to dredging, the construction of barrages and inland navigation. In addition, there are some morphological changes to facilitate land drainage including straightening, deepening and culverting.

In the Thames RBD, land reclamation, shoreline reinforcing, inland navigation, barrages and fishing are significant morphological alterations. Land reclamation is human activity that may have reclaimed low-lying areas from the sea and includes coastal flood defence structures. Shoreline defences include embankments, sea walls, groynes and culverts. Inland navigation is an important leisure and tourist activity in the Thames RBD.

There is an SIC category that covers the construction of all water projects and includes ports, jetties, lochs and dredging. This sector is a moderate size in the Thames RBD and is expected to grow steadily over the period to 2015.
3.2 Sectors impacting on water status

The following sections provide more detail on a number of sectors which are particularly important to water status in the Thames RBD. These are grouped in terms of households, industry and agriculture.

3.3.1 Households

Housing growth is a significant issue in the UK with an estimated 189,000 new households likely to form per year over the next 20 years. However, it should be noted that population growth accounts for only 57 per cent of this growth, with the remainder coming from changing household patterns, including smaller households, later marriage and increased life expectancy. Moreover, this household growth is strongly regional in nature, with the southern English regions experiencing higher trend household growth and population growth, through a combination of natural growth (fertility), international and domestic migration. Housing figures are not currently available on a river basin basis, but rather are produced on a Government Office Region basis. In the wider South East\(^1\), these show a net under supply in the period 1997-01 of homes over new households of about 100,000\(^2\).

As a result, there is now a serious shortfall in housing provision across many of these areas causing affordability problems, contributing to homelessness and putting strain on the supply of social housing. The Government has signalled its wish to achieve a better balance between supply and demand and to this end is seeking, through new regional spatial strategies, a further 200,000 homes in the period 2001 to 2016. This is above the 930,000 in existing plans in the wider South East, of which 345,000 are in London. The extra 200,000 should be focused in London and four growth areas. The Government is also considering what reforms might be necessary in response to the work on the UK housing supply undertaken by Kate Barker\(^3\).

The environmental implications of increasing the housing supply in the UK have been analysed in terms of a number of scenarios up to 2016 in a study for the Defra\(^4\). These scenarios are not presently available on an RBD basis but will be analysed as part of future work on defining baselines for River Basin Management Plans (RBMPs). On a UK basis, under the Baseline Scenario in the study it is estimated that approximately 47,500 hectares of greenfield land would be lost between 2001 and 2016. This increases to

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\(^1\) Thames River Basin District includes all or part of three Government Office regions: all of London and parts of South East and Eastern regions.


\(^3\) See [http://www.hm-treasury.gov.uk/consultations_and_legislation/barker/consult_barker_index.cfm](http://www.hm-treasury.gov.uk/consultations_and_legislation/barker/consult_barker_index.cfm)

\(^4\) *Study into the Environmental Impacts of Increasing the Supply of Housing in the UK*, Entec 2004, [http://statistics.defra.gov.uk/esg/reports/housing/default.asp](http://statistics.defra.gov.uk/esg/reports/housing/default.asp). These scenarios are the result of a research project and do not represent agreed Government figures.
77,500 hectares under Scenario 3\(^1\) - although this scenario is not currently likely to be implemented.

In addition to the *Integrated Water Management Study* undertaken for the Ashford, Kent Growth Area (which looked at the entire water cycle) two further major research projects are underway looking at the environmental impacts of such a step-change in housing supply. The first examines the existing growth proposals as laid out in *Sustainable Communities: Building for the Future*, and looks, via case studies, at a range of impacts including water supply, sewerage, waste water treatment standards and run-off. This is being undertaken by the Environment Agency and is due for publication in April 2005. The second is a study to explore the environmental, social, economic and fiscal impacts of different housing growth scenarios, linked to different levels of affordability. The study will provide a summary of the impacts at national and regional level, and is due for completion in June 2005.

Water companies provide water services to households, to commercial premises as well as to some industrial customers. The largest volume of water abstracted in the Thames RBD is by water companies, and future trends in the level of water demanded by water users may have important impacts on water status.

Water demand forecasts have been undertaken and incorporated into the risk assessment. In the case of the Thames RBD, forecasts are related to the following companies: Northumbrian Water (through its subsidiary Essex and Suffolk Water), Southern Water, Thames Water, Mid Kent Water, South East Water, Sutton and East Surrey Water and Three Valleys Water. The forecasts are based on the World Markets Scenario in the Environment Agency’s water resources strategy report ‘A Scenario Approach to Water Demand Forecasting’ 2001\(^2\). The risk assessment could not use water industry forecasts of demand in their *Water Resource Plans* (WRP) because of timing and confidentiality issues.

The Environment Agency’s strategy forecasts, however, have been compared to the water companies’ recent forecasts to validate them and highlight qualitatively any differences between the forecasts and their supporting information. In general, it was concluded that the water company growth rates for per capita consumption used in the Environment Agency’s strategy report are higher than the growth rates used by the water companies in their final *Water Resources Plan* (WRP) in April 2004 as part of the periodic review.

The key explanation for the differences in per capita consumption growth rates in the Environment Agency’s strategy report and the companies’ WRPs is in the assumptions behind the Beta Scenario used in the strategy report.

\(^1\) The Baseline represents largely a continuation of current trends and is consistent with the *Communities Plan* launched by the Office of the Deputy Prime Minister. Scenario 3 represents a much greater expansion in housing consistent with assumptions developed for the *Barker Review* of the housing supply and in terms of meeting targets about affordability of housing by reducing the real trend in house prices.

\(^2\) [www.environment-agency.gov.uk/subjects/waterres/286587/286599/286911/?lang=_e](http://www.environment-agency.gov.uk/subjects/waterres/286587/286599/286911/?lang=_e)
The Environment Agency is reviewing how to refine these per capita water consumption projections in the near future to inform the risk assessment and the analysis of options for the PoMs. This will involve taking account of the major changes in demand forecasts in the companies’ WRPs and the major anticipated changes in the agriculture sector from the Environment Agency’s Business as Usual (BAU) agriculture projections. In addition the water implications of housing development and regeneration policies (see area based initiatives) that the Government has recently announced will be examined carefully. This will also involve taking into account any other relevant forecasts, including those in this document.

3.3.2 Industry

The second largest abstraction of water in the Thames RBD is for the production and distribution of electricity accounting for 201.3 mega litres per day. This is a high proportion of all inland water abstractions for electricity, making up 81.5 per cent of such abstractions across all RBDs.

While a high proportion of the total abstractions in the Thames RBD relate to the production of electricity, it is not possible to establish how much of the electricity produced in a RBD is consumed in the same RBD due to the nature of electricity and the characteristics of the integrated national transmission and distribution networks. Electricity production is of national significance. In order to ensure security of supply a unit of electricity can be transmitted and used wherever needed. Strong geographic, economic and technical factors determine the location of a power station and the transmission and distribution systems. It is rare for the siting of a power station to be directly linked to very local demand for electricity. It is therefore necessary to put electricity in a national rather than RBD context.

The Experian forecasts for Electricity & distribution (SIC 40.1) point to a steady increase in output between 2002 and 2015.

Forecasts for electricity by production type are not available at an RBD level. However, national forecasts undertaken by the Department of Trade and Industry for Energy Paper 68 point to an increase in gas fired electricity production at the expense of nuclear energy and coal fired power. Renewable energy is expected to increase in importance, but still remain a relatively small share of overall energy production.

The Thames RBD has a number of important ports, including London and Medway. Shipping relies on safe access to water of an adequate depth for access to markets. Some ports have statutory duties to maintain waters to specified depths and undertake dredging activities to maintain and deepen channels. Ports and marinas can be directly affected by discharges upstream, leading to water quality issues. In some cases, navigation by vessels may also influence water quality. Abstractions upstream can have potential impacts on port water levels, leading to navigational issues in some instances.
Ports and marinas undertake an extremely broad range of activities. Cargo and passenger handling are the most important but ports also supply services to industries such as oil and fishing. Marinas can have a major influence on tourism activity.

Ports handle approximately 95 per cent of UK trade in tonnage terms. Domestic coastal freight services contribute to reducing road congestion and provide a more environmentally friendly mode of transport than road or rail. A major concern to the transport industry is the lack of additional deep-water container port capacity in the UK. The UK port industry expects that overall tonnage handled at the UK’s ports will, at least, continue to grow in line with GDP for the foreseeable future. This will necessarily require further sustainable development, dredging and disposal of dredged materials.

Nationally, the ports industry has direct employment of approximately 25,000 and it is estimated that a further 380,000 jobs are indirectly dependant on port activity.

Table 3.3 details the goods and passenger movements through ports in the Thames RBD. Approximately one fifth of goods in to ports are handled within the RBD.

**Table 3.3: Port foreign and domestic traffic, passenger movements in the Thames RBD**

<table>
<thead>
<tr>
<th>Flow (000s tonnes)</th>
<th>Percentage of all RBD port movement</th>
<th>RBD rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goods in 2002</td>
<td>55,104</td>
<td>20.16%</td>
</tr>
<tr>
<td>Goods out 2002</td>
<td>10,921</td>
<td>7.72%</td>
</tr>
<tr>
<td>All foreign and domestic traffic 2002</td>
<td>66,025</td>
<td>16.15%</td>
</tr>
<tr>
<td>Passenger movements 2002</td>
<td>13</td>
<td>0.05%</td>
</tr>
</tbody>
</table>

Source: British Ports Association

The main ports within the Thames RBD include:

- London – throughput (2002) of 51,185,000 tonnes; and

In 2003, inland water traffic in the Thames and Kent totalled 20.83 million tonnes and internal inland waters traffic was 2.06 million tonnes.

London is the UK’s second largest port and covers a distance of 95 miles from Teddington to the North Sea and has 80 operational cargo terminals. The port handles a diverse range of cargo and has plans to develop the disused Shellhaven oil terminal into a ferry and container port. The Medway handles a variety of cargoes and is home to Thamesport, one of the largest container terminals in the UK. Other ports included in the Medway area are Sheerness, Rochester, Ridham Dock and Chatham.
There are a number of marinas in the Thames RBD, particularly along the Kennet and Avon Canal. The River Thames has a long historical heritage of transporting goods. Within London there are a number of docks and marinas associated with residential development.

A British Marine Federation report on marinas and moorings for both inland and coastal sectors illustrated that the demand for moorings exceeds the supply in coastal waters. For inland waters, there is a strong demand for moorings for current and mid term requirements, with current waiting lists indicating an overwhelming demand for power moorings.

Output forecasts have been conducted by Experian Business Strategies Ltd under the following relevant categories:

- Sea and coastal water transport (covering passenger sea and coastal water transport and freight sea and coastal water transport); and
- Inland water transport.

In the Thames RBD output from sea and coastal water transport is forecast to increase from £213.3 million in 2002 to £296.8 million in 2015. This is an increase of 39.1 per cent.

Output from inland water transport is also forecast to grow from £20.0 million in 2002 to £22.3 million in 2015, an increase of 11.2 per cent.

3.3.3 Agriculture

The Agriculture sector has the potential to impact on water quality in a number of ways. Agriculture is an abstractor of water, as well as a source of diffuse pollution (mainly nitrates, phosphates and pesticides). Diffuse pollution can impact on water courses and water bodies. Static waters can be particularly vulnerable. Sediment run-off can also impact on hydromorphology.

There are two sources of forecasts for the agricultural sector – forecasts undertaken by Cambridge University and those by Experian Business Strategies Limited.

The Experian forecasts are based on output for SIC categories. A brief summary of the methodology used is found in Annex 2. The forecasts predicted an overall decline in agricultural production over the period between 2002 and 2015. An average fall in output of 0.3 per cent per annum is forecast over this period.

An in-depth agriculture Business as Usual study for the WFD was undertaken by Cambridge University (ref 2). The study provides quantitative percentage changes of key agricultural activities to 2015 at a national level and at a regional level for Government Office Regions in England and for Wales (see Tables 16-18). The report used a top down approach, essentially looking at
overall changes in England and Wales and adjusting these based on knowledge of the region and expert opinion to reflect regional changes.

The projections are based on a hybrid approach involving projections of current trends (adjusted for known developments in the drivers), institutional projections, available models, expert opinion, stakeholder meetings and a peer review process. The impacts of a wide range of drivers are considered including market forces, political (including Common Agriculture Policy reform), rationalisation within the industry, technological change and macroeconomic factors.

The Thames RBD includes part of the South East Government Office Region (GOR) as well as a small part of the East of England GOR. The key projected trends for major commodities in the Thames RBD are:

- Removal of set-aside brings land into arable production;
- Small increase in cereal production (particularly wheat, oilseed rape and maize) due to set aside changes;
- Continued decline of dairy herd as yields increase;
- Decline in beef and sheep herds; and
- A continued decline in fruit and horticultural crops (especially sugar beet and potatoes).

Overall a small fall in agricultural area is predicted. However, this may hide potentially significant changes in the structure and intensification of the industry and how businesses are managed. This may have impacts on water quality. For instance, more intensive cropping through greater use of fertilisers may impact on diffuse pollution.

In the future, in order to inform the development of the PoMs, the Environment Agency hopes to refine these projections to reflect differences within RBDs and important local aspects such as changes in intensity of farming methods. This future work will provide the basis for local baseline risk assessment and for the appraisal of options for water bodies at risk of not meeting good ecological status due to agricultural activities. The projections will then be refined and developed so that they can be applied at a local level.
4 Water services and cost recovery

4.1 Introduction

The WFD aims to ensure that pricing policies improve the sustainability of water resources and requires pricing policies to perform the following functions by 2010:

- Take account of the principle of the recovery of the costs of water services, including environmental and resource costs;
- Embody the polluter pays principle;
- Provide adequate incentives to use water resources efficiently; and
- Ensure that water use groups (separated into at least industry, households and agriculture) make an adequate contribution to the costs of water services.

The Government's view, expressed in previous consultations on the WFD, is that there is no need at present to alter present pricing policies to meet the requirements of the WFD. The present arrangements deliver charges by water and sewerage undertakers that recover the costs of these services, both overall and by sector of customer. This system takes account of the principles and objectives of the WFD and the provisions of Article 9 in particular.

However, as revealed by the Cost Recovery and Incentive Pricing Report (CRIP) (ref 3) this is not the same as recovery of cost by broad user group (households, industry and agriculture). It is not currently possible, given existing data and bearing in mind the cost of additional data collection, to identify recovery of costs of water uses by these water user groups. In addition, some of the costs imposed by water uses (such as diffuse pollution from roads, agriculture etc.) may not be adequately recovered from the relevant users, but further research is required to establish this.

Additional work is planned in relation to the recovery of financial costs and in relation to environmental and resource costs ahead of the 2010 deadline for demonstrating an adequate recovery of costs of water services.

Article 5 requires that future pricing policies will be further informed by the economic analysis of water use undertaken in accordance with Annex III of the WFD. This section provides information on the current levels of the recovery of the costs of water services in the Thames RBD to assist in this process1. The following sections outline:

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1 This section follows the guidance (Information Sheet) produced by France/UK/Commission on behalf of Drafting Group ECO1 under the auspices of Working Group 2B of the Common Implementation Strategy. The information sheet builds on the WATECO guidance published in 2002. The section draws on research undertaken in January to September 2004 by ERM on behalf of the England and Wales Economic Advisory Stakeholder Group (EASG) and with input from members of the UK wide Economics Steering Group.
• How water services are defined and how they relate to the Thames RBD;
• Who provides and who contributes to the cost of water services (users and polluters) in the Thames RBD;
• The current level of financial cost incurred in providing these services;
• The current level of environmental and resource costs associated with providing the services;
• The revenues of water services and how costs are recovered;
• Given the revenues and costs, the overall level of financial cost recovery; and
• Within this overall recovery of costs, how the costs are allocated between broad user groups.

The information provided in this section is based on the CRIP report (ref 3) which is available to download from the Defra website.
4.2 Water services and the Thames RBD

Water Services are defined by the WFD in Box 4.1.

**Box 4.1: Definition of water services**

“All services which provide, for households, public institutions or any economic activity:

(a) abstraction, impoundment, storage, treatment and distribution of surface water or groundwater;

(b) waste-water collection and treatment facilities which subsequently discharge into surface water.”

In England and Wales the definition of water services encompasses the water industry together with activities providing similar services. For the sake of transparency, it is also important to consider self-services in addition to water services.

Seven water companies operate in the Thames RBD. The estimated proportion of each company’s customer households falling within the RBD is provided in brackets:

- Northumbrian Water (through its subsidiary Essex & Suffolk Water) (15 per cent);
- Southern Water (27.5 per cent);
- Thames Water (95 per cent);
- Mid Kent Water (58 per cent);
- South East Water (65 per cent);
- Sutton and East Surrey Water (100 per cent); and,
- Three Valleys Water (95.5 per cent).

There are two sewerage service companies operating in the Thames RBD. The estimated proportion of each company’s customer households falling within the RBD is provided in brackets:

- Southern Water (25.1 per cent)
- Thames Water (98.4 per cent)

The water service areas of these companies do not coincide with the Thames RBD. For instance the majority of Thames Water, Sutton and East Surrey Water and Three Valleys Water customers are within the Thames RBD, with small proportions customers for the remaining providers within the District.
Ultimately, the analysis of cost recovery needs to be undertaken at a RBD scale. However, for Article 5 reporting it is possible to report rates of cost recovery on the basis of water service areas. Hence, in the following analysis of cost recovery in the Thames RBD figures are presented for all water companies. In addition an indicative “RBD allocation” is provided. This is based on a simple pro-rata allocation and may not reflect well the actual costs and revenues associated with particular geographic areas. It is provided for indicative purposes only.
4.3 Water service providers, users and polluters

4.3.1 Service providers

Northumbrian Water, Southern Water, Thames Water, Mid Kent Water, South East Water, Sutton and East Surrey Water and Three Valleys Water all provide water services within the Thames RBD. Details of the services provided can be found in the CRIP report (water sources, treatment works, length of mains, sewage loads and facilities etc.). In addition information related to business plans, investments, costs and prices for the period 2005-10 can be found in the Future Water and Sewerage Charges 2005-10: Final Determination report.

In addition to the water service companies in the Thames RBD listed above, there is a range of private water and sewerage services. Private water services cover any water service that is not supplied by a statutory water or sewerage undertaker. In addition to private water services there are also self-services.

In the United Kingdom, private water supplies are governed by the Private Water Supplies Regulations 1991 which transpose the 1980 European Drinking Water Directive (80/779/EEC) in relation to private water supplies. These regulations place responsibilities on local authorities to monitor and improve private supplies to reflect the number of private water supplies in a particular area and the specific priorities of the local authority.

Recent local authority surveys are inconclusive about the likely extent of private water supplies in England and Wales. The estimated number of supplies ranges between 50,000 to 100,000 and the population served between 300,000 to 1 million, with this concentrated in rural locations. A majority of supplies for domestic water use purposes (about 70 per cent) serve single properties. Larger commercial uses of private supplies are concentrated in the Food & drink manufacturing sector.

Recent analysis of the 2001 English House Condition Survey also suggests around 700,000 (3.3 per cent) household properties in England are not connected to the mains supply for drinking water purposes. Based on typical household occupancy this would suggest a population of around 1.5 million do not receive mains water supply. No comparable estimates are currently available for the Thames RBD, nor is there a comparable Government Office Region which broadly matches this RBD.

One example of a significant private supplier is British Waterways, which has sold water to canal-side industries for over 100 years. Watergrid is a British Waterways’ joint venture that uses the country’s network of inland waterways.
to provide water services to industry, agriculture and developers. In many cases the water is returned to the canal. Further information on British Waterways can be found in the stakeholder template in the Economic Importance and Dynamics of Water Use report (ref 1).

Private sewerage can involve the collection of wastewater, the treatment of sewage effluents and the discharge of treated wastewater to watercourses and the safe disposal of sludge (waste products from treatment processes). It has been estimated that there are between 80,000 to 200,000 kilometres of private sewers in England and Wales and nearly half of all household properties are served by private sewers or lateral drains¹. The vast majority of private sewer connections ultimately discharge wastewater to the public sewerage network.

Septic tanks and cesspools represent the most common form of private sewerage for household properties that are not connected to the public network. It is estimated that around 400,000 (1.9 per cent) household properties in England are served by septic tanks, cesspools or private sewerage systems. No direct estimates are currently available for the Thames RBD, nor for a broadly equivalent Government Office Region. However, data at the level of local authorities suggests some pockets within the Thames RBD that may have relatively high concentrations of private sewerage connections; for example Bedfordshire (6 per cent), Wiltshire (5 per cent) and Oxfordshire (4 per cent).

Within the manufacturing and industrial sectors, private and in particular self-services are well established in respect of effluent treatment and disposal. One direct measure of this is provided by Environment Agency data on the direct discharge of effluent to watercourses, which requires authorisation by the Environment Agency in the form of discharge consents. These are collectively termed trade discharges as opposed to discharges from treatment works operated by sewerage companies.

About 30 per cent of total consented discharges in England and Wales are made by trade sources. The equivalent figure for the Thames Environment Agency region is also 30 per cent. Consent compliance is lower for trade discharges compared to sewage discharges.

Further work on identifying the characteristics of private water suppliers is ongoing. In particular, the information is not currently collected in the correct geographical units to provide more detailed information in this report. In general, the abstractions and discharges from industries other than the public water suppliers (see Tables 3.1 and 3.2) are related to private abstractions and discharges, including self-service water users.

¹ A lateral drain is part of a private drain or sewer that is located beyond the curtilage of the property to connect it to the public sewer. The curtilage is the normal boundary between private drains and the public sewer.
4.3.2 Water users

Water use is defined by the WFD in Box 4.2.

**Box 4.2: Definition of water use**

“Water use” means water services together with any other activity identified under Article 5 and Annex II having a significant impact on the status of water.

Source: WFD Article 2 Paragraph 39

Article 9 of the WFD specifies that the water uses should be disaggregated into at least households, agriculture and industry.

An attempt is made as far as possible to report the information on water uses into these categories, however some uses cannot be disaggregated in this way and this will need to be subject to further analysis. This further work will also consider the appropriate sub-categorisation in the context of water pricing and PoMs. Current sub-categorisation is on the basis of the uses identified in the impacts and pressures analysis.

Some water uses, such as land reclamation or drainage, do not fit easily within the categories of households, industry and agriculture. As recognised in the reporting guidance it is necessary to include these “other uses” which are identified on the basis of the river basin characterisation.

**Households and non-households (commercial properties)**

These are the customers of the licensed water undertakers (including some commercial, non-household), other providers and households with private water supply and wastewater systems.

Tables 4.1a and 4.1b below provide the number and population of households and non-households receiving water and sewerage services from the main water service providers, as well as the volume (Ml/day).

There are estimated to be 5.5 million households and 441,000 non-households provided with water services by water companies in the Thames RBD.
Table 4.1a: Characteristics of water services in Thames RBD

<table>
<thead>
<tr>
<th>Water company</th>
<th>H/holds ('000)</th>
<th>Non-h/holds ('000)</th>
<th>Population (H/holds) ('000)</th>
<th>Population (non-h/hold) ('000)</th>
<th>Volume (ML/day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mid Kent Water</td>
<td>221</td>
<td>23</td>
<td>556</td>
<td>24</td>
<td>166</td>
</tr>
<tr>
<td>South East Water</td>
<td>549</td>
<td>45</td>
<td>1,321</td>
<td>68</td>
<td>394</td>
</tr>
<tr>
<td>Southern Water</td>
<td>947</td>
<td>70</td>
<td>2,211</td>
<td>69</td>
<td>599</td>
</tr>
<tr>
<td>Sutton and East Surrey Water</td>
<td>252</td>
<td>19</td>
<td>627</td>
<td>13</td>
<td>169</td>
</tr>
<tr>
<td>Thames Water</td>
<td>3,244</td>
<td>247</td>
<td>7,830</td>
<td>309</td>
<td>2,874</td>
</tr>
<tr>
<td>Three Valleys Water</td>
<td>1,162</td>
<td>68</td>
<td>3,020</td>
<td>10</td>
<td>899</td>
</tr>
<tr>
<td>Northumbrian Water</td>
<td>1,788</td>
<td>120</td>
<td>4,142</td>
<td>63</td>
<td>481</td>
</tr>
<tr>
<td>Total</td>
<td>8,163</td>
<td>592</td>
<td>19,707</td>
<td>556</td>
<td>5,582</td>
</tr>
<tr>
<td>Allocated to Thames RBD</td>
<td>6,208</td>
<td>436</td>
<td>14,976</td>
<td>366</td>
<td>4,027</td>
</tr>
</tbody>
</table>

Source: Annual Returns submitted by water companies to Ofwat

There are estimated to be 5.3 million households and 313,000 non-households provided with sewerage services by sewerage companies in the Thames RBD.

Table 4.1b: Characteristics of sewerage services, 2003-04

<table>
<thead>
<tr>
<th>Water company</th>
<th>H/holds ('000)</th>
<th>Non-h/holds ('000)</th>
<th>Population (H/holds) ('000)</th>
<th>Population (non-h/hold) ('000)</th>
<th>Volume (ML/day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Southern Water</td>
<td>1,662</td>
<td>99</td>
<td>4,062</td>
<td>445</td>
<td>796</td>
</tr>
<tr>
<td>Thames Water</td>
<td>4,948</td>
<td>293</td>
<td>12,635</td>
<td>427</td>
<td>3,020</td>
</tr>
<tr>
<td>Total</td>
<td>6,610</td>
<td>392</td>
<td>16,697</td>
<td>872</td>
<td>3,816</td>
</tr>
<tr>
<td>Allocated to Thames RBD</td>
<td>5,286</td>
<td>313</td>
<td>13,452</td>
<td>532</td>
<td>3,171</td>
</tr>
</tbody>
</table>

Source: Annual Returns submitted by water companies to Ofwat

Industry – trade effluent and large users

These are the large user and trade-effluent customers (including some agriculture) of the licensed water undertakers, plus direct industrial dischargers and abstractors, plus the customers of other third party water services. Tables 4.2a, 4.2b and 4.2c summarise the numbers of customers and volumes for large volume water users, trade effluent and large volume sewerage service users for each of the water services in the RBD. The tables also note the number of customers and volumes associated with special agreements. This information is provided on a water service area basis as an RBD allocation of trade effluent and large users is not possible given there is currently no adequate variable for apportioning data (unlike population in the case of households).
### Table 4.2a: Large users (>50Ml pa) and special agreements – water

<table>
<thead>
<tr>
<th>Company</th>
<th>Customers</th>
<th>Water Delivered (Ml pa)</th>
<th>Special agreement customers</th>
<th>Special agreements water delivered (Ml pa)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Northumbrian Water</td>
<td>179</td>
<td>107,304</td>
<td>2</td>
<td>14,892</td>
</tr>
<tr>
<td>Southern Water</td>
<td>61</td>
<td>10,088</td>
<td>1</td>
<td>1,767</td>
</tr>
<tr>
<td>Thames Water</td>
<td>307</td>
<td>31,358</td>
<td>29</td>
<td>19,339</td>
</tr>
<tr>
<td>Mid Kent Water</td>
<td>19</td>
<td>2,034</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>South East Water</td>
<td>34</td>
<td>4,766</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Sutton &amp; East Surrey Water</td>
<td>3</td>
<td>204</td>
<td>1</td>
<td>922</td>
</tr>
<tr>
<td>Three Valleys Water</td>
<td>103</td>
<td>15,982</td>
<td>1</td>
<td>213</td>
</tr>
</tbody>
</table>

Special Agreements - Consumption per annum is not specified as above 50 Ml for these customers.

### Table 4.2b: Large users (>50Ml pa) and special agreements - trade effluent

<table>
<thead>
<tr>
<th>Company</th>
<th>Customers</th>
<th>Trade effluent (Ml pa)</th>
<th>Special agreement customers¹</th>
<th>Special agreements trade effluent (Ml pa)¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>Southern Water</td>
<td>47</td>
<td>2,880</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Thames Water</td>
<td>123</td>
<td>22,009</td>
<td>6</td>
<td>1,454</td>
</tr>
</tbody>
</table>

Special Agreements - Consumption per annum is not specified as above 50 Ml for these customers.

### Table 4.2c: Large users (>50Ml pa) and special agreements – sewerage

<table>
<thead>
<tr>
<th>Company</th>
<th>Customers</th>
<th>Sewerage collected (Ml pa)</th>
<th>Special agreement customers¹</th>
<th>Special agreements sewerage collected (Ml pa)²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Southern Water</td>
<td>78</td>
<td>5,260</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Thames Water</td>
<td>406</td>
<td>33,767</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Special Agreements - Consumption per annum is not specified as above 50 Ml for these customers.

**Agriculture**

These are the agricultural customers of the licensed water undertakers, as well as those that directly abstract water for agricultural purposes. Direct abstractions from the agriculture sector make up around 13 per cent of all abstractions in England and Wales, with the fish farming sector accounting for most abstractions.

¹ Consumption per annum is not specified as above 50Ml for these customers.  
² Consumption per annum is not specified as above 50Ml for these customers.
Other

These are users that do not fit into the above categories, such as transport, infrastructure etc.

4.3.3 Polluters

There are different types of pollution in the context of the WFD and it is useful to identify polluters who give rise to increased costs of providing water services. This is a technically difficult area and a large number of assumptions are required to arrive at an answer. The approach adopted is explained in the report on Cost Recovery and Incentive Pricing (CRIP)(ref 3).

Data reported by the water companies to Ofwat can be used to identify some costs that can be associated with polluting activities. In the case of water supply the company’s costs reflect capital and operating expenditure on nitrate and pesticide removal, removal of other contaminants (metals, phosphates, soil and arsenic) and reducing the risk of Cryptosporidium.

Table 4.3 summarises the capital and operating expenditure in terms of annualised costs. The table also provides indicative estimates of how much of these annual costs are attributable to external sources, in this case the agricultural sector¹.

The estimates suggest that currently around £326.7 million of annual remediation cost is incurred by water companies to deal with standards on nitrate removal, pesticide removal, other contaminants and Cryptosporidium risks. This equates to about 10 per cent of total public water supply costs in these companies. About £227.5 million of this is attributable to the external impacts of the agricultural sector on raw water quality. Based on the population allocation procedure, around £50.5 million of these costs arise within the Thames RBD itself.

The following table shows that water treatment capital expenditure has been and continues to be a significant proportion of the total capital expenditure for water quality enhancements. The balance of this expenditure has been shifting from issues such as nitrate and pesticide removal to the reduction of Cryptosporidium risks.

¹ Pretty (2000) provides the source for the assumptions on the shares attributable to this sector.
Table 4.3: Estimated annual costs in 2002-03 associated with external impacts on raw water quality

<table>
<thead>
<tr>
<th></th>
<th>Annual costs borne by water company customers</th>
<th>Percentage contribution due to external sources</th>
<th>Total annual remediation costs attributable to external sources</th>
<th>Allocated costs in the Thames RBD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capital costs</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nitrates</td>
<td>18.1</td>
<td>80%</td>
<td>14.5</td>
<td>1.3</td>
</tr>
<tr>
<td>Pesticides</td>
<td>72.1</td>
<td>89%</td>
<td>64.2</td>
<td>27.7</td>
</tr>
<tr>
<td>Other parameters</td>
<td>126</td>
<td>50%</td>
<td>63.0</td>
<td>6.3</td>
</tr>
<tr>
<td>Cryptosporidium</td>
<td>37.2</td>
<td>90%</td>
<td>33.5</td>
<td>8.6</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td><strong>253.4</strong></td>
<td><strong>175.1</strong></td>
<td></td>
<td><strong>43.8</strong></td>
</tr>
<tr>
<td>Opex</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deteriorating raw water quality</td>
<td>64.7</td>
<td>69%</td>
<td>44.6</td>
<td>5.9</td>
</tr>
<tr>
<td>Cryptosporidium</td>
<td>8.6</td>
<td>90%</td>
<td>7.7</td>
<td>0.7</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>73.3</strong></td>
<td></td>
<td></td>
<td><strong>6.7</strong></td>
</tr>
<tr>
<td><strong>Grand total</strong></td>
<td><strong>326.7</strong></td>
<td></td>
<td></td>
<td><strong>50.5</strong></td>
</tr>
</tbody>
</table>

Source: Cost Recovery and Incentive Pricing (CRIP) report (ref 3)

For the sewerage service one of the key sources of pollution giving rise to elevated costs is diffuse run-off containing hazardous substances received at sewage treatment works. Hazardous substances may also be present in urban drainage and sewers where substances are inappropriately disposed of, or indeed released by households in their legitimate use of, for instance, cleaning products. It is not presently possible to quantify the level of costs involved. The sectors responsible for these costs are domestic (disposal of household and DIY chemicals or use of products containing hazardous substances) manufacturing, transport and construction. These sectors contribute differently towards the recovery of those costs with households and industries that are customers of sewerage companies bearing the treatment costs.
4.4 Current financial costs of the water services

The financial costs of the water and sewerage service companies operating in the Thames RBD are summarised in Tables 4.4 and 4.5. These costs include the remediation costs identified above. Costs and figures in Tables 4.4 through to 4.7 are based on work done for the CRIP report (ref 3) and information collated by Ofwat from water companies.

In 2003-04 the financial costs of the water and sewerage services were £819.6 million and £709.8 million for the Thames RBD. These are based on population allocation.

Table 4.4: Public water supply: total financial costs (£m, 2003-04 prices), Thames RBD

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Northumbrian Water</td>
<td>15.0%</td>
<td>300.9</td>
<td>288.4</td>
<td>250.2</td>
<td>254.6</td>
<td>247.5</td>
<td>246.7</td>
</tr>
<tr>
<td>Southern Water</td>
<td>27.5%</td>
<td>149.3</td>
<td>157.0</td>
<td>128.0</td>
<td>123.7</td>
<td>124.3</td>
<td>120.5</td>
</tr>
<tr>
<td>Thames Water</td>
<td>95.0%</td>
<td>498.7</td>
<td>502.0</td>
<td>466.5</td>
<td>484.6</td>
<td>481.9</td>
<td>487.2</td>
</tr>
<tr>
<td>Mid Kent Water</td>
<td>58.0%</td>
<td>43.7</td>
<td>45.5</td>
<td>38.2</td>
<td>38.6</td>
<td>39.9</td>
<td>41.0</td>
</tr>
<tr>
<td>South East Water</td>
<td>65.0%</td>
<td>110.8</td>
<td>111.3</td>
<td>94.0</td>
<td>93.6</td>
<td>91.6</td>
<td>94.9</td>
</tr>
<tr>
<td>Sutton &amp; East Surrey Water</td>
<td>100.0%</td>
<td>46.7</td>
<td>45.1</td>
<td>38.4</td>
<td>41.5</td>
<td>40.9</td>
<td>39.8</td>
</tr>
<tr>
<td>Three Valleys Water</td>
<td>95.5%</td>
<td>191.8</td>
<td>200.7</td>
<td>168.2</td>
<td>169.9</td>
<td>167.4</td>
<td>168.9</td>
</tr>
<tr>
<td>Allocated total financial costs</td>
<td></td>
<td>887.2</td>
<td>898.9</td>
<td>798.2</td>
<td>819.5</td>
<td>812.5</td>
<td>819.6</td>
</tr>
</tbody>
</table>

Source: Ofwat

Table 4.5: Sewerage service: total financial costs (£m, 2003-04 prices), Thames RBD

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Southern Water</td>
<td>25.1%</td>
<td>338.6</td>
<td>362.0</td>
<td>319.9</td>
<td>325.0</td>
<td>330.4</td>
<td>335.0</td>
</tr>
<tr>
<td>Thames Water</td>
<td>98.4%</td>
<td>706.0</td>
<td>718.1</td>
<td>630.1</td>
<td>644.9</td>
<td>647.2</td>
<td>635.9</td>
</tr>
<tr>
<td>Allocated total financial costs</td>
<td></td>
<td>779.7</td>
<td>797.5</td>
<td>700.3</td>
<td>716.1</td>
<td>719.8</td>
<td>709.8</td>
</tr>
</tbody>
</table>

Source: Ofwat

The following tables summarise the unit financial costs of the companies operating in the Thames RBD for the water and sewerage service. The tables show an indicative, population based allocation of these unit costs. In 2003-04 the unit water supply cost was £0.63 per m³ and for the sewerage service £0.62 per m³.
Table 4.6: Public water supply: unit financial costs (£/m³, 2003-04 prices), Thames RBD

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Northumbrian Water</td>
<td>15.0%</td>
<td>0.76</td>
<td>0.74</td>
<td>0.65</td>
<td>0.66</td>
<td>0.65</td>
<td>0.64</td>
</tr>
<tr>
<td>Southern Water</td>
<td>27.5%</td>
<td>0.79</td>
<td>0.83</td>
<td>0.68</td>
<td>0.64</td>
<td>0.65</td>
<td>0.63</td>
</tr>
<tr>
<td>Thames Water</td>
<td>95.0%</td>
<td>0.72</td>
<td>0.67</td>
<td>0.61</td>
<td>0.63</td>
<td>0.62</td>
<td>0.61</td>
</tr>
<tr>
<td>Mid Kent Water</td>
<td>58.0%</td>
<td>0.86</td>
<td>0.88</td>
<td>0.76</td>
<td>0.76</td>
<td>0.79</td>
<td>0.78</td>
</tr>
<tr>
<td>South East Water</td>
<td>65.0%</td>
<td>0.99</td>
<td>0.97</td>
<td>0.82</td>
<td>0.80</td>
<td>0.78</td>
<td>0.76</td>
</tr>
<tr>
<td>Sutton &amp; East Surrey Water</td>
<td>100.0%</td>
<td>0.94</td>
<td>0.89</td>
<td>0.76</td>
<td>0.79</td>
<td>0.77</td>
<td>0.71</td>
</tr>
<tr>
<td>Three Valleys Water</td>
<td>95.5%</td>
<td>0.74</td>
<td>0.76</td>
<td>0.62</td>
<td>0.61</td>
<td>0.60</td>
<td>0.58</td>
</tr>
<tr>
<td>Allocated Unit Financial Costs</td>
<td></td>
<td>0.76</td>
<td>0.74</td>
<td>0.64</td>
<td>0.65</td>
<td>0.64</td>
<td>0.63</td>
</tr>
</tbody>
</table>

Source: Ofwat

Note: Unit financial costs for 2003-04 in this report might differ from those in Ofwat’s *Unit Costs and Relative Efficiency 2003-04* reports. This is because of different assumptions used in the two reports in eliciting the financial cost. For more information contact www.ofwat.gov.uk.

Table 4.7: Sewerage service: unit financial costs (£/m³, 2003-04 prices), Thames RBD

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Southern Water</td>
<td>25.1%</td>
<td>1.15</td>
<td>1.23</td>
<td>1.07</td>
<td>1.11</td>
<td>1.13</td>
<td>1.15</td>
</tr>
<tr>
<td>Thames Water</td>
<td>98.4%</td>
<td>0.73</td>
<td>0.70</td>
<td>0.61</td>
<td>0.61</td>
<td>0.61</td>
<td>0.58</td>
</tr>
<tr>
<td>Allocated total financial costs</td>
<td></td>
<td>0.76</td>
<td>0.74</td>
<td>0.64</td>
<td>0.65</td>
<td>0.65</td>
<td>0.62</td>
</tr>
</tbody>
</table>

Source: Ofwat

Note: Unit financial costs for 2003-04 in this report might differ from those in Ofwat’s *Unit Costs and Relative Efficiency 2003-04* reports. This is because of different assumptions used in the two reports in eliciting the financial cost. For more information contact www.ofwat.gov.uk.

Part of the financial costs represent costs incurred by the water companies aimed at improving water quality.

Since privatisation in 1989, water companies in England and Wales have incurred capital and operating expenditure in order to mitigate the environmental impacts of the sewerage services and to investigate and alleviate the impacts of their abstractions on the aquatic environments. Ofwat has analysed the sewerage services costs on a RBD level and Table 4.8 illustrates the Thames RBD results.\(^1\) Column 1 shows the percentage of the water companies costs which are attributed (on an indicative basis) to the Thames RBD. Column 2 shows the capital expenditure recorded as being spent on mitigation of environmental impacts from sewerage services. In

\(^1\) Note that the results are sensitive to the assumptions that Ofwat adopted in its analysis.
Southern Water Services Ltd, these have amounted to £1.6 billion between 1989 and 2003. Column 3 shows the incremental annual costs associated with operating these assets (operating expenditure and capital charges). Column 4 and 5 show the figures on the basis of the Thames RBD. As Table 4.8 shows, total capital expenditure incurred in the Thames RBD is in the region of £1.5 billion. Taken together with the operating expenditure this means that around £120 million per annum of the water service providers’ costs are associated with mitigating environmental impacts of sewerage services.

Table 4.8: Environmental mitigation expenditure/costs, Thames RBD

<table>
<thead>
<tr>
<th>Company</th>
<th>Percentage of company costs allocated to RBD</th>
<th>Capex (1989-03) £m</th>
<th>Cost £m p.a.</th>
<th>Capex (1989-03) allocated £m</th>
<th>Cost pa allocated £m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Southern Water Services Ltd</td>
<td>25%</td>
<td>1,621</td>
<td>137</td>
<td>407</td>
<td>34.25</td>
</tr>
<tr>
<td>Thames Water Utilities Ltd</td>
<td>98%</td>
<td>1,134</td>
<td>89</td>
<td>1,116</td>
<td>87.22</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>1,523</td>
<td>121.47</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Ofwat
4.5 Revenues and financial cost recovery

The identified water service providers recover the costs of providing water services from customers within their water service areas.

The structure of charges in the water companies varies. Where metering is in place, tariffs (for both water and sewerage services) have two components: a standing charge which is irrespective of consumption and is the same for all customers on the tariff; and a volumetric charge, which varies according to how much water is consumed.

Unmeasured tariffs (for both water and sewerage services) usually comprise a fixed charge, which includes the customer related costs of supply; and a rateable value (RV) related charge (based on the monthly rental value of the property). The structure varies with the water company and zones or geographical districts, for example some water companies do not charge a fixed fee, whereas others only have a fixed charge. In all cases, the amount customers pay is not related to levels of water consumption. Detailed information on these tariffs for the relevant water companies operating in the Thames RBD can be found in the Ofwat Tariff Structure and Charges 2004 – 2005 report 1.

The breakdown of metered and non-metered households in 2003-04 and projections for 2009-10 are given in Table 4.9a and Table 4.9b below. These tables present metering information for all water and sewerage companies operating in the Thames RBD, rather than for all households and non-households in the Thames RBD. As such, the tables below provide indicative information only on the level of metering in the Thames RBD.

Table 4.9a: Percentage of water and sewerage customers taking metered supplies: 2003-04, Thames RBD

<table>
<thead>
<tr>
<th>Thames RBD</th>
<th>Southern Water</th>
<th>Thames Water</th>
<th>Northumbria Water</th>
<th>Mid Kent Water</th>
<th>South East Water</th>
<th>Sutton and East Surrey Water</th>
<th>Three Valleys Water</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Household</td>
<td>25.1</td>
<td>19.7</td>
<td>9.6</td>
<td>30.0</td>
<td>27.2</td>
<td>17.2</td>
<td>20.5</td>
</tr>
<tr>
<td>Non-household</td>
<td>78.4</td>
<td>87.5</td>
<td>78.5</td>
<td>91.2</td>
<td>84.0</td>
<td>83.0</td>
<td>82.7</td>
</tr>
<tr>
<td>Sewerage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Household</td>
<td>23.5</td>
<td>19.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-household</td>
<td>76.9</td>
<td>84.3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Ofwat

1 Available at
Table 4.9b: Percentage of water and sewerage customers taking metered supplies: 2009-10, Thames RBD

<table>
<thead>
<tr>
<th>Thames RBD</th>
<th>Southern Water</th>
<th>Thames Water</th>
<th>Northumbria Water</th>
<th>Mid Kent Water</th>
<th>South East Water</th>
<th>Sutton and East Surrey Water</th>
<th>Three Valleys Water</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Water</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Household</td>
<td>42.6</td>
<td>27.1</td>
<td>31.6</td>
<td>45</td>
<td>37.9</td>
<td>32.8</td>
<td>43.9</td>
</tr>
<tr>
<td>Non-household</td>
<td>78.4</td>
<td>88.4</td>
<td>90.4</td>
<td>93.4</td>
<td>85.3</td>
<td>82.9</td>
<td>84</td>
</tr>
<tr>
<td><strong>Sewerage</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Household</td>
<td>40.7</td>
<td>29.6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-household</td>
<td>76.9</td>
<td>85.7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Ofwat

Revenue in the companies arises from the provision of a range of services which make up the overall water service. These include measured and unmeasured charges for:

- Water consumption;
- Sewerage and trade effluent;
- Surface water and highway drainage; and
- Connection.

There are also a variety of other minor charges discussed in the CRIP report. For each of the charges, the cost recovery mechanism is slightly different but for each source of charge income, prices are generally cost reflective.

Tables 4.10 and 4.11 are based on work done for the CRIP report, which found that cost recovery was generally around 100 per cent\(^1\). These tables have been updated for more recent data collected by Ofwat in annual water company returns.

In any specific year, because of the five year regulatory cycle, water companies’ total costs and total revenues do not always match exactly. Broadly speaking, this is because the revenue profile is closely related to the economic regulator (Ofwat) assumptions on companies costs (e.g. depreciation of assets, investments time profile, specific levels of operating expenditure) when setting the price limits at Final Determinations and on projected status quo revenues.

Companies’ incurred costs might differ from the Ofwat assumed ones, in any given year, giving origin to some of the discrepancies between costs and revenues. Furthermore, changes, for instance in the assumptions

\(^1\) The approach to defining the cost recovery rate is explained in the report on Cost Recovery and Incentive Pricing (CRIP) http://www.defra.gov.uk/environment/water/wfd/economics/index.htm. This is a complicated area, but in very general terms the rate is defined as revenues less subsidies divided by cost
underpinning revenue projections used at Final Determinations, could result in lower revenues than expected and thereby create an imbalance between total costs and total revenues in specific years.

However, the balance between costs and revenues is necessarily achieved over a longer time horizon in the economic regulatory regime in England and Wales. The licensed providers of water and sewerage services are totally financed by revenues from customers although, in some years, some water companies receive grants (subsidies) from, for instance, the European Community. These however are negligible (they are generally well below 1 per cent of total costs for any specific year). In addition such subsidies are dealt with in the price setting process so that they do not affect the cost recovery rate as reported in Tables 4.10 and 4.11.

Table 4.10: Public water supply: cost recovery for Thames RBD (£m, 2003-04 prices)

<table>
<thead>
<tr>
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<th></th>
<th></th>
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<th></th>
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</thead>
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<tr>
<td>Total revenues</td>
<td>872.7</td>
<td>887.7</td>
<td>787.1</td>
<td>810.3</td>
<td>805.6</td>
<td>812.2</td>
</tr>
<tr>
<td>Subsidies</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Total financial costs</td>
<td>887.2</td>
<td>898.9</td>
<td>798.2</td>
<td>819.5</td>
<td>812.5</td>
<td>819.6</td>
</tr>
<tr>
<td>(inclusive of taxes)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost recovery rate</td>
<td>98%</td>
<td>99%</td>
<td>99%</td>
<td>99%</td>
<td>99%</td>
<td>99%</td>
</tr>
</tbody>
</table>

Source: Ofwat

Table 4.11: Sewerage service: cost recovery for Thames RBD (£m, 2003-04 prices)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Total revenues</td>
<td>780.9</td>
<td>792.4</td>
<td>676.9</td>
<td>698.4</td>
<td>695.8</td>
<td>694.0</td>
</tr>
<tr>
<td>Subsidies</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Total financial costs</td>
<td>779.7</td>
<td>797.5</td>
<td>700.3</td>
<td>716.1</td>
<td>719.8</td>
<td>709.8</td>
</tr>
<tr>
<td>(inclusive of taxes)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost recovery rate</td>
<td>100%</td>
<td>99%</td>
<td>97%</td>
<td>98%</td>
<td>97%</td>
<td>98%</td>
</tr>
</tbody>
</table>

Source: Ofwat

Water companies (and other abstractors and dischargers) pay abstraction and discharge fees for the water they abstract to use and on-sell and the discharges they make to water bodies and courses. The Environment Agency administers the abstraction and discharge licensing system for all water users, including the water and sewerage service companies. The Environment Agency levies administrative charges to recover its costs of managing water resources in line with the Water Resources Act 1991.
Abstraction charges are calculated according to the total volume authorised by the licence, adjusted for:

- The season of authorised abstractions;
- The ‘loss factor’ (or degree to which water is returned directly to the environment); and
- The degree of environmental ‘support’ provided to the source of abstraction.

In addition, there is an annual charge and an application charge for every new or varied licence application (with the exception of a simple reduction in volume).

The discharge consents scheme includes an application charge and an annual charge. The annual charging system gives greater weight to larger volumes, more sophisticated effluents (since higher monitoring costs are incurred due to greater complexity) and the complexity of monitoring given the nature of receiving waters (sampling and analytical problems being most associated with estuaries).

The Environment Agency also recovers part of its costs in dealing with water pollution incidents from some polluters.
4.6 Current level of environmental and resource costs

This section uses the available information to assess the environmental costs of current water pollution and abstraction in England and Wales. This provides contextual information indicating the importance of the environmental and resource costs of water use and highlights the need for their careful and serious consideration. This contextual information cannot and should not determine any specific measures since this will require careful appraisal of feasibility, scope and costs and benefits of reducing the environmental impacts of water use.

Environmental and resource costs arise where water uses affect water bodies and contribute to water bodies failing to achieve good status. As there is no definition of good status nor a classification scheme for it at present, it is difficult to measure the gap between current and good status and hence the level of environmental and resource costs. However, it is still possible to infer their significance.

It is possible to use the available assessment methods and information from the Overall Benefits Assessment for the current Periodic Review of Water Prices (PR04) to indicate the significance of environmental and resource costs; but it should be recognised that further work is needed to update the assumptions in the existing studies.

After the implementation of the environment programme recently agreed in the PR04, the remaining quantified environmental damage costs caused by water pollution and abstraction in England and Wales will be about £1-1.5 billion per annum. The water industry and agriculture contribute equally to about 85 per cent of this total. Other diffuse and point sources such as diffuse urban pollution, landfill sites and contaminated land account for the remaining 15 per cent.

These estimates do not include:

- Impacts of water pollution (other than eutrophication) on lakes;
- Impacts on fishing and recreation of abstraction in causing low flow problems in rivers and lakes; and
- Impacts of abstraction on the quantity of groundwater.

These impacts are likely to be significant. They will be assessed as far as possible as part of the appraisal of options affecting such water bodies for the draft RBMPs in 2008-09.

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1 For information on these estimates and the methodology applied to derive them, see The Environmental Damage Costs of Current Water Quality And Flows In England And Wales, Environment Agency, 2004, forthcoming on www.environment-agency.gov.uk/economics.
These estimates do not relate fully to the issues to be addressed in the WFD. It does not include important issues and environmental pressures identified by the river basin characterisation exercise as affecting risks of achieving good status (e.g. morphology pressures such as flood risk management, impacts on coastal and transitional waters and lakes, and release of priority hazardous substances). These issues are likely to be significant and they will be considered as far as possible as part of the appraisal of options for the draft RBMPs in 2008-09.

Due to the above factors regarding the scope of our estimates, they might underestimate the environmental and resource costs of water use, on the other hand there are countervailing methodological and empirical reasons why they might be overestimates. In summary, more work is needed on this subject.

These estimates provide contextual information that highlight the importance of this subject and the need for its careful and serious consideration. However, on their own, they cannot and should not determine any specific measures since this will require careful appraisal of the feasibility and scope for reducing these environmental impacts, for which the potential costs could rise significantly to achieve greater reductions. Moreover, it will require careful appraisal of the costs and benefits of the options to determine the cost-effectiveness of options across all sectors and whether the options are disproportionately costly. Being based on a pre-WFD approach to the assessment of the impacts of environmental pressures, this assessment should only be seen as an initial marker.

**Collaborative research programme**

In this vein, various Government departments, agencies and stakeholders in the UK are carrying out research to develop the economic analyses and appraisal techniques for efficient implementation of the WFD. In particular, this includes a current study to develop methods to assess the costs and effectiveness of options. This will build on a recent report for the Department for Environment, Food and Rural Affairs (Defra) on *Cost Effectiveness Analysis and Developing a Methodology for Assessing Disproportionate Costs* (ref 4).

This research will assess the environmental and resource costs to aid in the assessment of disproportionate costs as part of drawing up the PoMs and to aid the examination of pricing policies and the adequacy of the recovery of costs, including consideration of environmental and resource costs.
5 Cost-effectiveness analysis

The pressures and impacts analysis reveals that a large number of activities contribute towards pressures in the Thames RBD. Many water bodies are at risk from multiple pressures. Information on costs and benefits, including environmental and resource costs and benefits, is needed to inform the design of cost-effective PoMs.

It is important that a common approach to assessment of cost-effectiveness and information on disproportionate costs is adopted. A method has been developed in a study entitled *Cost-Effectiveness Analysis and Developing a Methodology for Assessing Disproportionate Costs* (ref 4). Work is underway as part of the UK Collaborative Research Programme on River Basin Management Planning and Economics (CRP) to develop this into a practical approach (the CRP is outlined in more detail in section 6).
6 Improving knowledge and the information base

A draft programme of work on assessing the costs and benefits of options in River Basin Management (RBM) for implementing the WFD has been developed. This is entitled the *UK Collaborative Research Programme on River Basin Management Planning Economics (CRP)*.

The draft CRP builds on the three scoping studies that Defra commissioned in 2003-04 on:

- *Cost-Effectiveness Analysis and Developing a Methodology for Assessing Disproportionate Costs* (ref 4);
- *Cost Recovery and Incentive Pricing* (ref 3); and
- *Economic Characterisation and Dynamics of Water Use* (ref 1).

Each of these reports identified a list of actions. These actions have been prioritised, and the CRP is taking forward those that are most important for implementing the WFD.

It identifies and justifies the need for research, outlines the key collaborative requirements and prioritises and schedules the research in the light of the time and likely resources available. A key feature of the process is the collaborative involvement of a wide range of stakeholders from the start.

The draft CRP has the following sequential tasks:

1. To set out an initial identification and illustration of the issues related to the economic analysis and its role in the decision making for PoMs under the WFD (2004-05);
2. To determine how to assess costs and economic impacts for each of the main types of options affecting the major different sectors that will need to be appraised in RBMPs in an even handed manner (2004-05);
3. To scope and characterise the potentially disproportionately costly cases in RBMPs and the main gaps in information to draw up an appropriate process for assessing them and making best use of original and existing work to fill these gaps. This will include exploring alternative assessment methods (2005-06);
4. Focus group analyses to specify clearly environmental damages of concern in these cases (2006);
5. Development, trial and refinement of guidance on benefits assessment for RBMPs (2006-08); and
6. New studies to provide better assessments and related demand information of the major environmental benefits of RBMPs (2006-08).
A more detailed summary of the projects is available from the Defra website\(^1\).

\(^1\) http://www.defra.gov.uk/environment/water/wfd/economics/index.htm
7 References


Annex 1 – Background data

Data sources

A number of data sources have been used in compiling this document.

Economic forecasts have been produced by Experian Business Services Ltd, based on output and employment information from the Office of National Statistics.

Various economic information sources were reviewed and summarised in the 2004 report Economic Importance and Dynamics of Water Use Relevant for River Basin Characterisation (England and Wales) (ref 1). Data sources were identified in Annex G – Data Audit File of this report. In addition, profiles of economic sectors and trends in their water use were compiled and included in Annex E of the report. These data sources have been used for compilation of this Article 5 Supporting Document.

Stakeholder templates were completed by a number of industry groups and these have also assisted in the compilation of this document. These are found in Annex I of the above mentioned report. Profiles were provided by the following groups:

- British Ports Association and United Kingdom Major Ports Group;
- WaterVoice;
- British Hydropower Association;
- Royal Society for the Protection of Birds (RSPB); and
- British Waterways.

Information on abstractions and discharges has been sourced from the Environment Agency.

Information on water companies has been provided by Ofwat and draws on work completed for the Cost Recovery and Incentive Pricing report (ref 3).
Geographical areas

Throughout this document several terms are used to describe geographical areas. To aid comprehension these are briefly defined:

River Basin District

Individual river basins have been identified and assigned to River Basin Districts, referred to within the document as RBDs. There are 11 RBDs within England and Wales, this document concentrates on the Thames RBD.

Government Office Regions

England has been subdivided into nine Government Office Regions. These are the primary statistical subdivisions of England and contain a number of local authorities.

County

There are 34 non-metropolitan counties in England and they form the upper tier of the two-tier local Government structure found in many parts of England.

Local Authority District

Local authority districts form the lower tier of the two-tier local Government structure.

Electoral Wards

Electoral wards are the spatial units used to elect local Government councillors in the UK. For the Article 5 supporting documents key information for each of the RBDs, for example population and employment numbers, have been built up from ward level data.

Super Output Areas

Super Output Areas (SOAs) are a new geography designed to improve the reporting of small area statistics. Due to the stability and consistency limitations of the electoral ward geography, a range of areas that are of consistent size and whose boundaries will not change was put forward. These have been built from groups of 2001 Census Output Areas (OAs) and are known as Super Output Areas (SOAs). Three layers of SOA were created.
Annex 2 – Experian forecasts

The following table summarises the population, household, employment and output forecasts undertaken by Experian Business Strategies Ltd for the Thames RBD. Employment and output forecasts have been undertaken for 30 SICs as well as a number of disaggregated categories that have some link to water status.

Actual and forecast output is measured in constant price terms (based on 2002 prices). Prices are assumed to remain constant within the forecasts, so that forecast changes in output are net of price movements. Output is defined as a value added measure of production (i.e. net of input costs).

Experian’s industry forecasts for RBDs in the UK are summations of ward level forecasts. These forecasts are informed by two key sources of information. The first is historic estimates of employment by industry at the ward level between 1995 and 2002. The second is Experian forecasts for employment and output for industry categories for local/unitary authority districts. The first step is to forecast ward level employment for each industry by using the past relationship in employment in the ward compared to its wider district. The second step is to estimate output in each industry for each ward by applying district level productivity trends to the employment forecast. These ward level forecasts are then aggregated to the relevant RBD boundaries.

For employment and output, data are presented for 30 SIC codes, as well as for a number of disaggregated SIC codes. These disaggregated categories were chosen on the basis of the impacts and pressures analysis and as being the most relevant in terms of the risk assessment.
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<th>1995 (000s)</th>
<th>2002 (000s)</th>
<th>2015 (000s)</th>
<th>Share of economy (%)</th>
<th>1995-02 (%)</th>
<th>2002-15 (%)</th>
<th>Annual Average Growth</th>
</tr>
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<td>Total population</td>
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<td>2002</td>
<td>2015</td>
<td>Share of economy</td>
<td>Annual Average Growth</td>
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<td></td>
<td>(000s)</td>
<td>(000s)</td>
<td>(000s)</td>
<td>(%)</td>
<td>(%)</td>
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<td>-7.2</td>
<td>-1.1</td>
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<td>0.3</td>
<td>-0.5</td>
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<td>27.1</td>
<td>23.5</td>
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<td>0.4</td>
<td>0.3</td>
<td>-0.5</td>
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<td>7.1</td>
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<td>2.6</td>
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<td>6.1</td>
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<td>Total employees         5990.7</td>
<td>7001.2</td>
<td>7700.7</td>
<td>100.0</td>
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<td>100.0</td>
<td>2.3</td>
<td>0.7</td>
</tr>
<tr>
<td>EMPLOYEES IN EMPLOYMENT-DISAGGREGATED CATEGORIES</td>
<td>1995</td>
<td>2002</td>
<td>2015</td>
<td>Share of economy</td>
<td>Annual Average Growth</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-----------------------------------------------</td>
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<td></td>
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<tr>
<td></td>
<td>(000s)</td>
<td>(000s)</td>
<td>(000s)</td>
<td>(%)</td>
<td>(%)</td>
<td>(%)</td>
<td>(%)</td>
</tr>
<tr>
<td>Electricity, gas, steam &amp; hot water supply (SIC40)</td>
<td>23.2</td>
<td>18.0</td>
<td>13.5</td>
<td>0.4</td>
<td>0.3</td>
<td>0.2</td>
<td>-3.5</td>
</tr>
<tr>
<td>Production &amp; distribution of electricity (SIC40.1)</td>
<td>15.2</td>
<td>12.7</td>
<td>9.6</td>
<td>0.3</td>
<td>0.2</td>
<td>0.1</td>
<td>-2.6</td>
</tr>
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<td>Manufacture of gas (SIC40.2)</td>
<td>7.7</td>
<td>5.3</td>
<td>3.9</td>
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<td>0.1</td>
<td>0.1</td>
<td>-5.3</td>
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<tr>
<td>Steam &amp; hot water supply (SIC40.3)</td>
<td>0.3</td>
<td>0.1</td>
<td>0.1</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>-9.0</td>
</tr>
<tr>
<td>Collection, purification &amp; distribution of water (SIC41)</td>
<td>6.8</td>
<td>5.7</td>
<td>3.9</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
<td>-2.6</td>
</tr>
<tr>
<td>Manufacture of basic chemicals (SIC24.1)</td>
<td>7.9</td>
<td>7.1</td>
<td>5.9</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
<td>-1.5</td>
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<td>Manufacture of pesticides &amp; other agro-chemicals (SIC24.2)</td>
<td>1.8</td>
<td>1.0</td>
<td>0.8</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>-8.3</td>
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<td>Manufacture of paints &amp; varnishes etc. (SIC24.3)</td>
<td>4.8</td>
<td>4.6</td>
<td>3.4</td>
<td>0.1</td>
<td>0.1</td>
<td>0.0</td>
<td>-0.4</td>
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<td>Manufacture of pharmaceuticals (SIC24.4)</td>
<td>22.8</td>
<td>23.4</td>
<td>20.5</td>
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<td>0.3</td>
<td>0.3</td>
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<td>Manufacture of soaps &amp; detergents (SIC24.5)</td>
<td>7.3</td>
<td>6.8</td>
<td>5.3</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
<td>-1.0</td>
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<tr>
<td>Manufacture of other chemical products (SIC24.6)</td>
<td>7.9</td>
<td>7.9</td>
<td>6.5</td>
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<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
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<td>Manufacture of man made fibres (SIC24.7)</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
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<td>Manufacture of basic metals (SIC27)</td>
<td>7.8</td>
<td>6.4</td>
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<td>0.1</td>
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<td>-2.8</td>
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<td>Manufacture of pulp, paper &amp; paper products (SIC21)</td>
<td>15.7</td>
<td>14.1</td>
<td>13.1</td>
<td>0.3</td>
<td>0.2</td>
<td>0.2</td>
<td>-1.5</td>
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<tr>
<td>Mining of coal &amp; lignite (SIC10)</td>
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<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>7.8</td>
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<td>Mining of uranium &amp; thorium (SIC12)</td>
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<td>0.0</td>
<td>0.0</td>
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<td>0.0</td>
<td>#DIV/0!</td>
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<td>Mining of metal ores (SIC13)</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
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<td>Other mining (SIC14)</td>
<td>2.1</td>
<td>2.9</td>
<td>2.9</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>5.0</td>
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<td>Sewage &amp; refuse disposal (SIC90)</td>
<td>16.8</td>
<td>21.6</td>
<td>23.0</td>
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<td>0.3</td>
<td>0.3</td>
<td>3.6</td>
</tr>
<tr>
<td>Agriculture, hunting &amp; related activities (SIC01)</td>
<td>21.4</td>
<td>25.9</td>
<td>20.8</td>
<td>0.4</td>
<td>0.4</td>
<td>0.3</td>
<td>2.8</td>
</tr>
<tr>
<td>Growing of crops (SIC011)</td>
<td>6.8</td>
<td>8.2</td>
<td>6.6</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
<td>2.8</td>
</tr>
<tr>
<td>Growing of cereals (SIC0111)</td>
<td>1.4</td>
<td>1.7</td>
<td>1.3</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>3.4</td>
</tr>
<tr>
<td>Growing of vegetables (SIC0112)</td>
<td>4.4</td>
<td>5.1</td>
<td>4.2</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
<td>2.3</td>
</tr>
<tr>
<td>Growing of fruits, nuts &amp; spices (SIC0113)</td>
<td>1.0</td>
<td>1.4</td>
<td>1.1</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>4.2</td>
</tr>
<tr>
<td>Farming of animals (SIC012)</td>
<td>4.6</td>
<td>5.5</td>
<td>4.1</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
<td>2.8</td>
</tr>
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<td>Farming of cattle (SIC0121)</td>
<td>2.0</td>
<td>2.7</td>
<td>2.1</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>4.0</td>
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<td>Farming of sheep, goats etc. (SIC0122)</td>
<td>0.9</td>
<td>1.1</td>
<td>0.8</td>
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<td>0.0</td>
<td>0.0</td>
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<td>Farming of swine (SIC0123)</td>
<td>0.3</td>
<td>0.3</td>
<td>0.2</td>
<td>0.0</td>
<td>0.0</td>
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<td>-1.5</td>
</tr>
<tr>
<td>Farming of poultry (SIC0124)</td>
<td>0.8</td>
<td>0.9</td>
<td>0.5</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>2.4</td>
</tr>
<tr>
<td>EMPLOYEES IN EMPLOYMENT- DISAGGREGATED CATEGORIES</td>
<td>1995</td>
<td>2002</td>
<td>2015</td>
<td>Share of economy</td>
<td>Annual Average Growth</td>
<td></td>
<td></td>
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<tr>
<td>-------------------------------------------------</td>
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<td></td>
<td>(000s)</td>
<td>(000s)</td>
<td>(000s)</td>
<td>(%)</td>
<td>(%)</td>
<td>(%)</td>
<td>(%)</td>
</tr>
<tr>
<td>Other farming of animals (SIC0125)</td>
<td>0.6</td>
<td>0.6</td>
<td>0.4</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.9</td>
</tr>
<tr>
<td>Growing of crops combined with farming of animals (SIC013)</td>
<td>1.1</td>
<td>1.6</td>
<td>1.2</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>5.0</td>
</tr>
<tr>
<td>Agricultural &amp; animal husbandry service activities, except veterinary (SIC014)</td>
<td>8.9</td>
<td>10.5</td>
<td>8.9</td>
<td>0.1</td>
<td>0.2</td>
<td>0.1</td>
<td>2.4</td>
</tr>
<tr>
<td>Hunting, gaming &amp; game propagation (SIC015)</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.9</td>
</tr>
<tr>
<td>Forestry, logging &amp; related activities (SIC02)</td>
<td>5.5</td>
<td>5.4</td>
<td>4.0</td>
<td>0.1</td>
<td>0.1</td>
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<td>-0.1</td>
</tr>
<tr>
<td>Fishing (SIC05)</td>
<td>0.4</td>
<td>0.3</td>
<td>0.2</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>-1.3</td>
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<tr>
<td>Fishing (SIC0501)</td>
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<td>0.1</td>
<td>0.1</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>-1.4</td>
</tr>
<tr>
<td>Operation of fish hatcheries &amp; fish farms (SIC0502)</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>-1.3</td>
</tr>
<tr>
<td>Production, processing and preserving of meat (SIC151)</td>
<td>5.1</td>
<td>5.2</td>
<td>4.9</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
<td>0.4</td>
</tr>
<tr>
<td>Processing and preserving of fish (SIC152)</td>
<td>0.3</td>
<td>0.3</td>
<td>0.2</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>1.1</td>
</tr>
<tr>
<td>Manufacture of dairy products (SIC155)</td>
<td>3.3</td>
<td>2.5</td>
<td>2.3</td>
<td>0.1</td>
<td>0.0</td>
<td>0.0</td>
<td>-3.9</td>
</tr>
<tr>
<td>Manufacture of beverage products (SIC159)</td>
<td>7.3</td>
<td>7.5</td>
<td>5.9</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
<td>0.4</td>
</tr>
<tr>
<td>Production of mineral waters and soft drinks (SIC1598)</td>
<td>3.1</td>
<td>2.8</td>
<td>2.1</td>
<td>0.1</td>
<td>0.0</td>
<td>0.0</td>
<td>-1.7</td>
</tr>
<tr>
<td>Manufacture of rubber products (SIC251)</td>
<td>3.2</td>
<td>2.8</td>
<td>2.4</td>
<td>0.1</td>
<td>0.0</td>
<td>0.0</td>
<td>-1.7</td>
</tr>
<tr>
<td>Manufacture of cement, lime and plaster (SIC265)</td>
<td>0.6</td>
<td>0.6</td>
<td>0.7</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.6</td>
</tr>
<tr>
<td>Manufacture of articles of concrete, plaster and cement (SIC266)</td>
<td>4.1</td>
<td>4.1</td>
<td>3.4</td>
<td>0.1</td>
<td>0.1</td>
<td>0.0</td>
<td>0.1</td>
</tr>
<tr>
<td>Manufacture of basic iron and steel and ferro-alloys (SIC271)</td>
<td>1.0</td>
<td>0.9</td>
<td>0.5</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>-2.2</td>
</tr>
<tr>
<td>Manufacture of basic precious and non-ferrous metals (SIC274)</td>
<td>2.7</td>
<td>2.4</td>
<td>1.9</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>-1.6</td>
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<tr>
<td>Manufacture of parts and accessories for motor vehicles and engines (SIC343)</td>
<td>13.5</td>
<td>11.7</td>
<td>5.8</td>
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<td>0.2</td>
<td>0.1</td>
<td>-2.1</td>
</tr>
<tr>
<td>Manufacture of aircraft and spacecraft (SIC353)</td>
<td>11.0</td>
<td>10.7</td>
<td>6.0</td>
<td>0.2</td>
<td>0.2</td>
<td>0.1</td>
<td>-0.3</td>
</tr>
<tr>
<td>Camping sites and other provision of short-stay accommodation (SIC552)</td>
<td>3.3</td>
<td>4.7</td>
<td>5.5</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
<td>5.0</td>
</tr>
<tr>
<td>Sporting activities (SIC926)</td>
<td>49.3</td>
<td>66.7</td>
<td>77.2</td>
<td>0.8</td>
<td>1.0</td>
<td>1.0</td>
<td>4.4</td>
</tr>
<tr>
<td>Manufacture of industrial gases (SIC2411)</td>
<td>1.6</td>
<td>1.5</td>
<td>1.5</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>-0.2</td>
</tr>
<tr>
<td>Manufacture of dyes and pigments (SIC2412)</td>
<td>0.9</td>
<td>0.6</td>
<td>0.4</td>
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<td>-5.0</td>
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<tr>
<td>Manufacture of other inorganic basic chemicals (SIC2413)</td>
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<td>0.8</td>
<td>0.6</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.3</td>
</tr>
<tr>
<td>EMPLOYEES IN EMPLOYMENT-DISAGGREGATED CATEGORIES</td>
<td>1995 (000s)</td>
<td>2002 (000s)</td>
<td>2015 (000s)</td>
<td>Share of economy (%)</td>
<td>Annual Average Growth (%)</td>
<td>1995-2002 (%)</td>
<td>2002-2015 (%)</td>
</tr>
<tr>
<td>------------------------------------------------</td>
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<td>--------------------------</td>
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<td>---------------</td>
</tr>
<tr>
<td>Manufacture of other organic basic chemicals (SIC2414)</td>
<td>1.6</td>
<td>2.0</td>
<td>1.6</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>3.1</td>
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<td>Manufacture of fertilizers and nitrogen compounds (SIC2415)</td>
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<td>0.1</td>
<td>0.1</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>-16.2</td>
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<tr>
<td>Manufacture of plastics in primary forms (SIC2416)</td>
<td>1.9</td>
<td>1.8</td>
<td>1.5</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>-0.9</td>
</tr>
<tr>
<td>Manufacture of synthetic rubber in primary forms (SIC2417)</td>
<td>0.8</td>
<td>0.3</td>
<td>0.2</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>-15.2</td>
</tr>
<tr>
<td>Casting of light metals (SIC2753)</td>
<td>0.5</td>
<td>0.4</td>
<td>0.4</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Casting of other non-ferrous metals (SIC2754)</td>
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<td>0.8</td>
<td>0.4</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>-5.8</td>
</tr>
<tr>
<td>Sea and coastal water transport (SIC6110)</td>
<td>3.4</td>
<td>4.1</td>
<td>4.7</td>
<td>0.1</td>
<td>0.1</td>
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<td>2.9</td>
</tr>
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<td>Inland water transport (SIC6120)</td>
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<td>0.4</td>
<td>0.4</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Washing and dry cleaning of textile and fur products (SIC9301)</td>
<td>10.2</td>
<td>13.1</td>
<td>14.3</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
<td>3.6</td>
</tr>
<tr>
<td>Construction of water projects (SIC4524)</td>
<td>0.5</td>
<td>0.7</td>
<td>0.7</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>4.1</td>
</tr>
<tr>
<td>--------------------------------</td>
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<td>----------------------</td>
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<tr>
<td></td>
<td>(£m)</td>
<td>(£m)</td>
<td>(£m)</td>
<td>(%)</td>
<td>(%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Standard 30 categories</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agriculture, forestry &amp; fishing</td>
<td>701.1</td>
<td>850.2</td>
<td>810.0</td>
<td>0.3</td>
<td>0.3</td>
<td>0.2</td>
<td>2.8</td>
</tr>
<tr>
<td>Oil &amp; gas extraction</td>
<td>687.9</td>
<td>318.9</td>
<td>226.9</td>
<td>0.3</td>
<td>0.1</td>
<td>0.1</td>
<td>-10.4</td>
</tr>
<tr>
<td>Other mining</td>
<td>345.3</td>
<td>344.8</td>
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<td>Gas, electricity &amp; water</td>
<td>3691.1</td>
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<td>Fuel refining</td>
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<td>4479.7</td>
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<td>Minerals</td>
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<td>1758.7</td>
<td>1424.2</td>
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<td>0.6</td>
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<td>Machinery &amp; equipment</td>
<td>2242.2</td>
<td>1936.2</td>
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<td>3617.5</td>
<td>4030.7</td>
<td>6012.8</td>
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<td>1.5</td>
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<td>Transport equipment</td>
<td>2423.1</td>
<td>2215.9</td>
<td>2038.4</td>
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<td>Food, drink &amp; tobacco</td>
<td>2952.3</td>
<td>3225.1</td>
<td>3917.5</td>
<td>1.4</td>
<td>1.2</td>
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<td>Textiles &amp; clothing</td>
<td>640.6</td>
<td>477.0</td>
<td>377.9</td>
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<td>Wood &amp; wood products</td>
<td>435.8</td>
<td>370.0</td>
<td>314.6</td>
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<td>Paper, printing &amp; publishing</td>
<td>7822.0</td>
<td>8504.6</td>
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<td>Rubber &amp; plastics</td>
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<td>1002.7</td>
<td>1401.3</td>
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<td>1167.9</td>
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<td>Construction</td>
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<td>14356.2</td>
<td>19509.4</td>
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<td>5.3</td>
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<td>Retailing</td>
<td>10971.7</td>
<td>15071.9</td>
<td>21664.3</td>
<td>5.2</td>
<td>5.6</td>
<td>5.3</td>
<td>4.6</td>
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<td>Wholesale &amp; distribution</td>
<td>15496.6</td>
<td>19300.1</td>
<td>25514.6</td>
<td>7.4</td>
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<td>6.2</td>
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<td>Hotels &amp; catering</td>
<td>7311.6</td>
<td>8914.9</td>
<td>12075.0</td>
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<td>3.3</td>
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<td>Transport</td>
<td>13345.0</td>
<td>17009.4</td>
<td>21806.6</td>
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<td>6.3</td>
<td>5.3</td>
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<td>6185.1</td>
<td>11655.3</td>
<td>30195.4</td>
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<td>7.3</td>
<td>9.5</td>
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<td>Banking &amp; insurance</td>
<td>18611.6</td>
<td>23801.1</td>
<td>37593.7</td>
<td>8.9</td>
<td>8.8</td>
<td>9.1</td>
<td>3.6</td>
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<td>Business services</td>
<td>31946.5</td>
<td>53761.7</td>
<td>103918.9</td>
<td>15.2</td>
<td>19.8</td>
<td>25.2</td>
<td>7.7</td>
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<td>Other financial &amp; business services</td>
<td>12521.3</td>
<td>15741.8</td>
<td>24540.3</td>
<td>6.0</td>
<td>5.8</td>
<td>6.0</td>
<td>3.3</td>
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<td>Public administration &amp; defence</td>
<td>12071.2</td>
<td>11256.9</td>
<td>11290.4</td>
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<td>4.1</td>
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<td>Education</td>
<td>11229.5</td>
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<td>Health</td>
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<td>14477.7</td>
<td>21421.5</td>
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<td>5.3</td>
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<td>Other services</td>
<td>14027.9</td>
<td>18296.6</td>
<td>23322.3</td>
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<td><strong>Total Output</strong></td>
<td>209664.7</td>
<td>271403.2</td>
<td>412169.8</td>
<td>100.0</td>
<td>100.0</td>
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<tr>
<td>OUTPUT-DISAGGREGATED CATEGORIES</td>
<td>1995 (£m)</td>
<td>2002 (£m)</td>
<td>2015 (£m)</td>
<td>Share of economy (%)</td>
<td>Annual Average Growth (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>---------------------------------</td>
<td>-----------</td>
<td>-----------</td>
<td>-----------</td>
<td>---------------------</td>
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<td>Electricity, gas, steam &amp; hot water supply (SIC40)</td>
<td>2958.5</td>
<td>3069.8</td>
<td>4176.6</td>
<td>1.4</td>
<td>1.1</td>
<td>1.0</td>
<td>0.5</td>
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<td>Production &amp; distribution of electricity (SIC40.1)</td>
<td>1959.0</td>
<td>2115.1</td>
<td>2898.4</td>
<td>0.9</td>
<td>0.8</td>
<td>0.7</td>
<td>1.1</td>
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<td>Manufacture of gas (SIC40.2)</td>
<td>964.7</td>
<td>925.7</td>
<td>1247.4</td>
<td>0.5</td>
<td>0.3</td>
<td>0.3</td>
<td>-0.6</td>
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<td>Steam &amp; hot water supply (SIC40.3)</td>
<td>34.8</td>
<td>29.0</td>
<td>30.9</td>
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<td>0.0</td>
<td>0.0</td>
<td>-2.6</td>
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<td>Collection, purification &amp; distribution of water (SIC41)</td>
<td>732.6</td>
<td>808.8</td>
<td>989.6</td>
<td>0.3</td>
<td>0.3</td>
<td>0.2</td>
<td>1.4</td>
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<td>Manufacture of basic chemicals (SIC24.1)</td>
<td>455.8</td>
<td>626.1</td>
<td>936.1</td>
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<td>0.2</td>
<td>0.2</td>
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<td>Manufacture of pesticides &amp; other agro-chemicals (SIC24.2)</td>
<td>90.6</td>
<td>85.3</td>
<td>128.3</td>
<td>0.0</td>
<td>0.0</td>
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<td>Manufacture of paints &amp; varnishes etc. (SIC24.3)</td>
<td>308.5</td>
<td>431.4</td>
<td>579.0</td>
<td>0.1</td>
<td>0.2</td>
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<td>Manufacture of pharmaceuticals (SIC24.4)</td>
<td>1349.6</td>
<td>2013.8</td>
<td>3115.9</td>
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<td>0.7</td>
<td>0.8</td>
<td>5.9</td>
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<tr>
<td>Manufacture of soaps &amp; detergents (SIC24.5)</td>
<td>424.2</td>
<td>635.9</td>
<td>880.1</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
<td>6.0</td>
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<td>Manufacture of other chemical products (SIC24.6)</td>
<td>492.8</td>
<td>687.1</td>
<td>1000.4</td>
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<td>0.3</td>
<td>0.2</td>
<td>4.9</td>
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<td>Manufacture of man made fibres (SIC24.7)</td>
<td>0.2</td>
<td>0.1</td>
<td>0.1</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>-5.5</td>
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<td>Manufacture of basic metals (SIC27)</td>
<td>226.6</td>
<td>230.5</td>
<td>192.4</td>
<td>0.1</td>
<td>0.1</td>
<td>0.0</td>
<td>0.2</td>
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<td>Manufacture of pulp, paper &amp; paper products (SIC21)</td>
<td>837.1</td>
<td>833.1</td>
<td>982.0</td>
<td>0.4</td>
<td>0.3</td>
<td>0.2</td>
<td>-0.1</td>
</tr>
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<td>Mining of coal &amp; lignite (SIC10)</td>
<td>2.4</td>
<td>2.6</td>
<td>3.4</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
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<td>Mining of uranium &amp; thorium (SIC12)</td>
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<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>#DIV/0!</td>
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<td>Mining of metal ores (SIC13)</td>
<td>0.1</td>
<td>0.4</td>
<td>0.5</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>21.7</td>
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<td>Other mining (SIC14)</td>
<td>342.8</td>
<td>341.8</td>
<td>430.7</td>
<td>0.2</td>
<td>0.1</td>
<td>0.1</td>
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<td>Sewage &amp; refuse disposal (SIC90)</td>
<td>831.8</td>
<td>1059.8</td>
<td>1308.3</td>
<td>0.4</td>
<td>0.4</td>
<td>0.3</td>
<td>3.5</td>
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<td>Agriculture, hunting &amp; related activities (SIC01)</td>
<td>545.2</td>
<td>683.9</td>
<td>659.4</td>
<td>0.3</td>
<td>0.3</td>
<td>0.2</td>
<td>3.3</td>
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<tr>
<td>Growing of crops (SIC011)</td>
<td>177.4</td>
<td>211.0</td>
<td>197.3</td>
<td>0.1</td>
<td>0.1</td>
<td>0.0</td>
<td>2.5</td>
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<td>Growing of cereals (SIC0111)</td>
<td>41.5</td>
<td>49.4</td>
<td>43.9</td>
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<td>0.0</td>
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<td>Growing of vegetables (SIC0112)</td>
<td>115.5</td>
<td>133.8</td>
<td>126.9</td>
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<td>0.0</td>
<td>0.0</td>
<td>2.1</td>
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<td>Growing of fruits, nuts &amp; spices (SIC0113)</td>
<td>20.4</td>
<td>27.8</td>
<td>26.5</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>4.5</td>
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<td>Farming of animals (SIC012)</td>
<td>118.3</td>
<td>153.9</td>
<td>141.0</td>
<td>0.1</td>
<td>0.1</td>
<td>0.0</td>
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<td>Farming of cattle (SIC0121)</td>
<td>55.1</td>
<td>77.5</td>
<td>73.2</td>
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<td>Farming of sheep, goats etc. (SIC0122)</td>
<td>22.5</td>
<td>32.9</td>
<td>30.4</td>
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<td>0.0</td>
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<td>Farming of swine (SIC0123)</td>
<td>7.6</td>
<td>6.2</td>
<td>6.3</td>
<td>0.0</td>
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<td>-2.9</td>
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<td>Farming of poultry (SIC0124)</td>
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<td>19.4</td>
<td>13.6</td>
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<td>0.0</td>
<td>0.0</td>
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<tr>
<td>OUTPUT-DISAGGREGATED CATEGORIES (Emillion, 2000 prices)</td>
<td>1995</td>
<td>2002</td>
<td>2015</td>
<td>Share of economy</td>
<td>Annual Average Growth</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-------------------------------------------------------</td>
<td>------</td>
<td>------</td>
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<td>----------------------</td>
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<td></td>
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<tr>
<td></td>
<td>(£m)</td>
<td>(£m)</td>
<td>(£m)</td>
<td>(%)</td>
<td>(%)</td>
<td></td>
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<tr>
<td>Other farming of animals (SIC0125)</td>
<td>15.5</td>
<td>18.0</td>
<td>17.6</td>
<td>0.0</td>
<td>0.0</td>
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<td>Growing of crops combined with farming of animals (SIC013)</td>
<td>27.1</td>
<td>37.9</td>
<td>39.7</td>
<td>0.0</td>
<td>0.0</td>
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<tr>
<td>Agricultural &amp; animal husbandry service activities, except veterinary (SIC014)</td>
<td>221.1</td>
<td>279.4</td>
<td>279.7</td>
<td>0.1</td>
<td>0.1</td>
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<td>Hunting, gaming &amp; game propagation (SIC015)</td>
<td>1.3</td>
<td>1.7</td>
<td>1.7</td>
<td>0.0</td>
<td>0.0</td>
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<td>Forestry, logging &amp; related activities (SIC02)</td>
<td>146.0</td>
<td>156.5</td>
<td>141.9</td>
<td>0.1</td>
<td>0.0</td>
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<td>Fishing (SIC05)</td>
<td>9.9</td>
<td>9.9</td>
<td>8.7</td>
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<tr>
<td>Fishing (SIC0501)</td>
<td>4.8</td>
<td>3.5</td>
<td>2.8</td>
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<td>0.0</td>
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<tr>
<td>Operation of fish hatcheries &amp; fish farms (SIC0502)</td>
<td>5.1</td>
<td>6.3</td>
<td>5.9</td>
<td>0.0</td>
<td>0.0</td>
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<tr>
<td>Production, processing and preserving of meat (SIC151)</td>
<td>269.2</td>
<td>303.7</td>
<td>387.0</td>
<td>0.1</td>
<td>0.1</td>
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<tr>
<td>Processing and preserving of fish (SIC152)</td>
<td>15.8</td>
<td>18.3</td>
<td>16.7</td>
<td>0.0</td>
<td>0.0</td>
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<td>Manufacture of dairy products (SIC155)</td>
<td>159.8</td>
<td>137.1</td>
<td>174.5</td>
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<td>0.1</td>
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<tr>
<td>Manufacture of beverage products (SIC159)</td>
<td>415.2</td>
<td>453.6</td>
<td>494.2</td>
<td>0.2</td>
<td>0.2</td>
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<tr>
<td>Production of mineral waters and soft drinks (SIC1598)</td>
<td>161.8</td>
<td>159.4</td>
<td>172.0</td>
<td>0.1</td>
<td>0.1</td>
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<td>Manufacture of rubber products (SIC251)</td>
<td>118.5</td>
<td>111.2</td>
<td>151.6</td>
<td>0.1</td>
<td>0.0</td>
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<td>Manufacture of cement, lime and plaster (SIC265)</td>
<td>20.6</td>
<td>26.1</td>
<td>38.5</td>
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<td>0.0</td>
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<tr>
<td>Manufacture of articles of concrete, plaster and cement (SIC266)</td>
<td>158.2</td>
<td>185.0</td>
<td>198.8</td>
<td>0.1</td>
<td>0.1</td>
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<tr>
<td>Manufacture of basic iron and steel and ferro-alloys (SIC271)</td>
<td>29.9</td>
<td>31.9</td>
<td>21.7</td>
<td>0.0</td>
<td>0.0</td>
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