The economic cost of fire: estimates for 2006

Fire Research Report 2/2011

This research was commissioned by the previous government and is not necessarily a reflection of the current government’s policies and priorities.

DCLG is publishing this report in the interests of transparency.
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Acknowledgements

The research team would like to thank the Advisory Board for their assistance and advice in the preparation of this study. The Advisory Board comprised representatives of the following organisations:

• Association of British Insurers
• Chief Fire Officers Association
• Department for Communities and Local Government; and
• Fire Protection Association.
Executive Summary

Headlines

The total cost of fire in England for 2006 was estimated at £8.2bn, which represented 0.9 per cent of Gross Value Added in England for 2006. This figure included:

- Costs in anticipation of fire at £3.1bn
- Costs as a consequence of fire at £3.4bn
- Costs in response to fire at £1.7bn
- The cost of arson in England was estimated at £1.9bn (this cost is included in the estimate for the total cost of fire above). This included the cost of human casualties and injuries, the Fire and Rescue Service response costs, costs to the criminal justice system, costs to victims, costs of property damage and business interruption costs.

<table>
<thead>
<tr>
<th>Area</th>
<th>Anticipation (£m)</th>
<th>Consequence (£m)</th>
<th>Response (£m)</th>
<th>Total (£m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>England</td>
<td>£3,099m</td>
<td>£3,433m</td>
<td>£1,665m</td>
<td>£8,197m</td>
</tr>
</tbody>
</table>

Please refer to accompanying text for a description of the assumptions used to create this table. Figures may not sum due to rounding.

These estimates do not include the environmental and social costs associated with the cost of fire or arson, which were not monetised. Examples of environmental costs identified included resource (water) and energy consumption while tackling fires and social costs included the impact on communities as a result of loss of unemployment or community facilities.

This report provides a regional breakdown of the costs in England (not included in previous estimates). The variation in costs reported across the regions is a reflection of the variety in the number of incidences occurring in the different regions and not a reflection on individual fire and rescue services.

The methodology applied to prepare the various cost elements of the current cost of fire model differed from that applied in previous estimates making a direct comparison between the models difficult. Most significantly, some of the underlying assumptions and

---

1 Gross Value Added is a measure of the total economic value of goods and services produced in an area or sector of an economy minus the cost of the raw materials and other inputs used to produce them. This, therefore, measures the contribution or value added and can be used as measure of economic performance. This is a method employed in other studies, for example studies in the United States and Australia as well as in the 2004 Cost of Fire Model and does not imply that the cost of fire contributes to the economy.
additional costs were included and estimates for Wales were not included. The *Regulatory Reform (Fire Safety) Order 2005* was considered out of scope for the 2006 estimates.

The cost of fire model was broken down into three categories:

- **Costs in anticipation** – the costs of measures designed to either prevent fires or protective measures to mitigate the damage caused by fires, such as: total costs of active (e.g. sprinklers) and passive (e.g. fire walls) fire protection in buildings; resource and capital costs of training and fire safety; non-pay related costs; and total insurance administration

- **Costs as a consequence** – the costs as a result of fire, including damage to properties, loss of business, and the costs of human injury and death, such as total cost of fatal and non-fatal casualties; total cost of lost business; costs of property damage; and costs to victims, the police, criminal justice system and prison service

- **Costs in response** – the costs as a result of reported incidents, including the cost to the Fire and Rescue Service of responding to fires, false alarms, etc, such as: Fire and Rescue Service resource costs in response to fire related incidents; and capital costs in response to fire related incidents.

It should be noted that the costs stated in this report are only estimates. They should be used with caution for a number of reasons:

- The mechanism for generating the estimates is in essence a “model”. While every effort has been made to make the model represent as fully as possible the cost of fire to the economy, it will always remain subject to refinement and improvement

- The 2006 cost of fire model was developed following a great deal of discussion and advice. However, a different approach would produce different estimates

- The quality of the estimates produced relies upon the completeness and validity of the various data sources used

- Some of the underlying data used to produce these estimates is subject to natural variation, peaks and troughs and price inflation. This would have an impact in the estimates produced.
Comparison of the estimates for 2004 and 2006

Because of the different methodologies used in the 2004 and 2006 models, it is difficult to make comparisons between the estimates. However a high level comparison between the estimates was carried out.

The data were adjusted in the 2006 model by taking account of the costs for Wales included in the 2004 model as well as inflation so that prices could be compared in the same base year (2006). When these adjustments were made, the total estimated cost of fire increased from £7.1bn in 2004 to £8.2bn in 2006 (an increase of 15%).

Several factors contributed to the apparent rise in the estimated cost of fire:

- an increase of 8 per cent in the total number of fatalities
- an increase in the value of insurance claims recorded by the Association of British Insurers during these two years, increasing the costs of property damage and lost business
- a significant change in the way property damage costs were calculated with the inclusion of additional elements in 2006 (damage costs relating to National Health Service buildings and estimates for self-insurance of public buildings)
- and a considerable increase in the types of costs included in relation to arson in the 2006 model.

Summary

The 2006 update of the economic cost of fire follows on from previous work undertaken in 2000, 2002 and 2004. The estimates of the 2006 model differed however in that the costs were calculated for England only. In addition, the 2006 model represents an improvement on previous versions of the model, in particular it:

- provides data for regions for the first time
- refines some of the underlying assumptions or includes additional costs
- updates data sources; and
- provides a spreadsheet model which can be used in the future to estimate the cost of fire to the economy.
Section 1

Introduction

1.1 Overview

This study estimates the total cost of fire in England in 2006 and the findings are set out in this report and an accompanying spreadsheet model. Fire represents a significant cost to the economy and includes direct impacts on individuals and property, extra protection installed in buildings, the administration of fire insurance and the resources required to provide fire cover through the Fire and Rescue Service.

Initial estimates of the cost of fire in England and Wales were published in the Home Office report: *The cost of fires: A review of the evidence available* which drew on analysis carried out overseas. Research continued and was repeated and refined on a number of occasions, see Table 1.1 below:

<table>
<thead>
<tr>
<th>Table 1.1: Previous studies examining the cost of fire</th>
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<tbody>
<tr>
<td><strong>Title</strong></td>
</tr>
<tr>
<td>The cost of fires: A review of the evidence available</td>
</tr>
</tbody>
</table>

This report presents an update of the work to estimate the total cost of fire to the economy for 2006. However, there are notable differences between the 2006 model.
and previous models. The study reported here estimates the cost of fire in England only, whereas previous estimates were made for England and Wales. This reflected the statutory obligation of DCLG for England only. In addition, this report presents a regional breakdown of the costs in England whereas previous reports considered the costs only at a national level. Finally, the work presented in this report incorporated additional analysis where it was possible to address a number of ‘areas for future research’ highlighted in The Cost of Fire 2004 (2006). The differences between the 2004 and 2006 estimates are further described in Section 2.

It should be noted that the costs included in this report are only estimates. They should be used with caution for a number of reasons:

- The mechanism for generating the estimates is in essence a “model”. While every effort has been made to make the model represent as fully as possible the cost of fire to the economy, it will always remain subject to refinement and improvement. For example additional cost elements that cannot at present be monetised could in future once the data becomes available, be added in
- Considerable advice was taken and discussion had when the model (described in this report) was developed. It should be noted that a different approach would produce different estimates
- The quality of the estimates produced also relies upon the completeness and validity of the various data sources used. Again while every effort has been made to use the best possible information, any lack of validity or completeness of the data will challenge the integrity of the model
- Some of the underlying data used to produce these estimates is subject to natural variation, peaks and troughs that will have an impact on the cost of fire. Equally some of the data elements are subject to price inflation; this again would have an impact in the estimates produced.

The main objective of this work was to provide an estimate of the potential costs of fire to the economy and to expand the model. It does not estimate the benefits associated with the Fire and Rescue Service or other activities.

Total cost estimates in this report are presented as a percentage of English Gross Value Added which is used as a reference for the scale of the costs being estimated – by comparing them with the size of the overall economy. Gross Value Added is a measure of the total economic value of goods and services produced in an area or sector of an economy minus the cost of the raw materials and other inputs used to produce them. This, therefore, measures the contribution or value added and can be used as a measure of economic performance. This is a method employed in other studies, for example; studies in the United States and Australia as well as in the previous 2004 Cost of Fire model and does not imply that the costs of fire contribute to the economy.
Prices in this report are all quoted in 2006 prices.

1.2 What are the costs of fire?

Previous models established three categories of the costs of fire associated with activities conducted by the Fire Rescue Service and others involved in preventing fire or fire damage, protecting against the physical effects of fire and mitigating the financial losses from fire. This report, and the accompanying economic spreadsheet model, subdivides costs into three separate categories:

- costs in anticipation – the costs of measures designed to either prevent fires or protective measures to mitigate the damage caused by fires
- costs as a consequence – the costs as a result of fire. These included damage to properties, loss of business, and the costs of human injury and death, and
- costs in response – the costs as a result of reported incidents which typically included the cost of the Fire and Rescue Service responding to fires, false alarms, etc. and costs to businesses which also responded to fires and false alarms.

Whilst the approach used for the 2006 model was broadly consistent with the approach used previously to categorise the economic costs of fire, there were a number of differences that prevented direct comparison. These are further described in Section 2. In addition, a number of international studies had been undertaken at the time of this research, however the results were not comparable due to differences in the methodologies employed.
Section 2

Comparison between 2004 and 2006 approach

2.1 Introduction

This section provides an overview of the 2004 and 2006 models. It provides a summary of the main methodological differences, comparison of key underlying fire incident (Fire Damage Report 1) data and provides a high level comparison of the total cost estimates between the two years.

2.2 Comparison of approaches used

Table 2.1 provides an indication of the comparability of the approaches used in either model to estimate key elements of the cost of fire, a summary of the broad differences and an indication of the proportion of the cost element in relation to the total cost of fire for that year. A more thorough explanation of the methodological differences can be found in Appendices A to C. Note that in addition to these differences costs for Wales were included within the 2004 model but not in the 2006 model.
### Table 2.1: Overview of comparison between approaches and information contained in 2006 and 2004 models

<table>
<thead>
<tr>
<th>Cost or impact</th>
<th>Comparable approach (Y/N)?</th>
<th>What is the difference in approach?</th>
<th>% of total cost in 2004&lt;sup&gt;5&lt;/sup&gt;</th>
<th>% of total cost in 2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inclusion of Wales</td>
<td>N</td>
<td>The 2004 Cost of Fire model was calculated for England and Wales whereas the 2006 model was calculated for England only.</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Costs in anticipation</td>
<td></td>
<td></td>
<td>32%</td>
<td>31%</td>
</tr>
<tr>
<td>Fire protection in buildings</td>
<td>N</td>
<td>The 2006 model included the cost of fire protection in buildings (in terms of capital and maintenance costs) and was based on total value of fire protection industry by region broken down (distributed) using the number of new domestic buildings in each region. The previous 2004 model assumed the capital (only) cost of fire protection (active and passive) based on the annuitisation of capital value of stock. The new methodology was a more accurate reflection of the total value of fire protection as it was based on a survey of the markets. The extent of any difference between the 2004 and 2006 estimates (increase or decrease) would depend on the accuracy of the previous method (e.g. if the previous method significantly over or underestimated the overall cost this would result in a greater change between the two results).</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 2.1: Overview of comparison between approaches and information contained in 2006 and 2004 models (continued)

<table>
<thead>
<tr>
<th>Cost or impact</th>
<th>Comparable approach (Y/N)?</th>
<th>What is the difference in approach?</th>
<th>% of total cost in 2004</th>
<th>% of total cost in 2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insurance administration</td>
<td>Y</td>
<td>The 2006 model included an estimate based on 2004 Association of British Insurers (ABI) data scaled to 2006 as this information was no longer collected by ABI. This cost element increased in line with inflation. Note that these costs did not (i) factor administrative costs of other organisations such as self-insurers insurance outside of the Association of British Insurers or (ii) reflect potential changes in administrative costs that resulted from changes in the way that cover was provided or administered (for example, greater on-line processing).</td>
<td>6.5%</td>
<td>6.4%</td>
</tr>
<tr>
<td>Cost or impact</td>
<td>Comparable approach (Y/N)?</td>
<td>What is the difference in approach?</td>
<td>% of total cost in 2004</td>
<td>% of total cost in 2006</td>
</tr>
<tr>
<td>---------------</td>
<td>-----------------------------</td>
<td>-------------------------------------</td>
<td>------------------------</td>
<td>------------------------</td>
</tr>
<tr>
<td>Fire service safety activity (labour)</td>
<td>N</td>
<td>This was determined in the 2006 model by multiplying hours spent on fire safety (inspections, community fire safety activity and fire investigation) by an average fire safety labour cost. Data provided by DCLG was available at a county level and was aggregated to a regional level. Regional costs included accounting for a London weighting. Average fire safety labour cost included 30 per cent overhead relating to fixed administration costs. The 2004 model did not include London weighting which was unavailable at the time. Note: Both models excluded fire safety activity undertaken by organisations other than the Fire and Rescue Service (for example private enterprises).</td>
<td>0.5%</td>
<td>0.2%</td>
</tr>
<tr>
<td>Non-pay related costs of fire safety</td>
<td>Y</td>
<td>Non-pay related costs, such as training and other employee expenses, were estimated for 2006 by subtracting pay related expenditure from total expenditure.</td>
<td>0.3%</td>
<td>0.3%</td>
</tr>
<tr>
<td>Costs to a ‘responsible person’</td>
<td>N/A</td>
<td>Not estimated in either model as Regulatory Reform (Fire Safety) Order 2005 came into effect late in 2006. This will need to be taken into account in future updates.</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>
Table 2.1: Overview of comparison between approaches and information contained in 2006 and 2004 models (continued)

<table>
<thead>
<tr>
<th>Cost or impact</th>
<th>Comparable approach (Y/N)?</th>
<th>What is the difference in approach?</th>
<th>% of total cost in 2004</th>
<th>% of total cost in 2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>Costs as a consequence</td>
<td>Y</td>
<td>These approaches were broadly comparable as both models used the ‘value of a statistical life’. The categorisation of injury types (translating from Fire Damage Report 1 data to the severity of injury – serious or slight) was also the same. However, the average value of a casualty by severity (economic value) was adjusted to 2006 prices (for example the value for a fatality used in the 2004 model is £1.375m compared with £1.520m in the 2006 model) and the number of recorded incidents was updated. The cost estimates in the two models were comparable and differences in the estimates related to inflation and changes in the number of casualties recorded. Note: the estimated costs were probably an underestimate – Fire Damage Report 1 data from Fire and Rescue Services does not necessarily include all casualty data (e.g. if a casualty occurred but the fire service did not attend the incident) and alternative methods explored for the current work (using hospital episode statistics) did not improve its definition.</td>
<td>16%</td>
<td>19.5%</td>
</tr>
</tbody>
</table>
Table 2.1: Overview of comparison between approaches and information contained in 2006 and 2004 models (continued)

<table>
<thead>
<tr>
<th>Cost or impact</th>
<th>Comparable approach (Y/N)?</th>
<th>What is the difference in approach?</th>
<th>% of total cost in 2004(^5)</th>
<th>% of total cost in 2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>Property damage</td>
<td>N</td>
<td>Both models used Association of British Insurers claims data relating to fires. The 2004 model included an estimate of domestic, commercial and public losses based on insurance claims (covered by the Association of British Insurers members and those self-insured) and an estimate of losses from uninsured market. Costs through fires that did not result in claims were not estimated. These assumptions were considered and revised in light of better available information for the 2006 model. This included claims data for National Health Service buildings as well as taking into account additional damages to public sector buildings not claimed for through commercial insurers.</td>
<td>18%</td>
<td>17%</td>
</tr>
</tbody>
</table>
### Table 2.1: Overview of comparison between approaches and information contained in 2006 and 2004 models (continued)

<table>
<thead>
<tr>
<th>Cost or impact</th>
<th>Comparable approach (Y/N)?</th>
<th>What is the difference in approach?</th>
<th>% of total cost in 2004</th>
<th>% of total cost in 2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lost business</td>
<td>N</td>
<td>In the 2006 model data from the Association of British Insurers regarding business interruption claims was used as the basis for this estimate. The 2006 estimate included a different assumption regarding transfer payments to the 2004 model (a higher proportion of 75 per cent rather than 50 per cent). This reflects a view that a greater proportion of equivalent goods could be obtained at no additional cost within England. The methodological difference in the two approaches would in theory decrease the total cost of lost business; however this may be affected if the total value of claims for 2004 and 2006 significantly increased.</td>
<td>0.6%</td>
<td>0.4%</td>
</tr>
</tbody>
</table>
Table 2.1: Overview of comparison between approaches and information contained in 2006 and 2004 models (continued)

<table>
<thead>
<tr>
<th>Cost or impact</th>
<th>Comparable approach (Y/N)?</th>
<th>What is the difference in approach?</th>
<th>% of total cost in 2004</th>
<th>% of total cost in 2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>Criminal justice system costs</td>
<td>N</td>
<td>There were important additional costs taken into consideration in the 2006 model. The 2004 model included only costs to the criminal justice system which refer to the costs of taking suspects to court. The 2006 model included the costs to the police, Crown Prosecution Service and forensic unit to investigate deliberate fires and process suspects, as well as the costs to the prison service for convicted arsonists. In addition the assumptions used for the number of detections leading to a charge and the ‘route to court’ were revised based on data in the Criminal Statistics report for 2006 produced by the Ministry of Justice. The costs for court proceedings were based on those available in the previous 2004 model (from the Ministry of Justice), adjusted for inflation. The inclusion of these additional elements increased the overall cost element compared to the 2004 model.</td>
<td>1.4%</td>
<td>5%</td>
</tr>
<tr>
<td>Costs in response</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of incidents</td>
<td>Y</td>
<td>The data for the 2006 model was based on information obtained from Fire Damage Report 1 data (and in the case of false alarms, secondary fires or chimney fires from Fire Damage Report 3 data). The same sources were used in the 2004 model but included incidents in Wales.</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>
### Table 2.1: Overview of comparison between approaches and information contained in 2006 and 2004 models (continued)

<table>
<thead>
<tr>
<th>Cost or impact</th>
<th>Comparable approach (Y/N)?</th>
<th>What is the difference in approach?</th>
<th>% of total cost in 2004</th>
<th>% of total cost in 2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average appliance hours</td>
<td>N</td>
<td>Time spent dealing with fires in the 2006 model was taken from Fire Damage Report 1 data. There was no data on the time taken to attend secondary fires. An assumption was made that time taken to attend secondary fires was the same for primary building fires. The inclusion of information about false alarms in the 2006 model was different to the 2004 model. This new approach better reflected the costs apportioned to different types of fire-related incidents but had no effect on the overall resource costs.</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Average number of pumps per incident</td>
<td>N</td>
<td>Whilst the 2006 model assumed the same number of crew per pump as 2004 (4.5 per pump in attendance), different data was available for 2006 regarding the average number of pumps per incident. This better reflected the costs apportioned to different types of fire-related incidents but had no effect on the overall resource costs.</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Response resource costs</td>
<td>Y</td>
<td>Figures regarding the total annual Fire and Rescue Service resource cost were available for the 2006 model from Chartered Institute of Public Finance and Accountancy and were adjusted to remove costs that were included in costs in anticipation (labour cost of fire safety, non-pay related costs of fire safety and resource costs apportioned to special service incidents).</td>
<td>23%</td>
<td>19%</td>
</tr>
</tbody>
</table>
Table 2.1: Overview of comparison between approaches and information contained in 2006 and 2004 models (continued)

<table>
<thead>
<tr>
<th>Cost or impact</th>
<th>Comparable approach (Y/N)?</th>
<th>What is the difference in approach?</th>
<th>% of total cost in 2004</th>
<th>% of total cost in 2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>Firefighting capital cost</td>
<td>N</td>
<td>Total capital cost figures were taken directly from expenditure in Chartered Institute of Public Finance and Accountancy Fire and Rescue Service statistics and adjusted to remove capital costs for fire safety and training which were then incorporated into the costs in anticipation. These costs were double counted in the 2004 model. Capital costs of special service incidents were also removed. The exclusion of these elements may decrease the overall cost element compared to 2004 but will depend on the various factors such as the lifetime and usage of firefighter equipment, machinery and vehicles.</td>
<td>1.4%</td>
<td>0.8%</td>
</tr>
<tr>
<td>Marginal cost of false alarms</td>
<td>N</td>
<td>This data was not estimated in the 2004 model.</td>
<td>Not estimated.</td>
<td>N/A.</td>
</tr>
<tr>
<td>Costs of attacks made on firefighters</td>
<td>N</td>
<td>This data was not estimated in the 2004 model.</td>
<td>Not estimated.</td>
<td>Not monetised (see appendix C1.8).</td>
</tr>
</tbody>
</table>

Please refer to accompanying text for a description of the assumptions used to create this table. Figures may not sum due to rounding. 2006 and 2004 financial estimates are produced by different methods therefore differences may not be ascribed to particular reasons, see text. All financial estimates throughout this work have taken inflation into account.

5 The total for 2004 refers to England only. England and Wales were separated for this comparison using the relative proportion of Gross Value Added.
6 This was discussed and agreed with the Advisory Board.
2.3 Discussion of comparison of the results of 2004 and 2006 models

This section provides an overview of the differences in the results of the cost estimates undertaken for the 2004 and 2006 model. These should be treated with caution and have been provided for indicative purposes only to separate out the effects that the inclusion of Wales and inflation may have on the differences in the estimates7.

A more detailed comparison of the costs in 2004 and 2006 is discussed in Appendix D: Comparison of the Economic Cost of Fire in 2004 and 2006 using an adjusted model. The comparison in Appendix D differs in that the 2006 model was adjusted to provide, where possible, a direct comparison of cost elements.

The 2006 model was more comprehensive than the previous model and employed differing methodological approaches to a number of costs (refer to Section 2.2 above for a discussion of differences in the approaches). There were a number of key factors that limited the extent that any conclusions could be drawn from a comparison of the two different models. Factors included the inherent methodological differences between the two models (discussed in Table 2.1 above) and the inclusion of additional categories of cost in the latest estimates. However, with some adjustments to the data in the model there was some scope to make some high level comparisons between the different models.

The first adjustment took account of costs for Wales that were included in the 2004 model and not the 2006 model. There were various methods that could have been used to make this adjustment, including using a number of scaling factors such as the ‘Barnett formula’, number of incidents of fire, population, etc. The method selected used the relative proportion Wales contributed to England and Wales Gross Value Added as many cost elements in the original 2004 model were apportioned using this scaling factor (for example; property damage, costs of implementing fire protection, etc.).

The second adjustment took account of inflation so that prices could be compared in the same base year (i.e. 2006). This was so that observed differences between the two total estimates related to a real change, such as the additional number of fatalities, as opposed to price inflation.

7 We do not recommend that these figures are used or applied in any context and Entec takes no responsibility for reliance placed on them by DCLG or any other third party.
2.3.1 Comparison of the underlying data

**Fire Incident (Fire Damage Report 1) data**

The figures below compare the total number of incidents, casualties and fatalities for 2004 and 2006 as recorded in the Fire Damage Report 1 statistics. Figure 2.1 shows a decrease in the total number of incidents in both accidental and deliberate fires. The total number of incidents decreased by 13 per cent between the two years.

![Figure 2.1: Number of incidents in 2004 and 2006](chart)

Please refer to accompanying text for a description of the assumptions used to create this graph. 2006 and 2004 financial estimates are produced by different methods therefore differences may not be ascribed to particular reasons, see text.

The overall number of casualties (shown in Figure 2.2) decreased by 3.5 per cent between 2004 and 2006. This decrease was observed in relation to both deliberate and accidental fires. There was however a more ambiguous change in the breakdown of total injuries between serious and slight between the two time periods (shown in Table 2.2 below). Serious injuries included those recorded in Fire Damage Report 1 forms as burns; overcome by gas or smoke; and burns and overcome by gas or smoke. Slight injuries included those recorded as physical injuries; shock; precautionary check up and other unspecified. There was an increase in injuries classified as ‘slight’ and a decrease in the number recorded as ‘serious’ as shown by the proportion of the total recorded as each. The underlying factors contributing to this could not be determined in the course of this work.

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8 Fire Damage Report 1 data includes building fires, road vehicle fires and other outdoor primary fires. It does not include other outdoor secondary fires, chimney fires or false alarms.

9 These classifications are consistent with those used in estimating the 2004 cost of fire.
Section 2 Comparison between 2004 and 2006 approach

Figure 2.2: Number of casualties in 2004 and 2006

<table>
<thead>
<tr>
<th>Casualties in deliberate fires</th>
<th>2004</th>
<th>2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total casualties in fires</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Please refer to accompanying text for a description of the assumptions used to create this graph. 2006 and 2004 financial estimates are produced by different methods therefore differences may not be ascribed to particular reasons, see text.

Table 2.2: Proportion of total injuries recorded as serious and slight in 2004 and 2006

<table>
<thead>
<tr>
<th></th>
<th>Proportion of injuries recorded as slight</th>
<th>Proportion of injuries recorded as serious</th>
</tr>
</thead>
<tbody>
<tr>
<td>England and Wales 2004</td>
<td>25%</td>
<td>75%</td>
</tr>
<tr>
<td>England 2006</td>
<td>47%</td>
<td>53%</td>
</tr>
</tbody>
</table>

Please refer to accompanying text for a description of the assumptions used to create this table. Figures may not sum due to rounding. 2006 and 2004 financial estimates are produced by different methods therefore differences may not be ascribed to particular reasons, see text.

There was an increase in fatalities (shown in figure 2.3) between the two years of approximately 8 per cent, with a greater increase in fatalities from deliberate fires (26%) than accidental fires (3%). The value of fatalities was a significant cost element, comprising 19 per cent of the total cost as a consequence in 2006.10

---

10 The data suggested that the number of casualties fell in 2006 relative to 2004 (non-fatal incidents), however the number of fatalities in 2006 increased relative to 2004. Fatalities had higher associated costs (the value of a fatality increased in 2006) hence the overall costs increased even though the number of incidents fell.
2.3.2 Comparison of the total cost estimates

The comparison of total estimates by cost category are summarised in Figure 2.4. These indicated that the largest variation between the two years was observed in costs as a consequence. There were several factors that contributed to this:

- An increase of 8 per cent in the total number of fatalities from 2004 to 2006\(^\text{11}\)
- The costs of property damage and lost business – there was a significant increase in the value of claims recorded by the Association of British Insurers during these two years. Data from the Association of British Insurers would suggest that business interruption costs and property damage costs were particularly low in 2004 in comparison to 2006 (i.e. 2004 was the least costly year over the period 1989-2006 adjusting for inflation, with all prices set to 2006 prices)
- A significant increase in the costs included in relation to arson. The 2004 model included only the criminal justice system costs whereas the 2006 model included costs to the police and prison service as well. Please see Section 6 for a detailed methodological explanation of the inclusion of these costs

\(^\text{11}\) Fire Damage Report 1 statistics would indicate that in 2004 the number of fatalities as a result of fire was low (period 2001-2006) and the post 2004 fatality count is rising back to pre 2004 levels. Since fatalities are valued much higher (£1.5m per death) compared to casualties (non-fatal injuries), the overall cost is higher in 2006 even though number of incidents have fallen.
There was also a significant change in the way property damage costs were calculated with the inclusion of additional elements. These included damage costs relating to National Health Service buildings as well as estimates for self-insurance of public buildings which significantly added to the total value of property damage estimates.

**Figure 2.4: Comparison of 2004 and 2006 results (adjusted data)**

Please refer to accompanying text for a description of the assumptions used to create this graph. The financial estimates for the 2006 model and 2004 model are produced by different methods therefore differences may not be ascribed to particular reasons, see text. 2004 results were adjusted by extrapolating England costs and accounting for inflation between the two years.
Section 3

Estimates for the costs in anticipation

3.1 Introduction

This section presents the main types of information concerning the costs associated with the anticipation of fire for the 2006 model.

3.2 Methodology in brief

This section provides a brief overview of the method used to estimate the costs in anticipation. Table 3.1 provides a brief description of the main elements associated with the costs in anticipation with explanations of how these were incorporated in the headline results shown in Section 3.3. Table 3.2 sets out the assumptions used to determine the costs in anticipation.

<table>
<thead>
<tr>
<th>Table 3.1 What is included in the headline results?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost</td>
</tr>
<tr>
<td>Costs of implementing fire protection in buildings</td>
</tr>
<tr>
<td>Costs of insurance administration</td>
</tr>
</tbody>
</table>
Section 3 Estimates for the costs in anticipation

Table 3.1 What is included in the headline results? (continued)

<table>
<thead>
<tr>
<th>Cost</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resource and capital costs of training and fire</td>
<td>A proportion of both Fire and Rescue Service resource and capital costs are related to activities that occur regardless of the number of reported fires. These are costs associated with ensuring firefighters are well prepared and trained in anticipation of a fire. These also include fire inspections, community fire safety hours and fire investigation. Fire safety labour costs were determined by multiplying the average fire safety labour cost (£/h) by the total number of hours spent on fire safety.</td>
</tr>
<tr>
<td>safety</td>
<td></td>
</tr>
<tr>
<td>Non-pay related costs</td>
<td>The value of non-pay related costs was calculated by subtracting pay related expenditure from total expenditure. Pay related expenses were calculated by subtracting pensions, training and other employee expenses from total employee expenses. These were taken from the Chartered Institute of Public Finance and Accountancy Fire and Rescue Service Statistics for 2006-07 and based on actual spend (rather than estimates).</td>
</tr>
</tbody>
</table>

What has not been explicitly monetised?

| Costs to responsible person                      | The Regulatory Reform (Fire Safety) Order 2005 came into effect in October 2006. The Order requires that the responsible person must carry out a fire safety risk assessment and implement and maintain a fire management plan. It was decided that the Fire Safety Order was outside the scope of this study and these costs were not included in the 2006 model. This decision was based on the fact that the legislation only came into effect late in 2006 – it would be difficult to determine compliance cost data for both before and after the legislation implementation date. |

Table 3.2: Assumptions used to determine the costs in anticipation

<table>
<thead>
<tr>
<th>Assumptions</th>
<th>Estimate</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regional breakdown of total fire protection in buildings market</td>
<td>Broken down using regional new build rate</td>
<td>Housing Statistics 2008, Communities and Local Government.</td>
</tr>
</tbody>
</table>
3.3 Headline results

Table 3.3 shows the headline results for the costs in anticipation of fire for 2006. The total anticipation costs for England were estimated at £3.1bn. The anticipation costs for England and Wales over the period of 2000-2004 had risen by 24 per cent and were estimated at £2.8bn in 2004\(^\text{12}\). As a means of comparison £3.1bn represented 0.34 per cent of Gross Value Added in England for 2006 compared with 0.31 per cent of Gross Value Added for England and Wales reported in 2004\(^\text{12}\). These figures are indicative and should be treated carefully – the 2004 model also included Welsh costs. The variation across the regions is a reflection of the variety in the number of incidences occurring in the different regions and not a reflection on individual Fire and Rescue Services. Please see Sections 2.2 and 2.3 for information and a comparison of the different methodologies employed for the 2004 and 2006 models.

<table>
<thead>
<tr>
<th>Regions</th>
<th>Insurance administration costs (£m)</th>
<th>Total cost of fire protection in buildings (£m)</th>
<th>Resource, capital, non-pay related costs (£m)</th>
<th>Total (£m)</th>
<th>Cost per 1,000 population (£)</th>
<th>Cost per person (£)(^\text{1})</th>
</tr>
</thead>
<tbody>
<tr>
<td>North East</td>
<td>£27m</td>
<td>£92m</td>
<td>£3m</td>
<td>£121m</td>
<td>£47,959</td>
<td>£48</td>
</tr>
<tr>
<td>North West</td>
<td>£72m</td>
<td>£291m</td>
<td>£3m</td>
<td>£366m</td>
<td>£53,564</td>
<td>£54</td>
</tr>
<tr>
<td>Yorkshire &amp; The Humber</td>
<td>£53m</td>
<td>£245m</td>
<td>£3m</td>
<td>£300m</td>
<td>£59,468</td>
<td>£59</td>
</tr>
<tr>
<td>East Midlands</td>
<td>£45m</td>
<td>£282m</td>
<td>£2m</td>
<td>£328m</td>
<td>£76,433</td>
<td>£76</td>
</tr>
<tr>
<td>West Midlands</td>
<td>£55m</td>
<td>£208m</td>
<td>£6m</td>
<td>£269m</td>
<td>£50,418</td>
<td>£50</td>
</tr>
<tr>
<td>East of England</td>
<td>£58m</td>
<td>£317m</td>
<td>£2m</td>
<td>£376m</td>
<td>£67,952</td>
<td>£68</td>
</tr>
<tr>
<td>South East</td>
<td>£84m</td>
<td>£442m</td>
<td>£3m</td>
<td>£529m</td>
<td>£64,709</td>
<td>£65</td>
</tr>
<tr>
<td>South West</td>
<td>£55m</td>
<td>£321m</td>
<td>£2m</td>
<td>£378m</td>
<td>£74,496</td>
<td>£74</td>
</tr>
<tr>
<td>London</td>
<td>£76m</td>
<td>£349m</td>
<td>£6m</td>
<td>£431m</td>
<td>£56,983</td>
<td>£57</td>
</tr>
<tr>
<td><strong>England</strong></td>
<td><strong>£524m</strong></td>
<td><strong>£2,546m</strong></td>
<td><strong>£30m</strong></td>
<td><strong>£3,099m</strong></td>
<td><strong>£61,502</strong></td>
<td><strong>£62</strong></td>
</tr>
</tbody>
</table>

\(^{1}\) Based on regional populations

Please refer to accompanying text for a description of the assumptions used to create this table. Figures may not sum due to rounding.

3.4 Suggestions for further work

The costs of implementing fire protection in buildings was based on a total value for the market in the UK which was broken down on a regional basis using the domestic new build rate to represent building activity in each region. This was due to a lack of available data relating to the commercial and public stock. Further research may be helpful to provide a more accurate regional breakdown of the data.
Section 4

Estimates for the costs as a consequence

4.1 Introduction

This section presents the main types of information concerning the costs associated with the consequence of fire for the 2006 model (this includes primary and secondary fires and false alarms). Non-fire related activities such as Special Service Incidents (e.g. road traffic accidents and flooding) were not included within the costs.

4.2 Method in brief

This section provides a brief overview of the method of estimating the costs as a consequence. Table 4.1 provides a summary of the key elements included in the estimate of costs as a consequence of fire. A more detailed description can be found in Appendix B Costs as a Consequence.

<table>
<thead>
<tr>
<th>Cost</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Costs of fatal and non-fatal casualties</td>
<td>This was estimated using the Department for Transport’s estimations in the document Highway Economic Note 1:2005 Valuation of the Benefits of Prevention of Road Accidents and Casualties. These values included consideration of lost output; ambulance and hospital costs; and human suffering (based on willingness-to-pay values).</td>
</tr>
<tr>
<td>Costs of property damage</td>
<td>These costs were estimated making use of the Association of British Insurers claims data relating to fires. They were adjusted to account for the insurance market not covered by the Association of British Insurers, for public sector buildings (which tend to self insure/have high excesses) and the uninsured market. Data relating to fires in National Health Service buildings was obtained from the National Health Service Litigation Authority.</td>
</tr>
</tbody>
</table>
Table 4.1: What is included in the headline results? (continued)

<table>
<thead>
<tr>
<th>Cost</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost of lost business</td>
<td>This cost was based on business interruption claims obtained from the Association of British Insurers. A proportion of these claims were assumed to be redistributed into the local economy. This represents the fact that a financial loss to one business is not necessarily a loss to the country as that business is likely to be picked up by another local business. National economic losses are incurred, for example, where a consumer cannot obtain the same good at the same time and price (e.g. where a specialist supplier is lost and goods need to be imported).</td>
</tr>
<tr>
<td>Costs to victims, the police, criminal justice system and prison service</td>
<td>These refer to deliberate fires only. Some fires are recorded by the Fire and Rescue Service as deliberate fires and reported to the police, but are not recorded by the police as arson. For these incidents, only the costs to the victim were calculated (Fire and Rescue Service resource costs were not included since these were included in costs in anticipation). For those fires where the police recorded the fire as arson, the costs to the police/Crown Prosecution Service, forensic team were calculated for different outcomes such as charges, penalties, cautions and when there was no suspect. The costs to the criminal justice system were also estimated based on average costs to magistrates’ and Crown Courts for the total number of cases sent to court recorded in Criminal Statistics 2006. The costs to the prison service were estimated using the average sentence time for criminal damage incidents for both magistrates’ and Crown Court costs and average prisoner costs per month. A more detailed methodology can be found in Section 6.2</td>
</tr>
</tbody>
</table>

What has not been explicitly monetised?

| Community costs | A range of community costs were identified as being a significant part of the overall costs as a consequence of fire. These included: impact on communities as a result of a loss of employment or community facilities; loss of cultural heritage; decline in overall appearance of an area affecting community wellbeing property values or ability to attract inward investment. However, given the extreme variability of the different types of incidents and the nature of different locations an aggregate estimated cost for England was not calculated. Please refer to Appendix B1.4 for further details of these costs. |
Table 4.1: What is included in the headline results? (continued)

<table>
<thead>
<tr>
<th>Cost</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental costs</td>
<td>A range of environmental costs were identified as a significant part of the overall costs as a consequence of fire. These included; resource (water) and energy consumption tackling fires, run-off of contaminated waters to controlled waters, emissions of greenhouse gases and other harmful substances, loss of biodiversity (especially at incidents affecting designated sites), debris and other after waste following a fire to landfill, and environmental clean-up/decontamination costs (at times including long-term monitoring). However, given the extreme variability of the different types of incidents and the environmental sensitivity of any given location to the environmental consequences of fire, an aggregate estimated cost for England was not calculated. Please refer to Appendix B1.5 for further details on these costs.</td>
</tr>
</tbody>
</table>

Table 4.2: Assumptions used to determine the costs as a consequence\(^\text{13}\)

<table>
<thead>
<tr>
<th>Assumptions</th>
<th>Estimate(^1)</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value of fatality</td>
<td>£1,520,371</td>
<td>Highway Economic Note 1: 2005 Valuation of the Benefits of Prevention of Road Accidents and Casualties, Department for Transport</td>
</tr>
<tr>
<td>Value of serious injury</td>
<td>£170,839</td>
<td>Highway Economic Note 1: 2005 Valuation of the Benefits of Prevention of Road Accidents and Casualties, Department for Transport</td>
</tr>
<tr>
<td>Proportion of public sector claims claimed from internal insurance funds</td>
<td>80% of total claims</td>
<td>Consultation with Association of Local Authority Risk Managers</td>
</tr>
<tr>
<td>Proportion of public sector claims claimed from private insurers</td>
<td>20% of total claims</td>
<td>Consultation with Association of Local Authority Risk Managers</td>
</tr>
</tbody>
</table>

\(^{13}\) All links to websites were current in November 2010
<table>
<thead>
<tr>
<th>Assumptions</th>
<th>Estimate</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage increase in damage in deliberate fires compared with damage in accidental fires in domestic buildings</td>
<td>38%</td>
<td>Fire Damage Report 1 data</td>
</tr>
<tr>
<td>Percentage increase in damage in deliberate fires compared with damage in accidental fires in commercial buildings</td>
<td>73%</td>
<td>Fire Damage Report 1 data</td>
</tr>
<tr>
<td>Percentage increase in damage in deliberate fires compared with damage in accidental fires in public buildings</td>
<td>90%</td>
<td>Fire Damage Report 1 data</td>
</tr>
<tr>
<td>Proportion of businesses with insurance</td>
<td>100%</td>
<td>Previous model assumption used in the absence of data from the Association of British Insurers</td>
</tr>
<tr>
<td>Proportion of business interruption claims that are redistributed</td>
<td>75%</td>
<td>Professional judgement used in the absence of any research on this subject.</td>
</tr>
<tr>
<td>Victim cost per criminal damage incident</td>
<td>£754</td>
<td>British Crime Survey 2006</td>
</tr>
<tr>
<td>Annual cost to Police (Crown Prosecution Service) due to arson</td>
<td>£92.1m</td>
<td><a href="http://tna.europarchive.org/20100413151441/http://crimereduction.homeoffice.gov.uk/toolkits/an020304.htm">http://tna.europarchive.org/20100413151441/http://crimereduction.homeoffice.gov.uk/toolkits/an020304.htm</a></td>
</tr>
<tr>
<td>Annual cost to forensic unit due to arson</td>
<td>£1m</td>
<td><a href="http://tna.europarchive.org/20100413151441/http://crimereduction.homeoffice.gov.uk/toolkits/an020304.htm">http://tna.europarchive.org/20100413151441/http://crimereduction.homeoffice.gov.uk/toolkits/an020304.htm</a></td>
</tr>
</tbody>
</table>
### Table 4.2: Assumptions used to determine the costs as a consequence\(^{13}\) (continued)

<table>
<thead>
<tr>
<th>Assumptions</th>
<th>Estimate(^1)</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost to Crown Prosecution Service and forensic unit per deliberate fire</td>
<td>£2,655</td>
<td>Annual cost to police and forensic unit (above) divided by the number of deliberate fires (sources: Fire Damage Report 1 and Fire Damage Report 3).</td>
</tr>
<tr>
<td>Average cost of a Magistrates Court</td>
<td>£1,542</td>
<td>Based on estimates used in the previous model (2004)</td>
</tr>
<tr>
<td>Average cost of a Crown Court</td>
<td>£103,750</td>
<td>Based on estimates used in the previous model (2004)</td>
</tr>
<tr>
<td>Annual average cost per prisoner</td>
<td>£37,395.45</td>
<td>Based on estimates provided by the Ministry of Justice via DCLG</td>
</tr>
<tr>
<td>Monthly average cost per prisoner</td>
<td>£3,116</td>
<td>Based on estimates provided by the Ministry of Justice via DCLG</td>
</tr>
<tr>
<td>Cost of Crime prevention officer</td>
<td>£1,449.64</td>
<td>Based on estimates provided by the Ministry of Justice via DCLG</td>
</tr>
<tr>
<td>Rate of detection</td>
<td>15%</td>
<td>British Crime Survey 2006</td>
</tr>
<tr>
<td>Proportion of police arson incidents that result in a: charge/summons</td>
<td>42%</td>
<td>British Crime Survey 2006</td>
</tr>
<tr>
<td>Proportion of police arson incidents that result in a: caution</td>
<td>32%</td>
<td>British Crime Survey 2006</td>
</tr>
<tr>
<td>Proportion of police arson incidents that result in: taken into consideration</td>
<td>5%</td>
<td>British Crime Survey 2006</td>
</tr>
<tr>
<td>Proportion of police arson incidents that result in a: Penalty notice for disorder</td>
<td>13%</td>
<td>British Crime Survey 2006</td>
</tr>
<tr>
<td>Proportion of police arson incidents that result in a: Non-sanction detection</td>
<td>8%</td>
<td>British Crime Survey 2006</td>
</tr>
<tr>
<td>Proportion of arson cases that go from Magistrates to Crown Court</td>
<td>41%</td>
<td>Based on data in the Crime Statistics 2006 – Ministry of Justice</td>
</tr>
</tbody>
</table>
Table 4.2: Assumptions used to determine the costs as a consequence

<table>
<thead>
<tr>
<th>Assumptions</th>
<th>Estimate</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Magistrates’ Court sentence (months) for arson</td>
<td>3 months</td>
<td>Crime Statistics 2006 – Ministry of Justice</td>
</tr>
<tr>
<td>Average Crown Court sentence for arson (months)</td>
<td>25 months</td>
<td>Crime Statistics 2006 – Ministry of Justice</td>
</tr>
<tr>
<td>Length of sentence served</td>
<td>50%</td>
<td>Based on information from Ministry of Justice provided to DCLG</td>
</tr>
</tbody>
</table>

Prices in this report are all quoted in 2006 prices

4.3 Headline results

Table 4.3 presents the total costs as a consequence of fire in England. This cost was estimated at £3.4bn for 2006. This cost was primarily attributable to the costs of fatal and non-fatal casualties at £1.6bn and property damage at £1.4bn. Costs to the police and prison services of responding to arson resulted in a cost of approximately £400m, and lost business at £35m.

The costs as a consequence of fire for England and Wales were estimated at £2.5bn in 2004, £3.1bn in 2003 and £2.7bn in 2000. The estimated £3.4bn in England for 2006 represents 0.38 per cent of Gross Value Added. As a means of comparison the 2004 model reported that £2.5bn costs as a consequence represented 0.28 per cent of Gross Value Added for England and Wales, and was relatively constant at around 0.36-0.39 per cent of Gross Value Added between the periods 2000-2003. These figures are indicative and should be treated carefully – the 2004 model also included Welsh costs. The variation across the regions is a reflection of the variety in the number of incidences occurring in the different regions and not a reflection on individual Fire and Rescue Services.

---

Table 4.3: Estimates for the costs as a consequence

<table>
<thead>
<tr>
<th>Regions</th>
<th>Total cost to police and prison service of dealing with arson (£m)</th>
<th>Total cost of fatal and non-fatal casualties (£m)</th>
<th>Property damage (£m)</th>
<th>Lost business (£m)</th>
<th>Total costs as a consequence (£m)</th>
<th>Cost per 1,000 population (£)¹</th>
<th>Cost per person (£)¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>North East</td>
<td>£44m</td>
<td>£90m</td>
<td>£93m</td>
<td>£2m</td>
<td>£230m</td>
<td>£90,819</td>
<td>£91</td>
</tr>
<tr>
<td>North West</td>
<td>£92m</td>
<td>£355m</td>
<td>£274m</td>
<td>£7m</td>
<td>£727m</td>
<td>£106,381</td>
<td>£106</td>
</tr>
<tr>
<td>Yorkshire &amp; The Humber</td>
<td>£63m</td>
<td>£174m</td>
<td>£150m</td>
<td>£4m</td>
<td>£391m</td>
<td>£77,505</td>
<td>£78</td>
</tr>
<tr>
<td>East Midlands</td>
<td>£31m</td>
<td>£138m</td>
<td>£106m</td>
<td>£3m</td>
<td>£279m</td>
<td>£64,855</td>
<td>£65</td>
</tr>
<tr>
<td>West Midlands</td>
<td>£49m</td>
<td>£142m</td>
<td>£148m</td>
<td>£4m</td>
<td>£343m</td>
<td>£64,268</td>
<td>£64</td>
</tr>
<tr>
<td>East of England</td>
<td>£26m</td>
<td>£125m</td>
<td>£120m</td>
<td>£3m</td>
<td>£273m</td>
<td>£49,356</td>
<td>£49</td>
</tr>
<tr>
<td>South East</td>
<td>£39m</td>
<td>£194m</td>
<td>£181m</td>
<td>£5m</td>
<td>£419m</td>
<td>£51,249</td>
<td>£51</td>
</tr>
<tr>
<td>South West</td>
<td>£25m</td>
<td>£117m</td>
<td>£132m</td>
<td>£4m</td>
<td>£278m</td>
<td>£54,674</td>
<td>£55</td>
</tr>
<tr>
<td>London</td>
<td>£29m</td>
<td>£274m</td>
<td>£186m</td>
<td>£5m</td>
<td>£494m</td>
<td>£65,315</td>
<td>£65</td>
</tr>
<tr>
<td>England</td>
<td>£399m</td>
<td>£1,608m</td>
<td>£1,391m</td>
<td>£35m</td>
<td>£3,433m</td>
<td>£68,127</td>
<td>£68</td>
</tr>
</tbody>
</table>

¹ Based on regional populations (source: Chartered Institute of Public Finance and Accountancy Fire and Rescue Service statistics 2006/07) reproduced in Appendix E

Please refer to accompanying text for a description of the assumptions used to create this table. Figures may not sum due to rounding.
4.4 Suggestions for further work

Insurance statistics from the Association of British Insurers offer the most comprehensive method of measuring property damage. There are, however, limitations in using these statistics to capture the costs of fire damage. For example, these statistics do not capture values for excesses paid and uninsured losses. Also the public sector tends to self-insure a proportion of their losses which are not recorded in Association of British Insurers’ statistics. Using Association of British Insurers’ statistics alone may therefore underestimate the true costs to the public sector, as (at the time of the research) there was no formal collation of statistics relating to self-insurance payouts. A system of reporting or collecting such data may be helpful to facilitate future estimates of the cost of fire.

When this work was carried out there was little research into the costs of lost business as a result of fire. In particular a better understanding of an appropriate value of ‘redistribution’ is required to improve future estimates of the true value of lost business to the English economy. The range of cost estimates related to arson was greatly expanded for 2006 in comparison to previous estimates (this is set out in Section 6). For example in 2004, criminal justice system costs of only £95m were estimated (£110m in 2006). A simple set of assumptions were used to calculate the remaining elements, but these may not reflect the complexities associated with police investigations to arrest and trial of offenders. Further research is recommended in this respect.
Section 5

Estimates for the Costs in Response

5.1 Introduction

This section presents information concerning the costs associated with responding to fire-related activities (for example, primary and secondary fires and false alarms). False alarms were included – these incidents are treated as actual fires by the Fire and Rescue Service until it is known that the incident is a false alarm\(^{15}\). Non-fire related activities such as Special Service Incidents (e.g. road traffic accidents and flooding) were not included within the costs. This was consistent with previous estimates of the economic costs of fire.

5.2 Method in brief

The detailed method is set out in Appendix C, with a diagram that illustrates how the costs in response were estimated. Table 5.1 provides a brief description of the main elements of the estimate and how these were incorporated in the headline results shown in Section 5.3.

\(^{15}\) The Advisory Board for this project advised Entec of the following: in some circumstances it is evident to the Fire and Rescue Service that a reported fire is a false alarm and less resources will be utilised in response than if the fire is considered an actual fire incident.
### Table 5.1 What is included in the headline results?

<table>
<thead>
<tr>
<th>Cost</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fire and Rescue Service resource costs in</strong></td>
<td>The resource costs of the Fire and Rescue Service were taken directly from the actual expenditure in the Chartered Institute of Public Finance and Accountancy Fire and Rescue Service Statistics for 2006-07. The resource costs were then apportioned by the average staff-hours per incident (average appliance hours x average crew size x number of pumps) and the number of incidents (primary, secondary and false alarms) in that region. When estimating the resource costs of responding to reported incidents, the potential for double counting was taken into account. For example, some resource costs to the Fire and Rescue Service would occur regardless of the number of incidents and these costs were already included in the costs in anticipation (e.g. pension contributions and training expenses and non fire related activities). To estimate the response resource costs the labour costs of fire safety, non-related pay costs and the resources associated with dealing with Special Service Incidents were subtracted from total Fire and Rescue Service resource costs.</td>
</tr>
<tr>
<td><strong>response to fire related incidents</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Capital costs in</strong></td>
<td>Firefighting capital costs (e.g. equipment and vehicles) were taken directly from the actual expenditure in the Chartered Institute of Public Finance and Accountancy Fire and Rescue Service statistics for 2006-07. Unlike the previous version of the Economic Cost of Fire (2004) capital costs of non-fire related activities (e.g. training and Special Service Incidents) were excluded in the capital costs related to responding to incidents. The costs of training were only included in the costs in anticipation, to avoid double counting capital costs. To ensure costs did not include non-fire related activities undertaken by the Fire and Rescue Service, capital costs related to Special Service Incidents were not included in this estimate.</td>
</tr>
<tr>
<td><strong>response to fire related incidents</strong></td>
<td></td>
</tr>
<tr>
<td>Cost Description</td>
<td>Description</td>
</tr>
<tr>
<td>------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Opportunity costs of false alarms</td>
<td>Opportunity costs in the context of false alarms refer to activities that firefighters could have been undertaking if they were not responding to false alarms. This could include for example, training, carrying out home fire risk assessments, vehicle and equipment maintenance and so forth. It would be possible to calculate the loss of wealth associated with not undertaking these activities and the subsequent benefits foregone. It was agreed with the Advisory Board that it was not possible to accurately assign alternative activities (as these vary depending on the time of the incident) and the time lost would be presented. Further analysis could be carried out to understand the opportunity costs associated with this time spent dealing with false alarms, once more information becomes available.</td>
</tr>
<tr>
<td>Attacks on firefighters</td>
<td>It was not possible to extract, from the Chartered Institute of Public Finance and Accountancy Fire and Rescue Service statistics, the costs resulting from attacks on firefighters. For example, the costs of using other retained or voluntary firefighters in the absence of injured firefighters, damage to vehicles and equipment during an attack, the costs of attacks in terms of sick days and medical bills. Therefore whilst these costs were not explicitly monetised, the resource and capital costs of attacks were included within the resource and capital costs. Further details on the types of attacks, their frequency and the impacts of attacks are set out in Appendix C.</td>
</tr>
<tr>
<td>Wider non-fire related activities such as Special Service Incidents</td>
<td>These activities (and the costs associated with these activities) were not included in this report, as this report focussed on the costs of fire related activities.</td>
</tr>
</tbody>
</table>

Every effort was made to estimate the costs in response using official data sources of the Fire and Rescue Service such as Fire Damage Report 1, Fire Damage Report 3 and Chartered Institute of Public Finance and Accountancy Fire and Rescue Service statistics. As a result of some limitations implicit within this data, it was necessary to make several assumptions. These are presented in Table 5.2.
Table 5.2 Assumptions used to determine the costs in response

<table>
<thead>
<tr>
<th>Assumptions</th>
<th>Estimate</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average crew size</td>
<td>4.5 people</td>
<td>This was consistent with the value used in previous models of the economic costs of fire and was agreed with the Advisory Board.</td>
</tr>
<tr>
<td>Proportion of chimney fires that are accidental</td>
<td>100%</td>
<td><a href="http://www.dsfire.gov.uk/NR/rdonlyres/C9CACC66-E2B4-49B6-BDDA-4DA44280F522/0/DeliberatevsAccidental.pdf">http://www.dsfire.gov.uk/NR/rdonlyres/C9CACC66-E2B4-49B6-BDDA-4DA44280F522/0/DeliberatevsAccidental.pdf</a></td>
</tr>
<tr>
<td>Marginal cost of mobilisation (per vehicle)</td>
<td>£0.75</td>
<td>Costs and benefits of alternative responses to Automatic Fire Alarms, Mott McDonald</td>
</tr>
<tr>
<td>Average attendance time for outdoor (secondary) fires</td>
<td>30 minutes</td>
<td>This was not recorded in Fire Damage Report 3 data. Therefore the same estimate used for previous models of the economic costs of fire was used for the 2006 model.</td>
</tr>
<tr>
<td>Average attendance time chimney fires</td>
<td>70 minutes</td>
<td>This was not recorded in Fire Damage Report 3 data. Therefore the same estimate that was used in previous models of the economic costs of fire was used for the 2006 model.</td>
</tr>
<tr>
<td>Number of pumps used for outdoor (secondary) fires is based on the average number of pumps used for building fires</td>
<td>1-3 (depending on the region)</td>
<td>This was not recorded in Fire Damage Report 3 data. This may represent either an over/under estimate. In the absence of better data, this was believed to be an acceptable assumption.</td>
</tr>
</tbody>
</table>
Table 5.2  Assumptions used to determine the costs in response\textsuperscript{16} (continued)

<table>
<thead>
<tr>
<th>Assumptions</th>
<th>Estimate\textsuperscript{1}</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of pumps used for chimney fires is based on the average number of</td>
<td>1-3 (depending on the region)</td>
<td>This was not recorded in Fire Damage Report 3 data. This may represent either an over/under estimate. In the absence of better data, this was believed to be an acceptable assumption.</td>
</tr>
<tr>
<td>pumps used for building fires</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of pumps used for false alarms is based on the average number of</td>
<td>2-3 (depending on the region)</td>
<td>This was not recorded in Fire Damage Report 3 data. This may represent either an over/under estimate. In the absence of better data, this was believed to be an acceptable assumption since most false alarms were treated as real incidents until it was known that they were false alarms.</td>
</tr>
<tr>
<td>pumps used for building and non-building fires</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The proportion (%) of resources devoted to training and fire safety</td>
<td>2-25% (depending on the region)</td>
<td>Chartered Institute of Public Finance and Accountancy Fire and Rescue Service statistics do not breakdown capital costs by Fire and Rescue Service activity. In the absence of better data, this was assumed to be a reasonable assumption which was similar to the approach used in the previous model of the economic costs of fire.</td>
</tr>
<tr>
<td>relative to resource costs is a good equivalent to the capital costs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>devoted to training and fire safety.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\textsuperscript{1} Prices in this report are all quoted in 2006 prices

5.3 Headline results

Table 5.3 shows the headline results for the response costs of fire for 2006. These included the resource and capital costs incurred specifically in response to fire-related activities. The total response costs for England were estimated to be £1.7bn (0.18 per cent of Gross Value Added), with an average response cost per incident in England estimated at £2,412. The variation across the regions is a reflection of the variety in the number of incidences occurring in the different regions and not a reflection on individual Fire and Rescue Services.
### Table 5.3: Estimates for the costs in response

<table>
<thead>
<tr>
<th>Regions</th>
<th>Number of Incidents&lt;sup&gt;1&lt;/sup&gt;</th>
<th>Resource costs&lt;sup&gt;2&lt;/sup&gt; (£m)</th>
<th>Capital costs&lt;sup&gt;2&lt;/sup&gt; (£m)</th>
<th>Total response costs&lt;sup&gt;3&lt;/sup&gt; (£m)</th>
<th>Average response cost (£/incident)</th>
<th>Cost per 1,000 population (£)&lt;sup&gt;4&lt;/sup&gt;</th>
<th>Cost per person (£)&lt;sup&gt;4&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>North East</td>
<td>49,376</td>
<td>£108m</td>
<td>£3m</td>
<td>£112m</td>
<td>£2,259</td>
<td>£44,104</td>
<td>£44</td>
</tr>
<tr>
<td>North West</td>
<td>112,753</td>
<td>£246m</td>
<td>£9m</td>
<td>£254m</td>
<td>£2,256</td>
<td>£37,223</td>
<td>£37</td>
</tr>
<tr>
<td>Yorkshire &amp; The Humber</td>
<td>82,751</td>
<td>£168m</td>
<td>£9m</td>
<td>£176m</td>
<td>£2,129</td>
<td>£34,888</td>
<td>£35</td>
</tr>
<tr>
<td>East Midlands</td>
<td>51,745</td>
<td>£116m</td>
<td>£4m</td>
<td>£120m</td>
<td>£2,327</td>
<td>£28,028</td>
<td>£28</td>
</tr>
<tr>
<td>West Midlands</td>
<td>77,885</td>
<td>£163m</td>
<td>£9m</td>
<td>£172m</td>
<td>£2,207</td>
<td>£32,215</td>
<td>£32</td>
</tr>
<tr>
<td>East Of England</td>
<td>60,699</td>
<td>£155m</td>
<td>£8m</td>
<td>£163m</td>
<td>£2,678</td>
<td>£29,350</td>
<td>£29</td>
</tr>
<tr>
<td>South East</td>
<td>93,835</td>
<td>£243m</td>
<td>£11m</td>
<td>£254m</td>
<td>£2,707</td>
<td>£31,075</td>
<td>£31</td>
</tr>
<tr>
<td>South West</td>
<td>54,958</td>
<td>£136m</td>
<td>£6m</td>
<td>£142m</td>
<td>£2,585</td>
<td>£27,972</td>
<td>£28</td>
</tr>
<tr>
<td>London</td>
<td>106,181</td>
<td>£265m</td>
<td>£7m</td>
<td>£272m</td>
<td>£2,560</td>
<td>£35,941</td>
<td>£36</td>
</tr>
<tr>
<td>England</td>
<td>690,183</td>
<td>£1,600m</td>
<td>£64m</td>
<td>£1,665m</td>
<td>£2,412</td>
<td>£33,033</td>
<td>£33</td>
</tr>
</tbody>
</table>

<sup>1</sup> Excludes Special Service Incidents  
<sup>2</sup> These include the costs associated with attacks on firefighters, vehicles and equipment  
<sup>3</sup> Does not include the opportunity costs of false alarms  
<sup>4</sup> Based on regional populations (source: Chartered Institute of Public Finance and Accountancy Fire and Rescue Service statistics 2006/07)

Please refer to accompanying text for a description of the assumptions used to create this table. Figures may not sum due to rounding.
The Fire and Rescue Service response costs for England and Wales were estimated at £1.74bn in 2004 (0.19 per cent of Gross Value Added), £1.57bn in 2002 and £1.33bn in 2000\(^\text{19}\). These figures are indicative and should be treated carefully – the previous models also included Welsh costs.

As noted earlier, the costs shown in Table 5.3 did not include the opportunity costs of false alarms. Table 5.4 presents the amount of hours ‘lost’ as a result of the Fire and Rescue Service attending false alarms in 2006. The total cost took into account the number of firefighters that typically responded to different types of fires (or in this case, false alarms), and the total time lost to the Fire and Rescue Service in England, estimated at around 1.26m hours or **52,500 full days** (i.e. 24 hour days).

<table>
<thead>
<tr>
<th>Region</th>
<th>Number of false alarms</th>
<th>Average hours lost attending false alarms (per false alarm)</th>
<th>Total hours lost attending false alarms</th>
</tr>
</thead>
<tbody>
<tr>
<td>North East</td>
<td>18,485</td>
<td>3</td>
<td>62,763</td>
</tr>
<tr>
<td>North West</td>
<td>45,989</td>
<td>3</td>
<td>150,788</td>
</tr>
<tr>
<td>Yorkshire &amp; The Humber</td>
<td>37,285</td>
<td>3</td>
<td>127,528</td>
</tr>
<tr>
<td>East Midlands</td>
<td>25,717</td>
<td>3</td>
<td>84,829</td>
</tr>
<tr>
<td>West Midlands</td>
<td>37,777</td>
<td>4</td>
<td>132,811</td>
</tr>
<tr>
<td>East Of England</td>
<td>32,773</td>
<td>3</td>
<td>110,389</td>
</tr>
<tr>
<td>South East</td>
<td>53,599</td>
<td>4</td>
<td>193,760</td>
</tr>
<tr>
<td>South West</td>
<td>29,132</td>
<td>4</td>
<td>105,403</td>
</tr>
<tr>
<td>London</td>
<td>69,089</td>
<td>4</td>
<td>290,531</td>
</tr>
<tr>
<td><strong>England</strong></td>
<td><strong>349,846</strong></td>
<td><strong>4</strong></td>
<td><strong>1,258,803</strong></td>
</tr>
</tbody>
</table>

\(^{1}\) This is based on an average crew size of 4.5 and regional variations of between 2 and 3 for the number of pumps used.

Please refer to accompanying text for a description of the assumptions used to create this table. Figures may not sum due to rounding.

### 5.4 Suggestions for further work

The majority of response costs were based on Fire Damage Report 1, Fire Damage Report 3 and Chartered Institute of Public Finance and Accountancy Fire and Rescue Service Statistics, although several assumptions were necessary in order to segregate costs between Fire and Rescue Service activities across England and those at a regional level. The

analysis of this data could be enhanced through improvements in reporting provided this does not impose a disproportionate administrative burden on Fire and Rescue Services. For example suggestions include: reporting Chartered Institute of Public Finance and Accountancy data in a manner that allows resource and capital expenditure to be allocated to different types of Fire and Rescue Service activities and the reporting of the financial implications regarding attacks on firefighters.

Further research is required, in particular around those impacts that were not monetised, such as understanding the nature of the attacks on firefighters. In relation to the opportunity costs of false alarms, further analysis should be undertaken in order to monetise the benefits foregone from alternative activities the Fire and Rescue Service could be undertaking if they were not responding to a false alarm.
Section 6

Estimates for the economic costs of arson

Table 6.1 shows the headline results for the economic costs of arson for 2006. The costs of arson in England were estimated to be £1.9bn which was approximately 23 per cent of the total cost of fire in 2006. This did not however include the environmental and social costs associated with arson, which were not monetised as part of this study. Arson is already included in the overall costs of fire and these results should not be seen as additional to the costs reported in the Executive Summary. The cost of arson included: human casualties and injuries, Fire and Rescue Service response costs, criminal justice system costs, costs to the police/Crown Prosecution Service, the prison service, property damage and business interruption costs.

The costs of arson for England and Wales (excluding anticipation) were estimated at £1.37bn in 2004 (19 per cent of the total cost of fire in 2004), £1.59bn in 2002 and £1.29bn in 2000\(^2\). As a means of comparison £1.9bn represented 0.21 per cent of Gross Value Added in England in 2006 and the £1.37bn in 2004 represented approximately 0.15 per cent of Gross Value Added for England and Wales. These figures are indicative and should be treated carefully – the previous models also included Welsh costs.

## Table 6.1: Estimates for the economic costs of arson in 2006

<table>
<thead>
<tr>
<th>Region</th>
<th>Anticipation (£m)</th>
<th>Consequence (£m)</th>
<th>Response (£m)</th>
<th>Total (£m)</th>
<th>Cost per 1,000 population (£)¹</th>
<th>Cost per person (£)¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>North East</td>
<td>–</td>
<td>£103m</td>
<td>£58m</td>
<td>£161m</td>
<td>£63,612</td>
<td>£64</td>
</tr>
<tr>
<td>North West</td>
<td>–</td>
<td>£319m</td>
<td>£121m</td>
<td>£440m</td>
<td>£64,387</td>
<td>£64</td>
</tr>
<tr>
<td>Yorkshire &amp; The Humber</td>
<td>–</td>
<td>£170m</td>
<td>£80m</td>
<td>£250m</td>
<td>£49,529</td>
<td>£50</td>
</tr>
<tr>
<td>East Midlands</td>
<td>–</td>
<td>£115m</td>
<td>£44m</td>
<td>£159m</td>
<td>£37,017</td>
<td>£37</td>
</tr>
<tr>
<td>West Midlands</td>
<td>–</td>
<td>£151m</td>
<td>£66m</td>
<td>£217m</td>
<td>£40,603</td>
<td>£41</td>
</tr>
<tr>
<td>East Of England</td>
<td>–</td>
<td>£92m</td>
<td>£44m</td>
<td>£136m</td>
<td>£24,551</td>
<td>£25</td>
</tr>
<tr>
<td>South East</td>
<td>–</td>
<td>£143m</td>
<td>£68m</td>
<td>£211m</td>
<td>£25,845</td>
<td>£26</td>
</tr>
<tr>
<td>South West</td>
<td>–</td>
<td>£83m</td>
<td>£41m</td>
<td>£124m</td>
<td>£24,327</td>
<td>£24</td>
</tr>
<tr>
<td>London</td>
<td>–</td>
<td>£130m</td>
<td>£54m</td>
<td>£184m</td>
<td>£24,372</td>
<td>£24</td>
</tr>
<tr>
<td><strong>England</strong></td>
<td>–</td>
<td>£1,306m</td>
<td>£576m</td>
<td>£1,882m</td>
<td><strong>£37,338</strong></td>
<td><strong>£37</strong></td>
</tr>
</tbody>
</table>

¹ Based on regional populations (source: Chartered Institute of Public Finance and Accountancy Fire and Rescue Service statistics 2006/07) reproduced in Appendix E

Please refer to accompanying text for a description of the assumptions used to create this table. Figures may not sum due to rounding.
Figure 6.1: Estimates for the economic costs of arson in 2006

<table>
<thead>
<tr>
<th>Regions</th>
<th>Consequence (£m)</th>
<th>Response (£m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>London</td>
<td>71%</td>
<td>29%</td>
</tr>
<tr>
<td>South West</td>
<td>67%</td>
<td>33%</td>
</tr>
<tr>
<td>South East</td>
<td>68%</td>
<td>32%</td>
</tr>
<tr>
<td>East Of England</td>
<td>68%</td>
<td>32%</td>
</tr>
<tr>
<td>West Midlands</td>
<td>70%</td>
<td>30%</td>
</tr>
<tr>
<td>East Midlands</td>
<td>72%</td>
<td>28%</td>
</tr>
<tr>
<td>Yorkshire &amp; The Humber</td>
<td>68%</td>
<td>32%</td>
</tr>
<tr>
<td>North West</td>
<td>72%</td>
<td>28%</td>
</tr>
<tr>
<td>North East</td>
<td>64%</td>
<td>36%</td>
</tr>
</tbody>
</table>

Please refer to accompanying text for a description of the assumptions used to create this graph.

Figure 6.1 shows the economic costs of arson estimated at a regional level. For each region, the total costs were broken down to illustrate the costs as a consequence of arson and the costs in response to arson incidents. In this estimate, the majority of the costs associated with arson related to the consequences of arson (discussed in Section 6.2). Costs in anticipation were not estimated, this is discussed further in Section 6.1 below.

### 6.1 Anticipation

Costs related to anticipation were not calculated for arson. It was not possible to accurately apportion the costs of anticipation (such as Fire and Rescue Service capital costs or fire protection in buildings) between those solely attributable to arson as opposed to anticipating the risk of fire in general. It was considered that there was insufficient information available to inform such analysis and this could be an area for future research.
6.2 Consequence

A number of costs as a consequence of arson were identified:

- **Casualties**: The total costs relating to fatal and non-fatal casualties in deliberate fires were estimated at £350m.

- **Property damage**: The value of property damage relating to deliberate fires was assumed to be greater than the value of damage from accidental fires (this assumption was based on evidence from Fire Damage Report 1 data of greater fire spread in deliberate than accidental fires\(^{21}\)). The total cost of property damage in England was estimated at £548m.

- **Lost business**: Deliberate fires which affect businesses also result in losses arising from damage to stock and business interruption. These losses were estimated by the Association of British Insurers to be £10m.

- **Costs of non-detected arsons**: This was estimated using criminal damage detection rates for 2006 (considered the best source of reliable data for the purposes here). This showed that only 15 per cent\(^{22}\) of incidents that were suspected to be deliberate by the Fire and Rescue Service resulted in a suspect being identified by the police. This meant that 85 per cent of arson incidents either had no suspect or were not considered to be arson by the police\(^{23}\). Therefore the costs of non-detected arsons were significant, with the two main cost elements being:

  - **Victim costs for those incidents not reported by the police**: Under the Criminal Damage Act 1971 an incident is only reported as arson by the police if they can prove that persons behaved ‘recklessly’ or ‘intended to damage property’ (and the arsonist is unconnected with the property/vehicle) whereas the Fire and Rescue Service merely have to suspect ignition is deliberate. For these incidents, victim costs were estimated at £754 per incident\(^{24}\) in 2006 prices based on the British Crime Survey (2006).

  - **Police recorded arson incidents with no suspect**: In the absence of a suspect, the only costs estimated were the average costs for the police and Crown Prosecution Service per incident (to investigate the deliberate fire) and victim costs. There was very limited information concerning the average cost to the police and forensic unit related to arson. The crime reduction toolkit\(^{25}\)

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\(^{21}\) This is an assumption. The type of building and contents are likely to affect the value of damage.

\(^{22}\) Using criminal damage (of which arson is included) detection rates as a proxy for arson detection rates may be a slight overestimate but is considered a reasonable assumption in the absence of better data. The research bulletin by the Arson Control Forum, *Arson: From Reporting to Conviction* (March 2003), estimated that detections for arson between 1997-2001/02 ranged from 16 per cent in 1997 to 8 per cent in 2001/02.

\(^{23}\) All deliberate fires are reported by the Fire and Rescue Service to the police, however the police do not record all of these incidents as arson.

\(^{24}\) It is recognised that this may be an underestimate given many incidents will affect more than one person, whilst it would be an overestimate for arson in derelict buildings where there may not be a victim.

estimated that the annual cost to the police and forensic unit for arson in 1996/97 for England and Wales was £92.1m (2006 prices). Based on the number of deliberate fires\textsuperscript{26}, the average costs per arson incident in England\textsuperscript{27} to the police and forensic team were estimated to be £2,655 (in 2006 prices).

- **Charge/summons (criminal justice) costs:** Only a small proportion of arson incidents resulted in a suspect being taken to court\textsuperscript{28}. Criminal justice system costs related to police arson incidents where there was a suspect and they were charged with arson and sent to court for trial. The proportion of detected criminal damage incidents (arson being an element of criminal damage) that resulted in a charge were obtained from the Ministry of Justice report *Criminal Statistics 2006*. There are numerous routes to court for those charged with offences. However, for simplicity and in the absence of more segregated data, it was assumed that all of these incidents were first sent to the magistrates’ court and a proportion of these cases (41\%\textsuperscript{29}) were then committed to the Crown Court. The average costs of both courts were based on inflation adjusted estimates used in the previous model, which were based on estimates originally provided by the Home Office.

- **Cautions:** These related to those incidents where the suspect was cautioned by the police but not sent to court. As before, the proportion was estimated using the *Criminal Statistics 2006* report. For these incidents the costs to the police and the victim were estimated.

- **Taken into consideration:** These related to the costs of those incidents where the incident was ‘taken into consideration’ by the police but where the suspect was released. As before, the proportion was estimated using the *Criminal Statistics 2006* report. For these incidents the costs to the police and the victim were estimated.

- **Penalty notice for disorder:** These related to those incidents where the suspect was given a penalty fine of £80\textsuperscript{30} by the police and the incident did not go to court. As before, the proportion was estimated using the *Criminal Statistics 2006* report. For these incidents the costs to the police and the victim were estimated along with the penalty charge.

\textsuperscript{26} Data provided by DCLG stated that the number of deliberate primary fires in 1996 was 74,861 – but no data was available for secondary fires. Using this figure, could significantly overestimate the police/Crown Prosecution Service costs per arson incident and therefore the number of deliberate fires (all types excluding false alarms) for 2000 where secondary fires were included were used.

\textsuperscript{27} Wales was excluded from the results based on the population of Wales relative to England and Wales.

\textsuperscript{28} It was estimated (using criminal damage detection rates) that only 15 per cent of arson incidents resulted in a suspect being identified and that only 6 per cent of arson incidents resulted in a charge/summons.


\textsuperscript{30} The £80 upper tier was chosen since it includes offences relevant to fire-related incidents (e.g. giving a false alarm, destroying and damaging property).

• **Non-sanction detection**: those incidents where the suspect was detained but subsequently released. As before, the proportion was estimated using the *Criminal Statistics 2006* report. For these incidents the costs to the police and the victim were estimated.

• **Costs to the prison service**: The datasets included with *Criminal Statistics 2006* report included the number of people that were sent to prison via the magistrates’ and Crown Courts for arson and included the average sentence length in months. It was estimated that the average arson sentence from a magistrates’ court was three months and 25 months from a Crown Court. An assumption was made that half the sentence time was served. This information was then used to estimate the cost to the prison service of arson using an average monthly cost per prisoner of £3,116 (2006 prices) and a cost of £1,450 (2006 prices) per starter for a crime prevention officer.  

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31 Data provided by the HM Prison Service (03/06/09) for England and Wales for 2007/08. The average annual costs included costs to both HM Prison Service and National Offender Management Service.
<table>
<thead>
<tr>
<th>Region</th>
<th>Costs of non-detected arsons (£m)</th>
<th>Charge/summons (£m)</th>
<th>Caution (£m)</th>
<th>Taken into consideration (£m)</th>
<th>Penalty notice for disorder (£m)</th>
<th>Non-sanction detection (£m)</th>
<th>Costs to the prison service (£m)</th>
<th>Total cost to police and prison service (£m)</th>
<th>Total cost of fatal and non-fatal casualties (£m)</th>
<th>Property damage (£m)</th>
<th>Lost business (£m)</th>
<th>Total (£m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>North East</td>
<td>£25m</td>
<td>£12m</td>
<td>£0.7m</td>
<td>£0.1m</td>
<td>£0.3m</td>
<td>£0.2m</td>
<td>£6m</td>
<td>£44m</td>
<td>£20m</td>
<td>£38m</td>
<td>£0.69m</td>
<td>£103m</td>
</tr>
<tr>
<td>North West</td>
<td>£52m</td>
<td>£25m</td>
<td>£1.5m</td>
<td>£0.2m</td>
<td>£0.6m</td>
<td>£0.4m</td>
<td>£12m</td>
<td>£92m</td>
<td>£105m</td>
<td>£120m</td>
<td>£2.15m</td>
<td>£319m</td>
</tr>
<tr>
<td>Yorkshire &amp; Humber</td>
<td>£36m</td>
<td>£17m</td>
<td>£1m</td>
<td>£0.2m</td>
<td>£0.4m</td>
<td>£0.3m</td>
<td>£8m</td>
<td>£63m</td>
<td>£37m</td>
<td>£69m</td>
<td>£1.25m</td>
<td>£170m</td>
</tr>
<tr>
<td>East Midlands</td>
<td>£18m</td>
<td>£9m</td>
<td>£0.5m</td>
<td>£0.1m</td>
<td>£0.2m</td>
<td>£0.1m</td>
<td>£4m</td>
<td>£31m</td>
<td>£37m</td>
<td>£46m</td>
<td>£0.75m</td>
<td>£115m</td>
</tr>
<tr>
<td>West Midlands</td>
<td>£28m</td>
<td>£14m</td>
<td>£0.8m</td>
<td>£0.1m</td>
<td>£0.3m</td>
<td>£0.2m</td>
<td>£6m</td>
<td>£49m</td>
<td>£38m</td>
<td>£63m</td>
<td>£1.30m</td>
<td>£151m</td>
</tr>
<tr>
<td>East Of England</td>
<td>£14m</td>
<td>£7m</td>
<td>£0.4m</td>
<td>£0.1m</td>
<td>£0.2m</td>
<td>£0.1m</td>
<td>£3m</td>
<td>£26m</td>
<td>£20m</td>
<td>£46m</td>
<td>£0.78m</td>
<td>£92m</td>
</tr>
<tr>
<td>South East</td>
<td>£22m</td>
<td>£11m</td>
<td>£0.6m</td>
<td>£0.1m</td>
<td>£0.3m</td>
<td>£0.2m</td>
<td>£5m</td>
<td>£39m</td>
<td>£39m</td>
<td>£65m</td>
<td>£1.21m</td>
<td>£143m</td>
</tr>
<tr>
<td>South West</td>
<td>£14m</td>
<td>£7m</td>
<td>£0.4m</td>
<td>£0.1m</td>
<td>£0.2m</td>
<td>£0.1m</td>
<td>£3m</td>
<td>£25m</td>
<td>£9m</td>
<td>£48m</td>
<td>£0.89m</td>
<td>£83m</td>
</tr>
<tr>
<td>London</td>
<td>£17m</td>
<td>£8m</td>
<td>£0.5m</td>
<td>£0.1m</td>
<td>£0.2m</td>
<td>£0.1m</td>
<td>£4m</td>
<td>£29m</td>
<td>£45m</td>
<td>£55m</td>
<td>£0.82m</td>
<td>£130m</td>
</tr>
<tr>
<td>England</td>
<td>£227m</td>
<td>£110m</td>
<td>£6.5m</td>
<td>£1m</td>
<td>£2.7m</td>
<td>£1.6m</td>
<td>£51m</td>
<td>£399m</td>
<td>£349m</td>
<td>£548m</td>
<td>£9.85m</td>
<td>£1,306m</td>
</tr>
</tbody>
</table>

Note: Police and prison service costs exclude malicious false alarms. It was assumed that in most cases there was no suspect. This may represent an underestimation for those malicious false alarms where there was a suspect given this was likely to result in a penalty notice for disorder and in some instances suspects taken to court.

Please refer to accompanying text for a description of the assumptions used to create this table. Figures may not sum due to rounding.
6.3 Response

Based on data provided by Fire Damage Report 1 and Fire Damage Report 3 it was possible to separate the number of fires into deliberate and accidental. For the costs of arson, the results presented refer to deliberate fires only. For chimney fires it was assumed that all fires were accidental. Resource costs of malicious false alarms were included.

<table>
<thead>
<tr>
<th>Regions</th>
<th>Number of deliberate Incidents¹</th>
<th>Resource costs² (£m)</th>
<th>Capital costs² (£m)</th>
<th>Total response costs³ (£m)</th>
<th>Average response cost (£/incident)</th>
</tr>
</thead>
<tbody>
<tr>
<td>North East</td>
<td>25,723</td>
<td>£56m</td>
<td>£2m</td>
<td>£58m</td>
<td>£2,259</td>
</tr>
<tr>
<td>North West</td>
<td>53,700</td>
<td>£117m</td>
<td>£4m</td>
<td>£121m</td>
<td>£2,256</td>
</tr>
<tr>
<td>Yorkshire &amp; The Humber</td>
<td>37,442</td>
<td>£76m</td>
<td>£4m</td>
<td>£80m</td>
<td>£2,129</td>
</tr>
<tr>
<td>East Midlands</td>
<td>19,063</td>
<td>£43m</td>
<td>£1m</td>
<td>£44m</td>
<td>£2,327</td>
</tr>
<tr>
<td>West Midlands</td>
<td>29,794</td>
<td>£62m</td>
<td>£4m</td>
<td>£66m</td>
<td>£2,207</td>
</tr>
<tr>
<td>East Of England</td>
<td>16,370</td>
<td>£42m</td>
<td>£2m</td>
<td>£44m</td>
<td>£2,678</td>
</tr>
<tr>
<td>South East</td>
<td>25,075</td>
<td>£65m</td>
<td>£3m</td>
<td>£68m</td>
<td>£2,707</td>
</tr>
<tr>
<td>South West</td>
<td>15,780</td>
<td>£39m</td>
<td>£2m</td>
<td>£41m</td>
<td>£2,585</td>
</tr>
<tr>
<td>London</td>
<td>21,143</td>
<td>£53m</td>
<td>£1m</td>
<td>£54m</td>
<td>£2,560</td>
</tr>
<tr>
<td>England</td>
<td>244,090</td>
<td>£553m</td>
<td>£23m</td>
<td>£576m</td>
<td>£2,358</td>
</tr>
</tbody>
</table>

¹ Excludes Special Service Incidents
² These indirectly include the costs associated with attacks on firefighters, vehicles and equipment
³ Does not include the opportunity costs of false alarms

Please refer to accompanying text for a description of the assumptions used to create this table. Figures may not sum due to rounding.
Section 7

Estimates for the cost of fire by building type/non-building and by region

7.1 Estimated costs by type of building/non-building

This section provides an overview of the average cost of a fire broken down by building type and non-building. These estimates include costs as a consequence and in response only and not costs in anticipation. Consequential and response costs related to the number of fires in each building type and were based on Fire Damage Report 1 data. Costs in anticipation, however, related not to the number of fires but to the total number of each type of building. For example, the cost of installing fire protection in buildings depends on the total number of buildings that protection is installed in regardless of the number of fires that actually occur. A detailed breakdown of building stock and its regional distribution was not available and therefore total costs in anticipation were not apportioned by building types and region. These costs were therefore not estimated, which was consistent with the 2004 model.

Table 7.1 summarises the average cost of fire by building type/non-building and region. Non-building fires refer to outdoor fires and fires in structures including post boxes, tunnels, bridges, etc.32

---

Table 7.1: Estimates of the average cost of fire by type of building (consequence and response)

<table>
<thead>
<tr>
<th></th>
<th>North East</th>
<th>North West</th>
<th>Yorkshire &amp; the Humber</th>
<th>East Midlands</th>
<th>West Midlands</th>
<th>East of England</th>
<th>South East</th>
<th>South West</th>
<th>London</th>
<th>England</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domestic</td>
<td>£28,234</td>
<td>£39,072</td>
<td>£43,300</td>
<td>£39,670</td>
<td>£38,244</td>
<td>£41,490</td>
<td>£37,002</td>
<td>£34,949</td>
<td>£45,670</td>
<td>£39,287</td>
</tr>
<tr>
<td>Total Commercial</td>
<td>£55,580</td>
<td>£60,364</td>
<td>£55,777</td>
<td>£63,061</td>
<td>£53,915</td>
<td>£52,301</td>
<td>£57,640</td>
<td>£58,428</td>
<td>£60,541</td>
<td>£57,731</td>
</tr>
<tr>
<td>Public sector</td>
<td>£45,750</td>
<td>£50,947</td>
<td>£58,689</td>
<td>£54,623</td>
<td>£49,870</td>
<td>£56,416</td>
<td>£53,150</td>
<td>£51,450</td>
<td>£54,896</td>
<td>£52,867</td>
</tr>
<tr>
<td>Total non-building</td>
<td>£5,536</td>
<td>£5,798</td>
<td>£4,228</td>
<td>£6,332</td>
<td>£4,496</td>
<td>£4,937</td>
<td>£5,682</td>
<td>£5,379</td>
<td>£4,384</td>
<td>£5,180</td>
</tr>
</tbody>
</table>

These estimates include costs relating to consequence and response only (includes the average cost of arson).
Non building fires costs did not include costs related to property damage as this data was not reported on or disaggregated in the Association of British Insurers data.

Please refer to accompanying text for a description of the assumptions used to create this table. Figures may not sum due to rounding.
Figure 7.1 and Figure 7.2 illustrate the variation in average cost by building type estimated in the model. The greatest average costs were associated with commercial buildings, both overall (shown in Figure 7.1) and across each of the regions (see Figure 7.2).

Comparing the average building costs by region (as seen in Figure 7.2) showed that London had the highest average costs overall associated with fires whilst the North East in general had the lowest costs per fire.

An important contributing factor to the higher costs in commercial buildings was the inclusion of the costs of lost business. Business loss costs (based on Association of British Insurers insurance claims) were not attributed to domestic fires or fires in public buildings. The higher costs for public buildings than for domestic buildings may potentially reflect the general nature and scale of public premises.

![Figure 7.1: Estimates of the average cost of fire by building type](image)

Source: Entec UK Ltd. Please refer to accompanying text for a description of the assumptions used to create this graph.

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33 Fire Damage Report 1 data does not provide further definition of ‘other’ and ‘unspecified’ buildings. Considering the uncertainty about which buildings were included in these classifications, it was considered more appropriate to omit ‘other’ and ‘unspecified’ buildings from the analysis here.
7.2 Regional variation in estimated costs

The regional breakdown of the costs of fire across England is examined in this sub-section. Of the three cost elements the greatest degree of variation related to costs as a consequence of fire and the smallest degree of variation was observed in costs in response. The average cost across all regions for each cost element was £344m for anticipation, £381m for consequence and £185m for costs in response.
### Table 7.2: Ranking of regions by estimated cost

<table>
<thead>
<tr>
<th>Region</th>
<th>Cost</th>
<th>Region</th>
<th>Cost</th>
<th>Region</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anticipation</td>
<td></td>
<td>Consequence</td>
<td></td>
<td>Response</td>
<td></td>
</tr>
<tr>
<td>South East</td>
<td>£529m</td>
<td>North West</td>
<td>£727m</td>
<td>London</td>
<td>£272m</td>
</tr>
<tr>
<td>London</td>
<td>£431m</td>
<td>London</td>
<td>£494m</td>
<td>South East</td>
<td>£254m</td>
</tr>
<tr>
<td>South West</td>
<td>£378m</td>
<td>South East</td>
<td>£419m</td>
<td>North West</td>
<td>£254m</td>
</tr>
<tr>
<td>East of England</td>
<td>£376m</td>
<td>Yorkshire &amp; the Humber</td>
<td>£391m</td>
<td>Yorkshire &amp; the Humber</td>
<td>£176m</td>
</tr>
<tr>
<td>North West</td>
<td>£366m</td>
<td>West Midlands</td>
<td>£343m</td>
<td>West Midlands</td>
<td>£172m</td>
</tr>
<tr>
<td>East Midlands</td>
<td>£328m</td>
<td>East Midlands</td>
<td>£279m</td>
<td>East of England</td>
<td>£163m</td>
</tr>
<tr>
<td>Yorkshire &amp; the Humber</td>
<td>£300m</td>
<td>South West</td>
<td>£278m</td>
<td>South West</td>
<td>£142m</td>
</tr>
<tr>
<td>West Midlands</td>
<td>£269m</td>
<td>East of England</td>
<td>£273m</td>
<td>East Midlands</td>
<td>£120m</td>
</tr>
<tr>
<td>North East</td>
<td>£121m</td>
<td>North East</td>
<td>£230m</td>
<td>North East</td>
<td>£112m</td>
</tr>
</tbody>
</table>

Source: Entec UK Ltd. Please refer to accompanying text for a description of the assumptions used to create this table. Figures may not sum due to rounding.

The scope of the study excluded any requirement for a detailed analysis of the regional variations. However, the variation in some of the underlying input data which was used in the regional cost estimates is set out here. Key input data included: regional population; number and type of incidents; and casualties.
Regional population, 2006

Figure 7.3 below illustrates the total population of each region. The three most highly populated regions were the South East, London and the North West.

Source: Mid-year population estimates, Office for National Statistics.
Figure 7.4 shows the population density for each region. This shows London far exceeded all other regions in terms of the number of people per hectare. The other most densely populated regions after London were the North West and the South East.

Source: Office for National Statistics.
**Incidents by region, 2006**

Figure 7.5 shows the variation in the number of accidental and deliberate incidents across each region as recorded by Fire Damage Report 1 data. The North West region had the greatest number of deliberate incidents whilst London had the greatest number of accidental fires.

<table>
<thead>
<tr>
<th>Region</th>
<th>Deliberate</th>
<th>Accidental</th>
</tr>
</thead>
<tbody>
<tr>
<td>London</td>
<td></td>
<td></td>
</tr>
<tr>
<td>South West Region</td>
<td></td>
<td></td>
</tr>
<tr>
<td>South East Region</td>
<td></td>
<td></td>
</tr>
<tr>
<td>East of England Region</td>
<td></td>
<td></td>
</tr>
<tr>
<td>West Midlands Region</td>
<td></td>
<td></td>
</tr>
<tr>
<td>East Midlands Region</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yorkshire &amp; the Humber Region</td>
<td></td>
<td></td>
</tr>
<tr>
<td>North West Region</td>
<td></td>
<td></td>
</tr>
<tr>
<td>North East Region</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Fire Damage Report 1 data, DCLG (2008). Please refer to accompanying text for a description of the assumptions used to create this graph.
Casualties, by region, 2006
Figure 7.6 presents the number of fatal and non-fatal casualties from fire incidents by region as recorded by Fire Damage Report 1 data. The North West and London regions experienced the greatest number of injuries.

Source: Fire Damage Report 1 data, DCLG (2008). Please refer to accompanying text for a description of the assumptions used to create this graph.
Section 8

Headline estimates

This 2006 update of the total economic cost of fire to England follows on from previous models in this regard undertaken in 2000, 2002 and 2004. The 2006 model differed from previous models in the following respect: some of the underlying assumptions; additional costs; and the exclusion of Wales. The costs of fire in England for 2006 were estimated at £8.2bn. This included both deliberate and accidental fires (and false alarms). Of this total cost arson accounted for £1.9bn, or 23 per cent, of the total cost of fire. There was a considerable variation in the costs between regions, the greatest variation was observed in costs as a consequence and the least variation observed in costs in response.

The economic costs of fire for England and Wales were estimated at £7.03bn in 2004, £7.19bn in 2002 and £6.3bn in 2000. As a means of comparison, £8.2bn cost for 2006 represented 0.9 per cent of Gross Value Added in England and the £7.03bn costs reported in 2004 model for in England and Wales represented approximately 0.78 per cent of Gross Value Added. These figures are indicative and should be treated carefully, as the previous models also included Welsh costs. Table 8.1 shows the headline results for the economic costs of fire for 2006.
<table>
<thead>
<tr>
<th>Region</th>
<th>Anticipation (£m)</th>
<th>Consequence (£m)</th>
<th>Response (£m)</th>
<th>Total (£m)</th>
<th>Cost per 1,000 population (£)</th>
<th>Cost per person in the population (£)</th>
</tr>
</thead>
<tbody>
<tr>
<td>North East</td>
<td>£121</td>
<td>£230</td>
<td>£112</td>
<td>£463</td>
<td>£182,882</td>
<td>£183</td>
</tr>
<tr>
<td>North West</td>
<td>£366</td>
<td>£727</td>
<td>£254</td>
<td>£1,347</td>
<td>£197,168</td>
<td>£197</td>
</tr>
<tr>
<td>Yorkshire &amp; the Humber</td>
<td>£300</td>
<td>£391</td>
<td>£176</td>
<td>£868</td>
<td>£171,861</td>
<td>£172</td>
</tr>
<tr>
<td>East Midlands</td>
<td>£328</td>
<td>£279</td>
<td>£120</td>
<td>£727</td>
<td>£169,316</td>
<td>£169</td>
</tr>
<tr>
<td>West Midlands</td>
<td>£269</td>
<td>£343</td>
<td>£172</td>
<td>£784</td>
<td>£146,900</td>
<td>£147</td>
</tr>
<tr>
<td>East of England</td>
<td>£376</td>
<td>£273</td>
<td>£163</td>
<td>£812</td>
<td>£146,658</td>
<td>£147</td>
</tr>
<tr>
<td>South East</td>
<td>£529</td>
<td>£419</td>
<td>£254</td>
<td>£1,202</td>
<td>£147,033</td>
<td>£147</td>
</tr>
<tr>
<td>South West</td>
<td>£378</td>
<td>£278</td>
<td>£142</td>
<td>£798</td>
<td>£157,141</td>
<td>£157</td>
</tr>
<tr>
<td>London</td>
<td>£431</td>
<td>£494</td>
<td>£272</td>
<td>£1,197</td>
<td>£158,239</td>
<td>£158</td>
</tr>
<tr>
<td>National Average</td>
<td>£344</td>
<td>£381</td>
<td>£185</td>
<td>£911</td>
<td>£164,133</td>
<td>£164</td>
</tr>
<tr>
<td>England</td>
<td>£3,099</td>
<td>£3,433</td>
<td>£1,665</td>
<td>£8,197</td>
<td>£162,662</td>
<td>£163</td>
</tr>
</tbody>
</table>
Figure 8.1 does not include the environmental and social costs associated with fire, which were not monetarised as part of this study. These are discussed in Appendix B.

**Figure 8.1: Estimates for the economic costs of fire in 2006**

Below, the average consequential and response costs of fire are presented (the average cost per fire):
Table 8.2: Average consequential and response costs per fire in 2006 (2006 prices)

<table>
<thead>
<tr>
<th>England</th>
<th>2006</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Consequential costs</strong></td>
<td></td>
</tr>
<tr>
<td>Property damage per fire</td>
<td>£2,016</td>
</tr>
<tr>
<td>Lost business per fire</td>
<td>£51</td>
</tr>
<tr>
<td>Cost of fatalities per fire*</td>
<td>£951</td>
</tr>
<tr>
<td>Cost of injuries per fire*</td>
<td>£1,378</td>
</tr>
<tr>
<td>Criminal Justice System costs per fire**</td>
<td>£159</td>
</tr>
<tr>
<td>Costs to police per fire**</td>
<td>£17</td>
</tr>
<tr>
<td>Costs to the prison service per fire**</td>
<td>£74</td>
</tr>
<tr>
<td>Cost of non-detected arson per fire**</td>
<td>£328</td>
</tr>
<tr>
<td><strong>Average consequence cost per fire</strong></td>
<td>£4,974</td>
</tr>
<tr>
<td><strong>Response costs</strong></td>
<td></td>
</tr>
<tr>
<td>Response cost per fire</td>
<td>£2,412</td>
</tr>
</tbody>
</table>

* These averages include fires where there were no fatalities or injuries
** This average is calculated across all fires, not just deliberate fires
In table 8.3 the same information is presented broken down by the English Regions:

<table>
<thead>
<tr>
<th>Region</th>
<th>Property damage per fire</th>
<th>Lost business per fire</th>
<th>Cost of fatalities per fire</th>
<th>Cost of injuries per fire</th>
<th>Criminal Justice System costs per fire</th>
<th>Costs to police per fire</th>
<th>Costs to the prison service per fire</th>
<th>Cost of non-detected arson per fire</th>
<th>Average consequence cost per fire</th>
<th>Response cost per fire</th>
</tr>
</thead>
<tbody>
<tr>
<td>North East</td>
<td>£1,886</td>
<td>£46</td>
<td>£955</td>
<td>£864</td>
<td>£248</td>
<td>£27</td>
<td>£115</td>
<td>£511</td>
<td>£4,653</td>
<td>£2,259</td>
</tr>
<tr>
<td>North West</td>
<td>£2,430</td>
<td>£58</td>
<td>£1,335</td>
<td>£1,809</td>
<td>£224</td>
<td>£24</td>
<td>£104</td>
<td>£463</td>
<td>£6,446</td>
<td>£2,256</td>
</tr>
<tr>
<td>Yorkshire &amp; the Humber</td>
<td>£1,815</td>
<td>£46</td>
<td>£864</td>
<td>£1,239</td>
<td>£211</td>
<td>£23</td>
<td>£98</td>
<td>£435</td>
<td>£4,729</td>
<td>£2,129</td>
</tr>
<tr>
<td>East Midlands</td>
<td>£2,056</td>
<td>£56</td>
<td>£1,263</td>
<td>£1,402</td>
<td>£167</td>
<td>£18</td>
<td>£77</td>
<td>£344</td>
<td>£5,384</td>
<td>£2,327</td>
</tr>
<tr>
<td>West Midlands</td>
<td>£1,901</td>
<td>£51</td>
<td>£917</td>
<td>£900</td>
<td>£174</td>
<td>£19</td>
<td>£81</td>
<td>£360</td>
<td>£4,403</td>
<td>£2,207</td>
</tr>
<tr>
<td>East of England</td>
<td>£1,979</td>
<td>£51</td>
<td>£877</td>
<td>£1,176</td>
<td>£116</td>
<td>£12</td>
<td>£54</td>
<td>£239</td>
<td>£4,503</td>
<td>£2,678</td>
</tr>
<tr>
<td>South East</td>
<td>£1,932</td>
<td>£49</td>
<td>£864</td>
<td>£1,207</td>
<td>£113</td>
<td>£12</td>
<td>£53</td>
<td>£234</td>
<td>£4,464</td>
<td>£2,707</td>
</tr>
<tr>
<td>South West</td>
<td>£2,404</td>
<td>£65</td>
<td>£830</td>
<td>£1,301</td>
<td>£125</td>
<td>£13</td>
<td>£58</td>
<td>£258</td>
<td>£5,054</td>
<td>£2,585</td>
</tr>
<tr>
<td>London</td>
<td>£1,750</td>
<td>£43</td>
<td>£666</td>
<td>£1,915</td>
<td>£76</td>
<td>£8</td>
<td>£35</td>
<td>£157</td>
<td>£4,652</td>
<td>£2,560</td>
</tr>
<tr>
<td>England</td>
<td>£2,016</td>
<td>£51</td>
<td>£951</td>
<td>£1,378</td>
<td>£159</td>
<td>£17</td>
<td>£74</td>
<td>£328</td>
<td>£4,974</td>
<td>£2,412</td>
</tr>
</tbody>
</table>

* These averages include fires where there were no fatalities or injuries
** This average is calculated across all fires, not just deliberate fires
# Glossary

This section provides a definition of the some important terms used in this report. The descriptions are drawn from formally recognised definitions where appropriate and how they are used in the context of this study.

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accidental fires</td>
<td>A fire where the most likely cause was defined in Fire Damage Report 1 report as ‘accidental’ and includes reports which were ‘not known’ or were unspecified.</td>
</tr>
<tr>
<td>Appliance hours</td>
<td>‘Appliance hours’ are intended to approximate the time spent dealing with fires and include the time taken from the record of the incident starting, time to mobilise and tackle the fire until the incident ceased/ was controlled. This is an approximation and excludes where further investigations take place after the incident or where some appliances stay longer at an incident.</td>
</tr>
</tbody>
</table>
| Casualties            | Persons requiring medical treatment beyond first aid given at the scene of the fire, and those sent to hospital or advised to see a doctor for a check-up or observation. People who are advised to see a doctor, with no obvious injury, are recorded as precautionary check-ups. Casualties are broken down into two categories:  
  - **Serious casualties:** An injury for which a person is detained in hospital as an “in-patient”, or any of the following injuries whether or not they are detained in hospital: fractures, concussion, internal injuries, crushings, burns (excluding friction burns), severe cuts and lacerations, severe general shock requiring medical treatment and injuries causing death 30 or more days after the accident.  
  - **Slight casualties:** An injury of a minor character such as a sprain (including neck whiplash injury), bruise or cut which are not judged to be severe, or slight shock requiring roadside attention. This definition includes injuries not requiring medical treatment. |
<p>| Deliberate fires      | Fires where the most likely cause was defined in Fire Damage Report 1 report was deliberate and includes fires where deliberate ignition is merely suspected and recorded by the Fire and Rescue Service as “doubtful”. |</p>
<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
</table>
| False alarms                  | In this instance this is taken to be an event in which the Fire and Rescue Service believes to be a reportable fire and then finds there is no such incident. This is also defined, in the context of alarms raised from automatic fire-alarm and fire-detection systems, as a fire signal resulting from a cause other than fire. Deliberate false alarms include malicious false alarms:  
  - Malicious false alarms arise from a malicious use of a call point (manual or automated activation switch) or phone call.  
Accidental false alarms include unwanted alarms, equipment false alarms, and false alarms with good intent:  
  - False alarms with good intent occur when an individual suspects there is a real fire and raises the alarm  
  - Equipment false alarms are alarms due to faults with fire-alarm and fire-detection systems  
  - Unwanted alarms are alarms caused by, for example fumes from cooking, steam, tobacco, dust, insects, etc. ‘Unknown’ false alarms are where the cause of the false alarm is not certain. |
<p>| Fatality                      | A person whose death is attributed to a fire even if death occurred some time after the event.                                                                                                             |
| Fire Damage Report 1 data     | Fire Damage Report 1 is a fire incident reporting form used by the fire and rescue services to report on primary fires attended. It includes a record of the details of the incident (such as time, duration, alarm location), how the fire was controlled, the supposed cause and damage relating to the fire, as well as details of casualties/persons/property affected. Much of this data is used to inform the annual Fire Statistics bulletins. |
| Fire Damage Report 3 data     | Fire Damage Report 3 is a monthly fire incident reporting form used by Fire and Rescue Services for reporting secondary fires, chimney fires and false alarms (those incidents not reported on the Fire Damage Report 1 form). |
| Fire and Rescue Service capital costs | Firefighting capital costs (such as; equipment and vehicles) to the Fire and Rescue Service have been taken directly from the actual expenditure in the Chartered Institute of Public Finance and Accountancy Fire and Rescue Service Statistics for 2006-07. |
| Fire and Rescue Service resource costs | These are the resource costs (such as salaries) of the Fire and Rescue Service. The total Fire and Rescue Service resource cost was taken directly from expenditure reported in the Chartered Institute of Public Finance and Accountancy Fire and Rescue Service Statistics for 2006-07. |</p>
<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross Value Added</td>
<td>Gross Value Added is a measure of the total economic value of goods and services produced in an area or sector of an economy minus the cost of the raw materials and other inputs used to produce them. This, therefore, measures the contribution or value added and can be used as a measure of economic performance.</td>
</tr>
<tr>
<td>Marginal costs</td>
<td>In the context of fire, the marginal cost would refer to the cost of an additional fire. This differs from the average cost of fire as this based on the costs of all fires divided by the number of fires. Since average costs include sharing fixed capital costs (for example vehicles) the average costs will be higher than the marginal cost of fire.</td>
</tr>
<tr>
<td>Non-sanction detection</td>
<td>The police record the levels of crimes that are detected and use a number of definitions to define how detections can be claimed. A ‘non-sanction detection’ means that a crime was detected by the police and there was sufficient evidence to charge for a crime but the police took no further action as a result of circumstances. For example, if the crime was undertaken by a child under the age of criminal responsibility.</td>
</tr>
<tr>
<td>Opportunity cost</td>
<td>Opportunity cost is the value of the next best alternative foregone as the result of making a decision. In the context of this report, opportunity costs were used for false alarms and referred to activities that firefighters could have undertaken if they were not responding to false alarms. This could include, for example, further training, carrying out home fire risk assessments, or vehicle and equipment maintenance.</td>
</tr>
<tr>
<td>Penalty notices for disorder</td>
<td>A type of one-off fine issued for anti-social behavior. Penalty notices for disorder are issued for serious offences, such as throwing fireworks or being drunk and disorderly. These notices can be issued to anyone over 16 years old. Fixed penalty notices are the other type of notice and can be issued for more minor, mostly environmental offences. Penalty notices are not the same as criminal convictions. However, failure to pay fines may result in a higher fines, or imprisonment.</td>
</tr>
<tr>
<td>Term</td>
<td>Definition</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Primary fires</td>
<td>These are defined in Fire Statistics UK 2006 (DCLG) as reportable fires (as listed below) or any fires involving casualties, rescues, or fires attended by five or more appliances. An appliance is counted if either the appliance, equipment from it or personnel riding on it, were used to fight the fire. Fires are categorised as follows: • buildings • caravans, trailers, etc • vehicles and other modes of transport • outdoor storage, plant and machinery • agricultural and forestry premises and property and • other outdoor structures including post boxes, tunnels, bridges, etc.</td>
</tr>
<tr>
<td>Pumps</td>
<td>In the context of this study, the number of pumps was used as a proxy for the number of appliances used at an incident. This data is recorded in Fire Damage Report 1 for primary fires in building and outdoor fires.</td>
</tr>
<tr>
<td>Regulatory Reform (Fire Safety) Order 2005</td>
<td>The Fire Safety Order came into effect in October 2006. It applies to all non-domestic premises in England including workplaces, public buildings and others to which the public have access. It also applies to the common parts of blocks of flats and houses in multiple occupation, but not to the individual dwellings. Under the Fire Safety Order, a responsible person (usually the employer, owner, or occupier, and/or a contractor with a degree of control over the premises) is required to carry out a fire safety risk assessment and implement and maintain fire safety measures which are sufficient to protect the lives of those on, or in the vicinity of, the premises in the event of a fire.</td>
</tr>
<tr>
<td>Average crew size</td>
<td>In the context of this study, this refers to the average number of firefighters per appliance.</td>
</tr>
<tr>
<td>Sanction detection</td>
<td>The police record the levels of crimes that are detected and use a number of definitions to define how detections can be claimed. A ‘sanction detection’ involves a sanction (a provision of a law), for example where an offender has received a summons, charge, caution or a penalty notice.</td>
</tr>
<tr>
<td>Secondary fires</td>
<td>These are defined in Fire Statistics UK 2006 (DCLG) as reportable fires that • Were not in primary fire locations • Were not chimney fires in buildings • Did not involve casualties or rescues and • Were attended by four or fewer appliances.</td>
</tr>
<tr>
<td>Term</td>
<td>Definition</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Value of a life year</td>
<td>A measure of the value of life based on total value of life but taking into account age and life expectancy.</td>
</tr>
<tr>
<td>Value of a statistical life</td>
<td>A monetary value of human life. In this report we use an approach developed by the Department for Transport.</td>
</tr>
</tbody>
</table>
Appendix A

Costs in anticipation

This appendix details the methodology used to calculate various costs associated with anticipation of fires in England.

A1.1 Fire protection in buildings

The cost of implementing fire protection in buildings included consideration of the costs of implementing both active and passive fire protection.

- **Active protection** – This refers to fire detection and alarm systems, fixed fire extinguishing systems, water sprinkler, spray systems, and so forth
- **Passive protection** – This refers to fire engineering safety design in buildings and includes elements such as structural fire protection, fire doors, flame retardant coatings, fire resistant partitions and suspended ceilings.

Each element of fire protection includes cost considerations such as product, installation and maintenance costs. These were estimated in a research document produced by the Fire Industry Association which calculated the total value of the UK fire protection industry in 2006 entitled *Survey of the Active and Passive Fire Protection Markets*.

This total value for the market was then broken down on a regional basis making use of the number of domestic new builds by region (from DCLG housing data). The rate of new build was taken as a proxy to represent all building activity in each region as there was a lack of publicly available data relating to new builds in the public and commercial sectors. Using the new build activity rate incorrectly assumed that all of the active and passive markets related to new buildings whereas a portion of each market related to maintenance in existing buildings. Again, however, a lack of data prevented this level of analysis from being undertaken.
The total estimated costs are shown in the table below:

<table>
<thead>
<tr>
<th>Regions</th>
<th>Active protection (£m)</th>
<th>Passive protection (£m)</th>
<th>Total protection (£m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>North East</td>
<td>£35m</td>
<td>£56m</td>
<td>£92m</td>
</tr>
<tr>
<td>North West</td>
<td>£112m</td>
<td>£179m</td>
<td>£291m</td>
</tr>
<tr>
<td>Yorkshire &amp; the Humber</td>
<td>£94m</td>
<td>£151m</td>
<td>£245m</td>
</tr>
<tr>
<td>East Midlands</td>
<td>£108m</td>
<td>£174m</td>
<td>£282m</td>
</tr>
<tr>
<td>West Midlands</td>
<td>£80m</td>
<td>£128m</td>
<td>£208m</td>
</tr>
<tr>
<td>East of England</td>
<td>£122m</td>
<td>£195m</td>
<td>£317m</td>
</tr>
<tr>
<td>South East</td>
<td>£170m</td>
<td>£272m</td>
<td>£442m</td>
</tr>
<tr>
<td>South West</td>
<td>£124m</td>
<td>£198m</td>
<td>£321m</td>
</tr>
<tr>
<td>London</td>
<td>£134m</td>
<td>£215m</td>
<td>£349m</td>
</tr>
<tr>
<td><strong>England</strong></td>
<td><strong>£979m</strong></td>
<td><strong>£1,567m</strong></td>
<td><strong>£2,546m</strong></td>
</tr>
</tbody>
</table>

Please refer to accompanying text for a description of the assumptions used to create this table. Figures may not sum due to rounding.

**A1.2 Costs to responsible person**

The Fire Safety Order came into effect in October 2006. It applies to all non-domestic premises in England including workplaces, public buildings and others to which the public have access. It also applies to the common parts of blocks of flats and houses in multiple occupation, but not to the individual dwellings. Under the Fire Safety Order, a responsible person (usually the employer, owner, or occupier, and/or a contractor with a degree of control over the premises) is required to carry out a fire safety risk assessment and implement and maintain fire safety measures which are sufficient to protect the lives of those on, or in the vicinity, of the premises in the event of a fire.

It was agreed in discussion with DCLG that the Fire Safety Order was outside the scope of this study. Costs were therefore estimated for 2006 for complying with legislation before the Fire Safety Order came into effect in October 2006. This exclusion was agreed because the costs associated with the Fire Safety Order were considered to be difficult to determine and would not represent a true annual cost since the legislation came into effect late in 2006. Although it was decided that this cost would not be estimated in the 2006 Cost of Fire Model, it should be taken into account in any future updates of the model.
A1.3 Total insurance administration

The data relating to administrative costs of processing claims premiums was not available from the Association of British Insurers. Therefore the values used in the 2004 model were used for the 2006 model and these were up-scaled (to 2006 values) with the rate of inflation. Thus, these costs only related to costs captured by the Association of British Insurers and did not capture those administrative-related expenses for self-insurance in the public sector. This approach only took into account increases due to inflation and not increases in the number of claims, however there was insufficient data available to take this into account.

<table>
<thead>
<tr>
<th>Regions</th>
<th>Total cost (£m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>North East</td>
<td>£27m</td>
</tr>
<tr>
<td>North West</td>
<td>£72m</td>
</tr>
<tr>
<td>Yorkshire &amp; the Humber</td>
<td>£53m</td>
</tr>
<tr>
<td>East Midlands</td>
<td>£45m</td>
</tr>
<tr>
<td>West Midlands</td>
<td>£55m</td>
</tr>
<tr>
<td>East of England</td>
<td>£58m</td>
</tr>
<tr>
<td>South East</td>
<td>£84m</td>
</tr>
<tr>
<td>South West</td>
<td>£55m</td>
</tr>
<tr>
<td>London</td>
<td>£76m</td>
</tr>
<tr>
<td><strong>England</strong></td>
<td><strong>£524m</strong></td>
</tr>
</tbody>
</table>

Please refer to accompanying text for a description of the assumptions used to create this table. Figures may not sum due to rounding.

A1.4 Total fire service safety activity (labour)

This refers to the total cost of fire service activity undertaken by the Fire and Rescue Service in anticipation of fires and included Inspections + Community fire safety hours + Fire investigation. Fire safety labour costs were determined by multiplying the average fire safety labour cost (£/h) by the total number of hours spent on fire safety. The total number of hours spent on fire safety was determined by summing the hours spent on: fire safety activities, fire investigations and community fire safety. This data was provided by DCLG at a county level and was aggregated up to a regional level. The average cost of fire safety was estimated at £14.81/hr (2006 prices), based on an estimate of £14.35 (2005 prices) from the Cabinet Office Better Regulation Executive *Measuring Administrative Costs: UK Standard Cost Model Manual* (2005). This estimate related to leading fire service officer and grades below. It included a 30 per cent overhead which covered costs.
in connection with fixed administration costs, such as expenses for premises (rent or building depreciation), telephone, heating, electricity, IT equipment, etc. The overhead also included absence owing to illness, since the hourly pay used to calculate administrative costs should, as far as possible, be the hourly pay per effective hour.

This estimate applied to all regions in England except London where the cost was estimated at £16.85/hr to account for London weighting. London weighting was estimated to be £4,468 p.a. (2006 prices) based on an estimate of £4,840 p.a. (2008 prices) and a firefighters working week of 42 hours. The values are shown in Table A.3.

Table A.3: Anticipation costs associated with fire safety and non-pay related costs (to the nearest million)

<table>
<thead>
<tr>
<th>Regions</th>
<th>Labour Cost of Fire Safety (£m)</th>
<th>Non Pay-related Costs of Fire Safety (£m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>North East</td>
<td>£2m</td>
<td>£1m</td>
</tr>
<tr>
<td>North West</td>
<td>£2m</td>
<td>£1m</td>
</tr>
<tr>
<td>Yorkshire &amp; the Humber</td>
<td>£2m</td>
<td>£1m</td>
</tr>
<tr>
<td>East Midlands</td>
<td>£1m</td>
<td>£0m</td>
</tr>
<tr>
<td>West Midlands</td>
<td>£3m</td>
<td>£2m</td>
</tr>
<tr>
<td>East of England</td>
<td>£1m</td>
<td>£1m</td>
</tr>
<tr>
<td>South East</td>
<td>£2m</td>
<td>£1m</td>
</tr>
<tr>
<td>South West</td>
<td>£2m</td>
<td>£1m</td>
</tr>
<tr>
<td>London</td>
<td>£4m</td>
<td>£2m</td>
</tr>
<tr>
<td><strong>England</strong></td>
<td><strong>£18m</strong></td>
<td><strong>£9m</strong></td>
</tr>
</tbody>
</table>

Please refer to accompanying text for a description of the assumptions used to create this table. Figures may not sum due to rounding.

### A1.5 Non-pay related costs

The value of non-pay related costs was calculated by subtracting pay related expenditure from total expenditure. Pay related expenses were calculated by subtracting pensions, training and other employee expenses from total employee expenses. These were taken from the Chartered Institute of Public Finance and Accountancy Fire and Rescue Service statistics for 2006-07 and based on actual spend (rather than estimates). The values are shown in Table A.3.

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A1.6 Environmental and community costs

A number of social and environmental costs in anticipation were identified as part of this project and represent areas where further research would be required to estimate a value:

- **Resource consumption as part of running fire service.** It may be possible to estimate the total water consumption (in terms of litres of water used), energy use (electricity and gas usage), and waste production (estimate of quantity of different wastes to landfill) at a regional level and then to value the different resource costs based on the different market values. This data was not available at this time and is an area for further research and

- **Community costs.** There are probably significant benefits from Fire and Rescue Services activities with communities. This work did not identify any significant costs in anticipation.
Appendix B

Costs as a consequence

B1.1 Cost of fatal and non-fatal casualties

The model estimated the costs of deaths and injuries as a result of fire in England. The value of deaths and injuries is generally accepted to be very difficult to estimate and a variety of methods and values are reported in the literature. At the time of the work, there were two major methods of calculating the economic value of a life lost which included the value of a statistical life and the value of a life year.

The use of value of a life year allows estimates to reflect how the value of a life may vary with age and health status. This estimate is predominately used in the context where the standard value of a statistical life estimate is not appropriate, for example in chronic health effects such as measuring mortality relating to air pollution, which may result in only a relatively small loss of life expectancy (e.g. a few months), cancers, etc. The method used to calculate the value of a life year is usually to assume the value of a statistical life is the discounted sum of the value of life years. The use of this method would require the introduction of a number of assumptions requiring further research, for example estimating how many months/years smoke inhalation may take off a person’s life, as well as consideration of data limitations in following this approach (for example Fire Damage Report 1 data, includes insufficient detail about nature and severity of injuries to inform assumptions about loss of life). Considering these practical issues as well as the fact that the value of a statistical life method is more commonly used in the valuing of lives lost in accidents, it was decided to continue using the value of a statistical life method in the 2006 update of the model. This method is consistent with the method used for the 2004 estimates and enables comparability between the two estimates.

The Department for Transport publication *Highways Economics Notes on the Valuation of Accidents*, estimates values for deaths and injuries and was used here to provide economic costs of casualties (a previous version of this source was used in the 2004 model). Although these costs were based on values estimated for road accidents there was, a lack of studies relating to fire. Therefore these values for road accidents were assumed to hold for casualties and accidents relating to fire as well. They were widely applied in other safety-related assessments for example in the cost benefit analysis of safety measures on the railways and accident prevention or mitigation requirements for the Control of Major Accident Hazards (1999 as amended to 2005) Regulations.

The approach employed by the Department for Transport included the following cost elements:

- Loss of output due to injury – net present value of expected loss of earnings plus non-wage contributions (e.g. national insurance contributions)
- Ambulance costs and the costs of hospital treatment and
- Human costs, based on willingness-to-pay values, which represent pain, grief and suffering to the casualty, relatives and friends, and, for fatal casualties, the intrinsic loss of enjoyment of life over and above the consumption of goods and services.

Some of these costs are borne by society (e.g. hospital and admission costs) whilst others are a burden to the individual or family thereof. Values in the Department for Transport publication related to 2005 and these were up-rated to 2006 values in the model using the Retail Price Index.

Economic values for casualties were assigned for three categories of casualties in the Department for Transport report: fatal, serious injuries and slight injuries. The values are shown in the table below:

<table>
<thead>
<tr>
<th>Casualty type</th>
<th>Value (2006)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fatal</td>
<td>£1,520,371</td>
</tr>
<tr>
<td>Serious</td>
<td>£170,839</td>
</tr>
<tr>
<td>Slight</td>
<td>£13,169</td>
</tr>
</tbody>
</table>

Source: Highway Economic Note 1:2005 Valuation of the Benefits of Prevention of Road Accidents and Casualties, Department for Transport. Please refer to accompanying text for a description of the assumptions used to create this table.

The same categorisation used in the 2004 Cost of Fire Model was used for the 2006 model to assign injury type (as recorded in the Fire Damage Report 1 data) to these categories for serious and slight. This is shown in the table below against the definitions of each injury type as applied by the Department for Transport:
Table B.2: Breakdown of injury type by serious and slight

<table>
<thead>
<tr>
<th>Severity of injury</th>
<th>Definition as applied by Department for Transport</th>
<th>Allocation of injury types (as recorded by Fire Damage Report 1) to Department for Transport definitions</th>
</tr>
</thead>
</table>
| Serious            | An injury for which a person is detained in hospital as an “in-patient”, or any of the following injuries whether or not they are detained in hospital: fractures, concussion, internal injuries, crushings, burns (excluding friction burns), severe cuts and lacerations, severe general shock requiring medical treatment and injuries causing death 30 or more days after the accident. | Burns  
Overcome by gas or smoke  
Burns and overcome by gas or smoke |
| Slight             | An injury of a minor character such as a sprain (including neck whiplash injury), bruise or cut which are not judged to be severe, or slight shock requiring roadside attention. This definition includes injuries not requiring medical treatment. | Physical injuries  
Shock only  
Precautionary check up  
Other specified  
Other unspecified |

Source: Definitions, Symbols and Conventions, Department for Transport  

Number of non-fatal casualties
The number of injuries recorded in Fire Damage Report 1 data may underestimate the total number of injuries associated with fire in England due to the high percentage of fires that go unreported to the Fire and Rescue Service. The results of the Survey of English Housing36 for 2004/05 (an annual household survey undertaken with a sample of approximately 20,000 households) found that of those that had experienced a fire during the previous 12 months, only 22 per cent of households had reported the fire to the Fire and Rescue Service. This suggests that a significant number of fires (and associated injuries) are not captured by Fire Damage Report 1 data.

The use of Hospital Episode Statistics37 was reviewed to establish whether the information was useful in capturing injuries associated with unreported fires. These statistics recorded information on all in-patients and the external cause and the type of injury. However these statistics did not prove useful to the purposes of this study for the following reasons:

37 http://www.hesonline.nhs.uk
Hospital Episode Statistics did not record whether patients were self-admitted or not – the most effective method of capturing injuries associated with unreported fires may be to measure the number of self-admissions with fire-related injuries.

The total number of admissions attributable to fire (measured by the external cause which includes categories such as exposure to uncontrolled fire, exposure to ignition of highly flammable material, exposure to other specified smoke, etc.) was significantly less than the number of injuries captured by the Fire Damage Report 1 statistics. This suggested that some injuries related to fire were not captured by the hospital episode statistics (such as physical injuries other than burns), that not all injuries recorded by the Fire Damage Report 1 were admitted to hospital or that the admissions data did not accurately record the cause of all injuries.

It was therefore decided that the Fire Damage Report 1 was the most comprehensive and reliable source of casualty data. It is likely that the nature of fires that go unrecorded are likely to be relatively small with few or minor injuries; the Survey of English Housing 04/05 found that 91 per cent of domestic fires experienced by households did not result in any personal injury to anyone in the household. As the cost of these injuries was relatively minor and insignificant and they were not accounted for in the 2006 Cost of Fire Model.

The table below shows a regional breakdown of the number of injuries and fatalities and the total economic value in England, based on 2006 Fire Damage Report 1 data. The costs are in 2006 prices:

<table>
<thead>
<tr>
<th>Region</th>
<th>Fatal (£m)</th>
<th>Serious injuries (£m)</th>
<th>Slight injuries (£m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>North East</td>
<td>£47m</td>
<td>£35m</td>
<td>£7m</td>
</tr>
<tr>
<td>North West</td>
<td>£151m</td>
<td>£183m</td>
<td>£21m</td>
</tr>
<tr>
<td>Yorkshire &amp; the Humber</td>
<td>£71m</td>
<td>£93m</td>
<td>£10m</td>
</tr>
<tr>
<td>East Midlands</td>
<td>£65m</td>
<td>£67m</td>
<td>£5m</td>
</tr>
<tr>
<td>West Midlands</td>
<td>£71m</td>
<td>£66m</td>
<td>£5m</td>
</tr>
<tr>
<td>East of England</td>
<td>£53m</td>
<td>£66m</td>
<td>£5m</td>
</tr>
<tr>
<td>South East</td>
<td>£81m</td>
<td>£105m</td>
<td>£8m</td>
</tr>
<tr>
<td>South West</td>
<td>£46m</td>
<td>£66m</td>
<td>£6m</td>
</tr>
<tr>
<td>London</td>
<td>£71m</td>
<td>£193m</td>
<td>£10m</td>
</tr>
<tr>
<td>England</td>
<td><strong>£657m</strong></td>
<td><strong>£874m</strong></td>
<td><strong>£78m</strong></td>
</tr>
</tbody>
</table>

Please refer to accompanying text for a description of the assumptions used to create this table. Figures may not sum due to rounding.
B1.2 Property damage

At the time of the work, insurance statistics were regarded as providing the most comprehensive and accurate reflection of the costs associated with property damage from fire. This data was collected primarily from the Association of British Insurers, but may not fully cover all aspects of fire damage for a variety of reasons discussed below. Where it was possible, assumptions were made to account for potential underestimations.

- **Uninsured market** – Some domestic properties may not be insured either because they are too high risk or the premiums are more than the household is willing to pay. In the domestic market the proportion of households with expenditure allocated to insurance was obtained from the 2006 Family Expenditure Survey (Office for National Statistics) and this provided a proxy for the extent of the uninsured market. In the commercial sector, there was no information available either from the Association of British Insurers or in the literature on this aspect of the insurance industry and so the same assumption used in the previous model was used for the 2006 model, that 100 per cent of commercial capital was insured.

- **Size of the insured market not covered by the Association of British Insurers** – The Association of British Insurers was assumed to cover 90 per cent of the insured market.

- **Excess** – The insurance payouts recorded by the Association of British Insurers are likely to underestimate the full cost of damage to households and businesses due to the excess that claimants will be required to pay. This may be relatively small for domestic properties but can be much larger for commercial properties. In addition fires resulting in damage below the value of excess may not be reported to insurance companies and these fires and their costs will not be captured. The Survey of English Housing found that of all households that had experienced a fire in the preceding 12 months, 48 per cent reported that the fire had resulted in no financial loss. This suggests that many respondents simply discounted any negligible costs. As a result the costs of fires falling below the value of excess (and therefore not reported) were not taken into account.

- The full extent of damages to local authorities may not be fully reflected in Association of British Insurers statistics. Local authorities tend self-insure up to certain levels and then buy private insurance for any losses exceeding those amounts. Therefore only those losses that exceed their agreed deductibles will be captured in Association of British Insurers statistics. At the time of writing there was no formal or central collection of information regarding losses or payouts from local authorities’ internal insurance funds. Thus the Association of British Insurers data collected for losses to local authorities probably underestimated the full cost of fire damage.
• **National Health Service property** – All National Health Service property is insured with The National Health Service Litigation Authority under the Risk Pooling Schemes for Trusts. The Property Expenses Scheme covers losses such as theft and damage to property. At the time of writing, this scheme was subject to a £20,000 excess, implying that any fires resulting in less than £20,000 damage will not be claimed for or captured in their data collection.

<table>
<thead>
<tr>
<th>Region</th>
<th>Property damage (£m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>North East</td>
<td>£93m</td>
</tr>
<tr>
<td>North West</td>
<td>£274m</td>
</tr>
<tr>
<td>Yorkshire &amp; the Humber</td>
<td>£150m</td>
</tr>
<tr>
<td>East Midlands</td>
<td>£106m</td>
</tr>
<tr>
<td>West Midlands</td>
<td>£148m</td>
</tr>
<tr>
<td>East of England</td>
<td>£120m</td>
</tr>
<tr>
<td>South East</td>
<td>£181m</td>
</tr>
<tr>
<td>South West</td>
<td>£132m</td>
</tr>
<tr>
<td>London</td>
<td>£186m</td>
</tr>
<tr>
<td><strong>England</strong></td>
<td><strong>£1,391m</strong></td>
</tr>
</tbody>
</table>

Please refer to accompanying text for a description of the assumptions used to create this table. Figures may not sum due to rounding.

**Property damage associated with deliberate fires**

Fire damage in buildings from deliberate fires may be more extensive than fire damage to buildings from accidental fires, implying increased costs of property damage associated with deliberate fires. This could be caused by the use of accelerants (e.g. petrol) which result in more rapid and extensive fire spread in a building and slower detection rates.

Fire Damage Report 1 data records the horizontal area damaged in square metres for each fire incident. This was analysed to determine the extent of the difference in damage between accidental and deliberate fires. The table below shows a high level summary of the findings from the Fire Damage Report 1 data (a more detailed breakdown was included in the spreadsheet model). The findings indicated that the extent of fire spread (a proxy for property damage costs) was at times significantly greater in deliberate fires than accidental fires. The average costs of damage in buildings was therefore adjusted to reflect greater damage associated with deliberate fires.
Table B.5: Average increase in fire spread

<table>
<thead>
<tr>
<th>Building type</th>
<th>Average increase in fire spread between deliberate and accidental</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domestic</td>
<td>38%</td>
</tr>
<tr>
<td>Commercial</td>
<td>73%</td>
</tr>
<tr>
<td>Public</td>
<td>90%</td>
</tr>
<tr>
<td>Other buildings</td>
<td>39%</td>
</tr>
</tbody>
</table>

Please refer to accompanying text for a description of the assumptions used to create this table.

B1.3 Lost business

Fire incidents are likely to result in losses for commercial companies through loss of stock, disruption to their production, temporary or permanent reductions in employment. Whilst these financial losses can often be very significant for individual firms they do not usually represent an economic loss for England as they are more likely to result in transfer payments. A discussion of transfer payments was presented in The Department for Environment, Food and Rural Affairs Project Appraisal Guidance which described a transfer payment as that which "occurs when a change simply affects either who gets the consumption or who provides the resources, but there is no change in the national total of either all consumption or all the resources required to generate that consumption."

So, for example, if a shop or factory is damaged by fire and its normal business is disrupted, if a customer can buy the same goods at the same price from an alternative supplier then there may be no loss to the consumer. Real losses are therefore incurred where consumers cannot obtain goods at similar times and costs. The value of this economic loss would probably not be significant given that typically there are many outlets offering similar services. Exceptional circumstances may arise where, for example, there is a loss of a specialist supplier or loss of a rural outlet requiring people to significantly increase their travel time.

Previously the costs of lost business were measured using insurance claims data relating to business interruption obtained from the Association of British Insurers. A proportion of this was then assumed to be ‘redistributed’ to reflect the fact that financial losses to one firm are transfer payments rather than economic losses to England as a whole. It was not possible to find any guidance or justification for estimating the proportion to be redistributed. The previous model assumed an arbitrary proportion of 50 per cent. This percentage was increased to 75 per cent for the 2006 model based on the professional estimates.


39 This claims data may underestimate the lost business to individual firms for the same reasons as claims data may underestimate property damage (due to uninsured businesses, not all losses being reported, self-insurance, damage below excess, etc.).
judgement of the researchers and discussion in the literature on the effects of transfer payments to the national economy in Department of Environment, Food and Rural Affairs Project Appraisal Guidance.\(^{40}\)

The total costs of lost business to the English economy are shown in the table below:

<table>
<thead>
<tr>
<th>Region</th>
<th>Lost business (£m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>North East</td>
<td>£2m</td>
</tr>
<tr>
<td>North West</td>
<td>£7m</td>
</tr>
<tr>
<td>Yorkshire &amp; the Humber</td>
<td>£4m</td>
</tr>
<tr>
<td>East Midlands</td>
<td>£3m</td>
</tr>
<tr>
<td>West Midlands</td>
<td>£4m</td>
</tr>
<tr>
<td>East of England</td>
<td>£3m</td>
</tr>
<tr>
<td>South East</td>
<td>£5m</td>
</tr>
<tr>
<td>South West</td>
<td>£4m</td>
</tr>
<tr>
<td>London</td>
<td>£5m</td>
</tr>
<tr>
<td><strong>England</strong></td>
<td><strong>£35m</strong></td>
</tr>
</tbody>
</table>

Please refer to accompanying text for a description of the assumptions used to create this table. Figures may not sum due to rounding.

**B1.4 Community costs**

A range of community costs were identified as being a significant part of the overall costs as a consequence of fire. However, given the extreme variability of the different types of incidents and the nature of different locations an aggregated cost for England was not estimated. Some significant costs identified included:

- Impact on communities as a result of a loss of employment or community facilities
- Loss of cultural heritage – some of these costs were probably covered by the insurance pay-outs which were already incorporated into the 2006 model. The insurance pay-outs probably do not cover the full damage costs of the loss when a particular building is raised and cannot be replaced and

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\(^{40}\) “Losses of trade to commerce and retail outlets result in real losses if the consumer cannot obtain an equivalent good at the same time and at the same cost. If all three conditions do not hold then an economic loss is involved. However, the normal expectation is that consumers will be able to obtain equivalent goods at no extra cost and therefore any differences will not be worth evaluating.” Department of Environment, Food and Rural Affairs 2000) Flood and Coastal Defence Project Appraisal Guidance: Economic Appraisal.
Decline in overall appearance of an area affecting community wellbeing, property values or ability to attract inward investment. This depends on the length of time before buildings are repaired or replaced.

Case studies are set out in Box B.1 to help illustrate the scope of potential social and environmental costs that might result as a consequence of fire.

### B1.5 Environmental costs

A range of environmental costs were identified as being a significant part of the overall costs as a consequence of fire. However, given the extreme variability of the different types of incidents and the environmental sensitivity of any given location to the environmental consequences of fire, an aggregated cost for England was not estimated. Costs identified included:

- **Resource (water) and energy consumption tackling fires** – work would be required to gather information on the average water and damage costs of energy consumption energy use attending fires, this would require obtaining appropriate data on average energy and water consumption and vehicle emissions per incident from Fire and Rescue Services for each region.

- **Emissions of greenhouse gases and other harmful substances** – these costs, relate to emissions from fires and might be estimated using damage cost functions (the Department of Environment, Food and Rural Affairs (Inter-Departmental Group on Costs and Benefits damage cost functions). Malicious fires may be more harmful as they are likely to use accelerants like petrol and this will need to be accounted for. Entec previously undertook an emissions inventory for the Fire Service College. This detailed the impacts to air from various burn activities and could potentially be used to estimate average emissions from fires in certain building types (office, industrial, dwellings) based on the types of materials likely to be found therein. It should be noted this might provide an approximate estimate for annual emissions based on a number of assumptions.

- **Loss of biodiversity from fires**, especially at incidents affecting designated sites (such as Areas of Outstanding Natural Beauty, Sites of Special Scientific Interest, etc.). These costs will be highly site specific. At this time of the work, there was a lack of sufficient previous data to estimate these costs.

- **Debris and other after fire arisings to landfill** – whilst some of this might be quantified using information from records of waste transfer notes or landfill tax as a proxy, estimates would be dependent on the amount of waste generated specifically from fires being recorded.
• Environmental clean-up/decontamination costs which could include long-term monitoring and dealing with run-off of contaminated waters to controlled waters (for example, rivers or groundwater) – these costs were covered by the insurance pay-outs which were already incorporated into the model.

Case studies are set out in Boxes B.1 and B.2 below to help illustrate the scope of potential social and environmental costs that might result as a consequence of fires in different types of buildings.

**Box B.1: Illustrative case studies of wider costs as a consequence of a fire on a business property**

**Fire damage to a small engineering company based on a trading estate**

This hypothetical case study illustrates the significant range of potential effects and groups of people (for instance, employees, local residents and wider community) affected by the consequence of fire and highlights immediate and longer term effects.

An accidental fire led to the partial destruction of the business premises and other assets which included some precision cutting machinery. Fortunately, no persons were injured as the incident occurred at night and the potential full extent of the fire was significantly reduced as the blaze was quickly controlled by the local fire and rescue service. The fire resulted in emissions to air and discharges of contaminants to the unprotected ground as a result of run-off from the site. Immediately after the fire access to the site was restricted as fire, safety and insurance investigations were undertaken. Over this time trade was completely disrupted and it became immediately obvious that the business had to make a number of their short term and temporary staff unemployed.

After a period of time, and when part of the premises could be made good, the business was able to reoccupy the undamaged part of the premises and it continue to trade. Unfortunately, the company was unable to meet orders that were placed before the incident. In addition, as it was working hard to catch up with orders it had insufficient time to secure new ones. This affected short term cash flow so the company used some of its reserves to service loans, putting itself at a greater risk if any other unforeseen incidents occurred. Insurance investigations found the company was responsible for the incident which, as a result of general under-insurance by the company, meant it had to meet its own costs to make good after the incident. It became apparent that the company could not afford the costs, which included paying for the investigation, remediation and monitoring of contamination to the groundwater below the site and the company was liquidated with the further loss of jobs.
The redundancies affected the former employees’ personal wellbeing (mostly as they had less income). In addition redundancy affected their way of life/routine and in some cases, impacted upon their health and wellbeing (both positively as well as negatively). Many of the former employees secured employment relatively soon after redundancy although some found themselves in a different type or quality of employment and having to retrain at the expense of their new employers. Those that were unable to find work directly suffered further detriment to their personal and mental wellbeing including loss of confidence and took longer to get back into employment.

The affect of the loss of the family based firm had knock on effects along the supply chain (indirect expenditure) which had a significant impact on a small local delivery company. The engineering firm had developed some specialised and unique machinery with associated skilled operators that supplied a component to another manufacturer on the estate that had to replace the supplier with one from abroad. Whilst the manufacture was able to continue trading its costs went up. The output (value added) and unique skills of the engineering firm were lost to the region and the UK. The expenditure of income from the redundant employees (induced expenditure) within the local area, until they secured new jobs, was also reduced.

In addition, as a result of the damage to the property and the fact the site occupied a prominent position on the business park, the overall appearance of the business park was impacted. It was reported by property agents the reduced appearance, together with the perception that the site was occupied by unsafe buildings, have discouraged inward investment and had an impact on the potential value of land and premises on the estate.
Box B.2: Illustrative case studies of wider costs as a consequence of a fire in a school

Fire in a school

This hypothetical case study illustrates the significant range of potential effects and groups of people (for instance, employees, local residents and wider community) affected by the consequence of fire and highlights immediate and longer term effects.

A fire started deliberately, badly damaged a school at a weekend. There had been numerous reports of arson at the school in the previous year. The school was so badly damaged that alternative accommodation was needed in the medium to long-term and just over 1,000 pupils and staff had to be relocated to other schools in the area whilst repairs could be made.

The adjacent leisure centre was closed temporarily as firefighters used water in the two swimming pools to fight the fire.

The fire damaged much of the schools teaching equipment, the library, and a new computer suite. Importantly, much of the pupils work which included displays and coursework as well as work on the hard drives of the computers were lost in the fire and directly impacted on teaching and learning.

Teachers worked hard to replace, in some instances, years of teaching materials and were important in maintaining teaching and learning provision. Although senior leaders and staff sought to ensure continuity in teaching and learning, and minimising any impact, the school experienced some negative impact on teaching and learning and, consequently, on assessment outcomes. The schools had focused on minimising any disruption for pupils who were in an assessment year (year 6 and year 11, for example) and yet they perceived a negative impact on assessment outcomes for these year groups, it is likely that the pupils in other year groups were also affected.

The school and local authority recognised that morale-building was required immediately after the fire, by acknowledging loss, but looking to the future and ensuring that the whole school was kept together if a long-term accommodation move was necessary.

The emotional impact of the fire on staff, pupils and the local community was one of the main impacts of the fire and was felt for some time after the fire.

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Appendix C

Costs in response

C1.1 Overview

Figure C.1 presents a simple overview of the different elements and methodology used to determine the costs of responding to fires.
C1.2 Number of incidents

The number of incidents was a record count of the number of times in 2006 that the Fire and Rescue Service was required to attend the scene of the incident and did not include fires that went unreported. The types of incidents included in the model were primary fires, secondary fires, outdoor fires, vehicle fires, chimney fires and false alarms.
The number of reported incidents related to primary fires in buildings and outdoor fires was obtained from Fire Damage Report 1 data. It was possible to break this data down by building type and at a regional level. The number of false alarms, secondary fires and chimney fires was obtained from Fire Damage Report 3 data. This data could only be broken down at a regional level, not by building type.

Table C.1 shows the high level summary of the number of incidents in England. A full breakdown of the data can be viewed in the spreadsheet model. The data was also divided in the model into deliberate and accidental fires, where the number of deliberate incidents was used to help estimate the costs of arson.

<table>
<thead>
<tr>
<th>Region</th>
<th>All incidents*</th>
<th>Building fires</th>
<th>Non Buildings Fires</th>
<th>False Alarms</th>
</tr>
</thead>
<tbody>
<tr>
<td>North East</td>
<td>49,376</td>
<td>5,067</td>
<td>25,824</td>
<td>18,485</td>
</tr>
<tr>
<td>North West</td>
<td>112,753</td>
<td>14,308</td>
<td>52,456</td>
<td>45,989</td>
</tr>
<tr>
<td>Yorkshire &amp; the Humber</td>
<td>82,751</td>
<td>7,620</td>
<td>37,846</td>
<td>37,285</td>
</tr>
<tr>
<td>East Midlands</td>
<td>51,745</td>
<td>5,238</td>
<td>20,790</td>
<td>25,717</td>
</tr>
<tr>
<td>West Midlands</td>
<td>77,885</td>
<td>7,491</td>
<td>32,617</td>
<td>37,777</td>
</tr>
<tr>
<td>East of England</td>
<td>60,699</td>
<td>6,044</td>
<td>21,882</td>
<td>32,773</td>
</tr>
<tr>
<td>South East</td>
<td>93,835</td>
<td>9,509</td>
<td>30,727</td>
<td>53,599</td>
</tr>
<tr>
<td>South West</td>
<td>54,958</td>
<td>6,555</td>
<td>19,271</td>
<td>29,132</td>
</tr>
<tr>
<td>London</td>
<td>106,181</td>
<td>10,629</td>
<td>26,463</td>
<td>69,089</td>
</tr>
<tr>
<td><strong>England</strong></td>
<td><strong>690,183</strong></td>
<td><strong>72,461</strong></td>
<td><strong>267,876</strong></td>
<td><strong>349,846</strong></td>
</tr>
</tbody>
</table>

* The totals do not include Special Service Incidents. Please refer to accompanying text for a description of the assumptions used to create this table. Figures may not sum due to rounding.
Table C.2: Number of incidents in England (per million population)

<table>
<thead>
<tr>
<th>Region</th>
<th>All incidents*</th>
<th>Building fires</th>
<th>Non Buildings Fires</th>
<th>False Alarms</th>
</tr>
</thead>
<tbody>
<tr>
<td>North East</td>
<td>19,520</td>
<td>2,003</td>
<td>10,209</td>
<td>7,308</td>
</tr>
<tr>
<td>North West</td>
<td>16,503</td>
<td>2,094</td>
<td>7,678</td>
<td>6,731</td>
</tr>
<tr>
<td>Yorkshire &amp; the Humber</td>
<td>16,389</td>
<td>1,509</td>
<td>7,495</td>
<td>7,384</td>
</tr>
<tr>
<td>East Midlands</td>
<td>12,045</td>
<td>1,219</td>
<td>4,840</td>
<td>5,987</td>
</tr>
<tr>
<td>West Midlands</td>
<td>14,595</td>
<td>1,404</td>
<td>6,112</td>
<td>7,079</td>
</tr>
<tr>
<td>East of England</td>
<td>10,962</td>
<td>1,092</td>
<td>3,952</td>
<td>5,919</td>
</tr>
<tr>
<td>South East</td>
<td>11,481</td>
<td>1,163</td>
<td>3,760</td>
<td>6,558</td>
</tr>
<tr>
<td>South West</td>
<td>10,819</td>
<td>1,290</td>
<td>3,794</td>
<td>5,735</td>
</tr>
<tr>
<td>London</td>
<td>14,041</td>
<td>1,406</td>
<td>3,499</td>
<td>9,136</td>
</tr>
<tr>
<td><strong>England</strong></td>
<td><strong>13,695</strong></td>
<td><strong>1,438</strong></td>
<td><strong>5,315</strong></td>
<td><strong>6,942</strong></td>
</tr>
</tbody>
</table>

* The totals do not include Special Service Incidents. Please refer to accompanying text for a description of the assumptions used to create this table. Figures may not sum due to rounding.

C1.3 Average appliance hours

The average appliance hours was the average time taken from when the record of the incident started, to the time of mobilisation, to when the incident stopped. The average appliance hour applies to all vehicles including specialist vehicles. It is important to note that the time of stopping was not necessarily the time work at the incident finished (e.g. there may have been further investigation) and that the times were not vehicle specific (e.g. some appliances may have stayed longer at the incident). However the calculation does provide a good approximation of the time spent dealing with different types of fires.

The average appliance hours for primary fires in buildings and outdoor fires were obtained from Fire Damage Report 1 data. It was possible to break this data down in detail by building type and at a regional level. The average appliance hours for false alarms were obtained from DCLG based on Office for National Statistics data. There were no official records of average appliance hours for secondary fires and chimney fires and so assumptions were made based on averages for primary building fires (see Table 5.2).

Table C.3 shows the high level summary of the average appliance hours in England. A full breakdown of the data can be viewed in the spreadsheet model. The data was divided in the model into deliberate and accidental fires, where the number of deliberate incidents was used to help estimate the costs of arson.
### Table C.3: Average attendance time (minutes) for different types of fires in England (2006)

<table>
<thead>
<tr>
<th>Region</th>
<th>All incidents*</th>
<th>Building fires</th>
<th>Non Buildings Fires</th>
<th>False Alarms</th>
</tr>
</thead>
<tbody>
<tr>
<td>North East</td>
<td>33</td>
<td>49</td>
<td>40</td>
<td>22</td>
</tr>
<tr>
<td>North West</td>
<td>35</td>
<td>52</td>
<td>42</td>
<td>22</td>
</tr>
<tr>
<td>Yorkshire &amp; the Humber</td>
<td>36</td>
<td>55</td>
<td>43</td>
<td>22</td>
</tr>
<tr>
<td>East Midlands</td>
<td>40</td>
<td>66</td>
<td>50</td>
<td>22</td>
</tr>
<tr>
<td>West Midlands</td>
<td>38</td>
<td>62</td>
<td>44</td>
<td>22</td>
</tr>
<tr>
<td>East of England</td>
<td>37</td>
<td>51</td>
<td>54</td>
<td>22</td>
</tr>
<tr>
<td>South East</td>
<td>41</td>
<td>70</td>
<td>49</td>
<td>22</td>
</tr>
<tr>
<td>South West</td>
<td>37</td>
<td>58</td>
<td>46</td>
<td>22</td>
</tr>
<tr>
<td>London</td>
<td>72</td>
<td>203</td>
<td>39</td>
<td>22</td>
</tr>
<tr>
<td><strong>England</strong></td>
<td><strong>41</strong></td>
<td><strong>74</strong></td>
<td><strong>45</strong></td>
<td><strong>22</strong></td>
</tr>
</tbody>
</table>

* The totals do not include Special Service Incidents. Please refer to accompanying text for a description of the assumptions used to create this table. Figures may not sum due to rounding.

### C1.4 Average number of pumps per incident

The average number of pumps used per incident was used as a proxy for the number of appliances used at an incident. It was assumed that the average crew size per appliance was 4.5 and this was consistent with the valuations used in the previous model for the Economic Costs of Fire 2004. However previous versions did not take into consideration the number of pumps used.

The average number of pumps related to primary fires in buildings and outdoor fires were obtained from Fire Damage Report 1 data. It was possible to break this data down in detail by building type and at a regional level. There were no official records of average appliance hours for secondary fires, chimney fires and false alarms, so assumptions were made based on averages for primary fires (see Table 5.2 for further details).

Table C.4 shows the high level summary of the average of pumps used in England. A full breakdown of the data can be viewed in the model. The data was also divided in the model into deliberate and accidental fires, where the number of deliberate incidents was used to help estimate the costs of arson.

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42 It is important to note that this did not change the total resource costs of fire (since this is based on actual resource costs reported in Chartered Institute of Public Finance and Accountancy statistics – see next heading “Response resource costs”) but improved how resource costs were apportioned to different types of fires.
Table C.4: Average number of pumps used for different types of fires in England (2006)

<table>
<thead>
<tr>
<th>Region</th>
<th>All incidents*</th>
<th>Building fires</th>
<th>Non Buildings Fires</th>
<th>False Alarms</th>
</tr>
</thead>
<tbody>
<tr>
<td>North East</td>
<td>2.0</td>
<td>2.3</td>
<td>1.8</td>
<td>2.0</td>
</tr>
<tr>
<td>North West</td>
<td>2.0</td>
<td>2.2</td>
<td>1.8</td>
<td>2.0</td>
</tr>
<tr>
<td>Yorkshire &amp; the Humber</td>
<td>2.1</td>
<td>2.3</td>
<td>1.8</td>
<td>2.1</td>
</tr>
<tr>
<td>East Midlands</td>
<td>2.0</td>
<td>2.2</td>
<td>1.8</td>
<td>2.0</td>
</tr>
<tr>
<td>West Midlands</td>
<td>2.1</td>
<td>2.3</td>
<td>1.9</td>
<td>2.1</td>
</tr>
<tr>
<td>East of England</td>
<td>2.0</td>
<td>2.1</td>
<td>1.9</td>
<td>2.0</td>
</tr>
<tr>
<td>South East</td>
<td>2.2</td>
<td>2.4</td>
<td>2.0</td>
<td>2.2</td>
</tr>
<tr>
<td>South West</td>
<td>2.2</td>
<td>2.4</td>
<td>2.0</td>
<td>2.2</td>
</tr>
<tr>
<td>London</td>
<td>2.5</td>
<td>2.7</td>
<td>2.4</td>
<td>2.5</td>
</tr>
<tr>
<td><strong>England</strong></td>
<td><strong>2.1</strong></td>
<td><strong>2.3</strong></td>
<td><strong>1.9</strong></td>
<td><strong>2.1</strong></td>
</tr>
</tbody>
</table>

* The totals do not include Special Service Incidents. Please refer to accompanying text for a description of the assumptions used to create this table. Figures may not sum due to rounding.

C1.5 Response resource costs

To estimate the resource costs of responding to reported incidents, resource costs to the Fire and Rescue Service that occurred regardless of the number of incidents was taken into account. These costs were included in the model under the costs of anticipation. To estimate the response resource costs, the labour costs of fire safety, resource costs of Special Service Incidents and non-pay related costs (e.g. pensions and training) were subtracted from total Fire and Rescue Service resource costs. The results are presented in Table C.5.

The total Fire and Rescue Service resource cost was taken directly from the actual expenditure in the Chartered Institute of Public Finance and Accountancy Fire and Rescue Service statistics for 2006-07. This information was broken down by type of Fire and Rescue Service: county; combined; and metropolitan. The information was aggregated to a regional level using the regional/county classification used in Office for National Statistics and the Department of Environment, Food and Rural Affairs census data.

Fire safety labour costs were determined by multiplying the average fire safety labour cost (£/h) by the total number of hours spent on fire safety. The total number of hours spent on fire safety was determined by summing the hours spent on fire safety activities, fire...
investigations and community fire safety. This data was provided by DCLG at a county level and was aggregated to a regional level. The average cost of fire safety was estimated at £14.81/hr (2006 prices) for all regions in England except London where the cost was estimated at £16.85/hr to account for London weighting.

The value of non-pay related costs was calculated by subtracting pay related expenditure from total expenditure. Pay related expenses were calculated by subtracting pensions, training and other employee expenses from total employee expenses. The actual spend was taken from the Chartered Institute of Public Finance and Accountancy Fire and Rescue Service statistics for 2006-07.

The resources devoted to Special Service Incidents were deducted from the Fire and Rescue Service resource costs. The Chartered Institute of Public Finance and Accountancy Fire and Rescue Service statistics did not break down resource costs by Fire and Rescue Service activity, therefore a proportion of resource costs were deducted based on the proportion of Special Service Incidents relative to all types of incidents.

<table>
<thead>
<tr>
<th>Regions</th>
<th>Total FRS Resource Costs (£m)</th>
<th>Labour Cost of Fire Safety (£m)</th>
<th>Non Pay-related Costs of Fire Safety (£m)</th>
<th>Resource costs appropriated to SSIs (£m)</th>
<th>Response Resource Cost (£m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>North East</td>
<td>£124m</td>
<td>£2m</td>
<td>£1m</td>
<td>£13m</td>
<td>£108m</td>
</tr>
<tr>
<td>North West</td>
<td>£283m</td>
<td>£2m</td>
<td>£1m</td>
<td>£34m</td>
<td>£246m</td>
</tr>
<tr>
<td>Yorkshire &amp; the Humber</td>
<td>£193m</td>
<td>£2m</td>
<td>£1m</td>
<td>£24m</td>
<td>£168m</td>
</tr>
<tr>
<td>East Midlands</td>
<td>£150m</td>
<td>£1m</td>
<td>£0m</td>
<td>£32m</td>
<td>£116m</td>
</tr>
<tr>
<td>West Midlands</td>
<td>£200m</td>
<td>£3m</td>
<td>£2m</td>
<td>£32m</td>
<td>£163m</td>
</tr>
<tr>
<td>East of England</td>
<td>£193m</td>
<td>£1m</td>
<td>£1m</td>
<td>£36m</td>
<td>£155m</td>
</tr>
<tr>
<td>South East</td>
<td>£306m</td>
<td>£2m</td>
<td>£1m</td>
<td>£60m</td>
<td>£243m</td>
</tr>
<tr>
<td>South West</td>
<td>£186m</td>
<td>£2m</td>
<td>£1m</td>
<td>£48m</td>
<td>£136m</td>
</tr>
<tr>
<td>London</td>
<td>£387m</td>
<td>£4m</td>
<td>£2m</td>
<td>£116m</td>
<td>£265m</td>
</tr>
<tr>
<td><strong>England</strong></td>
<td><strong>£2,022m</strong></td>
<td><strong>£18m</strong></td>
<td><strong>£9m</strong></td>
<td><strong>£395m</strong></td>
<td><strong>£1,600m</strong></td>
</tr>
</tbody>
</table>

Source: Chartered Institute of Public Finance and Accountancy Fire and Rescue Service Statistics 2006-07.
Please refer to accompanying text for a description of the assumptions used to create this table. Figures may not sum due to rounding.

SSI = Special Service Incident
C1.6 Firefighting capital cost

Firefighting capital costs (e.g. equipment and vehicles) were taken directly from the actual expenditure in the Chartered Institute of Public Finance and Accountancy Fire and Rescue Service statistics for 2006-07. Capital costs of fire safety (including fire investigations and community fire safety) and training were deducted from the Fire and Rescue Service capital costs, because they were included in the costs of anticipation. This differs to the previous model, where these costs were included in anticipation but were not deducted from response costs. Therefore these costs were double counted in the previous model.

Since, the Chartered Institute of Public Finance and Accountancy Fire and Rescue Service statistics did not breakdown capital costs by Fire and Rescue Service activity, it was assumed that the proportion (%) of resources devoted to training and fire safety relative to resource costs was a good equivalent to the capital costs devoted to training and fire safety. This approach was similar to the approach used in the previous model. The capital costs devoted to Special Service Incidents were excluded in this report, based on the proportion of Special Service Incidents relative to all types of incidents. This is presented in Table C.6.

<table>
<thead>
<tr>
<th>Region</th>
<th>FRS total capital cost (£m)</th>
<th>Capital cost of fire safety &amp; training (£m)</th>
<th>Capital cost of SSIs (£m)</th>
<th>Response capital costs (£m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>North East</td>
<td>£3.7m</td>
<td>£0.1m</td>
<td>£0.4m</td>
<td>£3.2m</td>
</tr>
<tr>
<td>North West</td>
<td>£10.0m</td>
<td>£0.2m</td>
<td>£1.2m</td>
<td>£8.6m</td>
</tr>
<tr>
<td>Yorkshire &amp; the Humber</td>
<td>£10.2m</td>
<td>£0.4m</td>
<td>£1.3m</td>
<td>£8.5m</td>
</tr>
<tr>
<td>East Midlands</td>
<td>£5.2m</td>
<td>£0.2m</td>
<td>£1.1m</td>
<td>£3.9m</td>
</tr>
<tr>
<td>West Midlands</td>
<td>£12.1m</td>
<td>£0.8m</td>
<td>£2.0m</td>
<td>£9.3m</td>
</tr>
<tr>
<td>East of England</td>
<td>£10.0m</td>
<td>£0.3m</td>
<td>£1.9m</td>
<td>£7.8m</td>
</tr>
<tr>
<td>South East</td>
<td>£13.7m</td>
<td>£0.4m</td>
<td>£2.7m</td>
<td>£10.5m</td>
</tr>
<tr>
<td>South West</td>
<td>£8.5m</td>
<td>£0.2m</td>
<td>£2.2m</td>
<td>£6.1m</td>
</tr>
<tr>
<td>London</td>
<td>£9.8m</td>
<td>£0.2m</td>
<td>£3.0m</td>
<td>£6.6m</td>
</tr>
<tr>
<td><strong>England</strong></td>
<td><strong>£83.1m</strong></td>
<td><strong>£2.8m</strong></td>
<td><strong>£15.8m</strong></td>
<td><strong>£64.5m</strong></td>
</tr>
</tbody>
</table>

Please refer to accompanying text for a description of the assumptions used to create this table. Figures may not sum due to rounding.

SSI = Special Service Incident
C1.7 Marginal cost of a false alarm

In economics marginal cost refers to the cost of an additional unit. In this case it refers to the cost of one additional false alarm. This is different from the average cost of false alarms which is the cost on average of a false alarm incident based on the apportioned Fire and Rescue Service costs allocated to false alarms divided by the number of reported false alarms. The marginal cost of false alarms were considered to be a more appropriate way to capture the costs of false alarms as fire crews and resources were available to deal with real fires regardless of whether false alarms occur. Therefore these fixed resource costs were not to be attributed to false alarms.

Costs for false alarms were not broken down by different types of false alarms. This issue was discussed with the Advisory Board and the approach taken was based on the data available (not broken down by type) and the wish to be broadly consistent with the previous model. The available data on false alarms was broken down into three categories: good intent; malicious; and due to apparatus. The spreadsheet model categorised false alarms as accidental or deliberate (consistent with other types of reporting of incidents e.g. primary fires).

The marginal cost of a false alarm (per vehicle) was based on the sum of three main factors:

- equipment running costs per incident = (total transport related expenses* 6.6%)/number of incidents
- marginal cost per mobilisation – £0.75 (2006 prices)
- marginal resource costs of the crew.

Total transport-related expenses per region were taken from the Chartered Institute of Public Finance and Accountancy Fire and Rescue Service statistics for 2006-07. The assumed 6.6 per cent was based on a report for DCLG by Mott McDonald titled Costs and benefits of alternative responses to Automatic Fire Alarms and the report assumed this was a reasonable estimate to be applied to all Fire and Rescue Services.

The marginal costs of mobilisation refer to the costs associated with damage caused by appliances on route to a false alarm. The report estimated the costs per mobilisation to be £0.75 which was based on historical data on the type of damage caused relative to the number of incidents attended. The marginal resource costs of the crew were based on the hourly wage cost for the average attendance time per crew. The results are presented below in Table C.7 taking into consideration the average number of pumps attending a false alarm.
### Table C.7: Marginal cost of a false alarm (£)

<table>
<thead>
<tr>
<th>Region</th>
<th>Equipment running costs (£)</th>
<th>Mobilisation (£)</th>
<th>Resource costs (£)</th>
<th>Total MC of a false alarm (£)</th>
</tr>
</thead>
<tbody>
<tr>
<td>North East</td>
<td>£5.14</td>
<td>£1.54</td>
<td>£50.27</td>
<td>£56.94</td>
</tr>
<tr>
<td>North West</td>
<td>£3.43</td>
<td>£1.48</td>
<td>£48.55</td>
<td>£53.46</td>
</tr>
<tr>
<td>Yorkshire &amp; the Humber</td>
<td>£6.09</td>
<td>£1.55</td>
<td>£50.64</td>
<td>£58.28</td>
</tr>
<tr>
<td>East Midlands</td>
<td>£9.12</td>
<td>£1.49</td>
<td>£48.84</td>
<td>£59.45</td>
</tr>
<tr>
<td>West Midlands</td>
<td>£5.09</td>
<td>£1.59</td>
<td>£52.05</td>
<td>£58.74</td>
</tr>
<tr>
<td>East of England</td>
<td>£7.37</td>
<td>£1.52</td>
<td>£49.87</td>
<td>£58.76</td>
</tr>
<tr>
<td>South East</td>
<td>£7.97</td>
<td>£1.63</td>
<td>£53.52</td>
<td>£63.13</td>
</tr>
<tr>
<td>South West</td>
<td>£8.27</td>
<td>£1.64</td>
<td>£53.57</td>
<td>£63.47</td>
</tr>
<tr>
<td>London</td>
<td>£9.03</td>
<td>£1.90</td>
<td>£71.58</td>
<td>£82.51</td>
</tr>
<tr>
<td>England</td>
<td>£6.84</td>
<td>£1.59</td>
<td>£52.17</td>
<td>£60.61</td>
</tr>
</tbody>
</table>

Please refer to accompanying text for a description of the assumptions used to create this table. Figures may not sum due to rounding.

There were several reasons for regional variations. These included:

- different equipment running costs at a regional level
- the different number of vehicles used per incident per region (and therefore the difference in the number of firefighters) and
- London weighting – all other regions use the same wage rate.

### C1.8 Attacks on firefighters – costs of attacks made on firefighters

Data reported via Fires of Special Interest Category C – Attacks on firefighters and Civil Disturbances, was inaccurate due mostly to a lack of reporting by Fire and Rescue Services concerning the true number of attacks on firefighters and problems surrounding the definition of an attack. Due to the inconsistencies in reporting, averages of the number and type of attacks over a three year period were used to determine annual numbers for 2006. DCLG provided two sets of data:

- the number of attacks at a regional level over a three year period with no breakdown of the severity of the attack
- the type of attacks over a three year period with no regional breakdown.
The average type of attack in a year was multiplied by the average proportion of attacks in that region as a percentage of the total number of attacks. The results are presented in Table C.8.

Table C.8: Tentative annual estimates for the types of attacks on firefighters

<table>
<thead>
<tr>
<th>Region</th>
<th>Verbal</th>
<th>Harassment</th>
<th>Damage to FRS Property</th>
<th>Civil Disturbance</th>
<th>Physical Attack</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>North East</td>
<td>88</td>
<td>36</td>
<td>9</td>
<td>4</td>
<td>52</td>
<td>189</td>
</tr>
<tr>
<td>North West</td>
<td>147</td>
<td>60</td>
<td>15</td>
<td>7</td>
<td>86</td>
<td>315</td>
</tr>
<tr>
<td>Yorkshire &amp; the Humber</td>
<td>103</td>
<td>42</td>
<td>10</td>
<td>5</td>
<td>60</td>
<td>220</td>
</tr>
<tr>
<td>East Midlands</td>
<td>32</td>
<td>13</td>
<td>3</td>
<td>2</td>
<td>19</td>
<td>68</td>
</tr>
<tr>
<td>West Midlands</td>
<td>69</td>
<td>28</td>
<td>7</td>
<td>3</td>
<td>41</td>
<td>148</td>
</tr>
<tr>
<td>East of England</td>
<td>20</td>
<td>8</td>
<td>2</td>
<td>1</td>
<td>11</td>
<td>42</td>
</tr>
<tr>
<td>South East</td>
<td>16</td>
<td>7</td>
<td>2</td>
<td>1</td>
<td>10</td>
<td>35</td>
</tr>
<tr>
<td>South West</td>
<td>15</td>
<td>6</td>
<td>2</td>
<td>1</td>
<td>9</td>
<td>32</td>
</tr>
<tr>
<td>London</td>
<td>5</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>10</td>
</tr>
<tr>
<td><strong>England</strong></td>
<td><strong>495</strong></td>
<td><strong>202</strong></td>
<td><strong>50</strong></td>
<td><strong>24</strong></td>
<td><strong>289</strong></td>
<td><strong>1,060</strong></td>
</tr>
</tbody>
</table>

Source: Category C data. Please refer to accompanying text for a description of the assumptions used to create this table. Figures may not sum due to rounding.

These figures should be used with extreme caution. Differences in regional figures could be due to better reporting by some Fire and Rescue Services rather than simply more attacks in certain regions. A report by the Labour Research Department for the Fire Brigades Union (2008)\(^{43}\) stated:

“the least satisfactory statistics are still those produced for England and Wales, despite efforts to improve the reporting system”.

The earlier report by the Fire Brigades Union (2005) set out several important considerations. It considered that official figures were “just the tip of the iceberg” with only the more serious incidents being reported and that many firefighters regarded verbal abuse as part of the job. Similarly less serious physical abuse like spitting was also considered by many as part of the job. The Fire Brigades Union 2008 report included similar findings:

“some firefighters argued that since the problem is likely to be caused by social deprivation, it was not something the fire service or the Fire Brigades Union could tackle alone. Another line of reasoning was that perpetrators were rarely punished so what was the point of reporting attacks. In the absence of serious consequences, it was argued, youths know that they could get away with attacks”.

Therefore those incidents included in the Files of Special Interest database were most likely to be incidents that firefighters considered to be serious. The report highlighted some examples such as hoax calls in order to trap firefighters in an ambush, where weapons such as missiles, stones, concrete slabs, fireworks, golf balls and bricks were used to attack firefighters or the property of the Fire and Rescue Service.

It was not possible to extract from the Chartered Institute of Public Finance and Accountancy Fire and Rescue Service statistics the costs resulting from attacks on firefighters. For example, the costs of using other retained or voluntary fire fighters in the absence of injured firefighters, damage to vehicles and equipment during an attack, the costs of attacks in terms of sick days and medical bills. Therefore whilst these costs were not explicitly monetised, the resource and capital costs of attacks were included within the resource and capital costs that were monetised.

Appendix D

Comparison of the economic cost of fire in 2004 and 2006 using an adjusted model

Introduction

This section attempts to compare the total cost of fire in England in 2004 and 2006. The comparison here differs to that in Section 2.3. In this appendix the model itself was adjusted to allow a comparison of the cost elements. The comparison in Section 2.3 was carried out with adjustments to the data to allow high level comparisons between the estimates (please refer to Section 2.3).

In this section, estimates of the costs of fire in England and Wales were undertaken for 2004\(^45\); this work was then updated and revised to estimate the costs of fire in England only in 2006\(^46\). The estimates for 2006 incorporated a revision of key assumptions that were used in the 2004 work, updating and improving the approach where possible and inclusion of additional cost elements.

The result of this work was that in some instances additional costs were estimated that were not included in the 2004 model (e.g. costs for arson) or new or different sources of data and approaches were used to estimate other cost elements (e.g. costs of fire protection in buildings). These factors affect the comparability between the 2004 and the 2006 models. These models are referred to as the “original 2004” model and “extended 2006” model respectively.

This section seeks to minimise factors that limit the comparability of the two models wherever and as far as possible. Where possible, the “extended 2006” model was altered to take out the additional cost elements for which there was no 2004 data. This model minus additional elements was inputted with 2004 data thus giving estimates for the two years that were made on the same basis as far as possible. For clarity this model is described as the “adjusted” model with either 2004 or 2006 data. The model was used to provide a direct comparison of cost elements between 2004 and 2006 where possible. All cost estimates are presented in constant 2006 prices.


\(^{46}\) This work is described in the main part of this report and appendices.
These estimates should be treated with caution and have been provided for indicative purposes only\textsuperscript{47}.

**Overview of differences in models**

The table below summarises the differences between the “original 2004” model and the “extended 2006” model. The last two columns include the action taken to reduce these differences where possible and whether the adjusted models are comparable.

\textsuperscript{47} We do not recommend that these figures are used or applied in any context and Entec takes no responsibility for reliance placed on them by DCLG or any other third party.
<table>
<thead>
<tr>
<th>Costs in anticipation</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Fire protection in buildings</td>
<td>N</td>
</tr>
</tbody>
</table>

In the “extended 2006” Cost of Fire model protection in buildings (in terms of capital and maintenance costs) was based on total value of the fire protection industry by region broken down (distributed) by the number of new domestic buildings in each region in 2006. The “original 2004” Cost of Fire model assumed the capital (only) cost of fire protection (active and passive) based on the annuitisation of capital value of stock. The new methodology was a more accurate reflection of the total value of fire protection as it was based on a survey of the markets. The extent of any difference between the 2004 and 2006 estimates (increase or decrease) would depend on the accuracy of the previous method (e.g. if the previous method significantly over or under-estimated the overall cost this would result in a greater change between the two results).

Method remained fundamentally different – figures for 2006 were based on a survey of the value of the market for active and passive protection. The 2004 model assumed capital costs as a percentage of the annuitised value of the capital stock of buildings and made assumptions regarding building life, proportion of buildings with protection etc.
### Table D.1: Comparison of methodologies (continued)

<table>
<thead>
<tr>
<th>Cost or impact</th>
<th>Comparable approach (Y/N)?</th>
<th>What is the difference in approach?</th>
<th>Action undertaken</th>
<th>Comparable results (Y/N)?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insurance administration</td>
<td>Y</td>
<td>Estimate based on 2004 Association of British Insurers data scaled to 2006 as this information was no longer collected by the Association of British Insurers. This cost element increased in line with inflation. Note that these costs did not (i) factor administrative costs of other organisations such as self-insurers insurance outside the Association of British Insurers or (ii) reflect potential changes in administrative costs that may have resulted from changes in the way that cover was provided or administered (for example, greater on-line processing).</td>
<td>No action required. Method was the same.</td>
<td>Y</td>
</tr>
</tbody>
</table>

---

Appendix D: Comparison of the economic cost of fire in 2004 and 2006 using an adjusted model
<table>
<thead>
<tr>
<th>Cost or impact</th>
<th>Comparable approach (Y/N)?</th>
<th>What is the difference in approach?</th>
<th>Action undertaken</th>
<th>Comparable results (Y/N)?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Costs in anticipation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fire service safety activity (labour)</td>
<td>N</td>
<td>This was determined in the “extended 2006” model by multiplying hours spent on fire safety (inspections, community fire safety activity and fire investigation) by an average fire safety labour cost. Data provided by DCLG was available at a county level and was aggregated to a regional level. Regional costs included accounting for a London weighting. Average fire safety labour cost included 30 per cent overhead relating to fixed administration costs. The “original 2004” model did not include London weighting which was unavailable at the time. Note: Both models excluded fire safety activity undertaken by organisations other than the Fire and Rescue Service (for example private enterprises).</td>
<td>London weighting was excluded from the 2006 model. For consistency the wage rate (originally a 2005 estimate) was adjusted for inflation and applied to both 2004 and 2006 data.</td>
<td>Y</td>
</tr>
<tr>
<td>Non-pay related costs of fire safety</td>
<td>Y</td>
<td>Non-pay related costs, such as training and other employee expenses, were estimated for the 2006 model by subtracting pay related expenditure from total expenditure.</td>
<td>No action required. Method was the same.</td>
<td>Y</td>
</tr>
<tr>
<td>Cost or impact</td>
<td>“Extended 2006” model and “Original 2004” model</td>
<td>Adjusted model run with 2004 and 2006 data</td>
<td>Action undertaken</td>
<td>Comparable results (Y/N)?</td>
</tr>
<tr>
<td>------------------------</td>
<td>------------------------------------------------</td>
<td>------------------------------------------</td>
<td>------------------</td>
<td>--------------------------</td>
</tr>
<tr>
<td>Costs in anticipation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Costs to a ‘responsible person’</td>
<td>N/A</td>
<td>Not estimated in either model as Regulatory Reform (Fire Safety) Order 2005 came into effect late in 2006. This will need to be taken into account in any future updates.</td>
<td>Not estimated in either model.</td>
<td>N/A</td>
</tr>
<tr>
<td>Costs as a consequence</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost of fatal and non-fatal casualties</td>
<td>Y</td>
<td>These approaches were broadly comparable as both models used the ‘value of a statistical life’. The categorisation of injury types (translating from Fire Damage Report 1 data to the severity of injury – serious or slight) was also the same. However, the average value of a casualty by severity (economic value) was adjusted to 2006 prices (for example the value for a fatality used in the “original 2004” model was £1.375m compared with £1.520m in the “extended 2006” model) and the number of recorded incidents was different. Differences in the estimates related to inflation and changes in the number of casualties recorded.</td>
<td>No action required. Method was the same.</td>
<td>Y</td>
</tr>
<tr>
<td>Cost or impact</td>
<td>“Extended 2006” model and “Original 2004” model</td>
<td>Adjusted model run with 2004 and 2006 data</td>
<td></td>
<td></td>
</tr>
<tr>
<td>------------------------------------------------------------------------------</td>
<td>------------------------------------------------</td>
<td>------------------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Costs as a consequence</td>
<td>Comparable approach (Y/N)?</td>
<td>Action undertaken</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost of fatal and non-fatal casualties (continued)</td>
<td>Note: costs produced by the approach selected were likely to be an underestimate – Fire Damage Report 1 data did not include unrecorded casualty data and alternative methods explored in the study (using hospital episode statistics) were not able to further improve its definition.</td>
<td>Comparable results (Y/N)?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Table D.1: Comparison of methodologies (continued)

<table>
<thead>
<tr>
<th>Cost or impact</th>
<th>Comparable approach (Y/N)?</th>
<th>What is the difference in approach?</th>
<th>Action undertaken</th>
<th>Comparable results (Y/N)?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Property damage</td>
<td>N</td>
<td>Both models use Association of British Insurers claims data relating to fires. The “original 2004” model included an estimate of domestic, commercial and public losses based on insurance claims (covered by Association of British Insurers members and those self-insured) and an estimate of losses from uninsured market. Costs through fires that did not result in claims were not estimated. These assumptions were considered and revised in light of better available information for the “extended 2006” model. This included claims data for National Health Service buildings as well as taking into account additional damages to public sector buildings not claimed for through commercial insurers.</td>
<td>The additional data regarding National Health Service was excluded from the revised 2006 model and additional assumptions regarding claims from public buildings. There remained however a difference in the treatment of Association of British Insurers data and claims from public buildings. The “original 2004” model assumed these were additional to Association of British Insurers ‘commercial claims’ category; whereas the “extended 2006” model assumed Association of British Insurers ‘commercial claims’ category was made up of both commercial and public buildings. (This was based on consultation with the Association of British Insurers).</td>
<td>N</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost or impact</td>
<td>Comparable approach (Y/N)?</td>
<td>What is the difference in approach?</td>
<td>Action undertaken</td>
<td>Comparable results (Y/N)?</td>
</tr>
<tr>
<td>---------------</td>
<td>----------------------------</td>
<td>-----------------------------------</td>
<td>------------------</td>
<td>-----------------------</td>
</tr>
<tr>
<td>Costs as a consequence</td>
<td></td>
<td>In the “extended 2006” model data from the Association of British Insurers regarding business interruption claims was used as the basis for this estimate. The “extended 2006” model estimate included a different assumption regarding transfer payments than the “original 2004” model (a higher proportion of 75 per cent rather than 50 per cent) reflecting a view that a greater proportion of equivalent goods could be obtained at no additional cost within England. The difference in the two approaches would in theory decrease the total cost of lost business; however this may be affected if the total value of claims for 2004 and 2006 were significantly different.</td>
<td>Variable for transfer payments was amended to the “original 2004” value, both versions of the revised model assumed 50 per cent.</td>
<td>Y</td>
</tr>
<tr>
<td>Lost business</td>
<td>N</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

48 This was discussed and agreed with the Advisory Board.
<table>
<thead>
<tr>
<th>Cost or impact</th>
<th>Comparable approach (Y/N)?</th>
<th>What is the difference in approach?</th>
<th>Action undertaken</th>
<th>Comparable results (Y/N)?</th>
</tr>
</thead>
</table>
| Criminal justice system costs | N | There were important additional costs taken into consideration in the "extended 2006" model. The "original 2004" model included only criminal justice system costs whereas the "extended 2006" model added the costs to the police and prison service. In addition the assumptions used for the number of detections leading to a charge and the 'route to court' were revised. The costs for court proceedings were based on those available in the previous, "original 2004" model, adjusted for inflation. The inclusion of additional elements increased the overall cost element compared to the "original 2004" model. | Additional elements which were included in the "extended 2006" model were taken out. These included:  
- casualties  
- property damage  
- lost business  
- costs of non-detected arson  
- cautions  
- taken into consideration  
- penalty notice for disorder  
- non-sanction detection  
- costs to the prison service  
The model also revised the proportions of detections by various methods in line with 2004 data (based on British Crime Survey 04/05) | Y |
<table>
<thead>
<tr>
<th>Cost or impact</th>
<th>Comparable approach (Y/N)?</th>
<th>What is the difference in approach?</th>
<th>Action undertaken</th>
<th>Comparable results (Y/N)?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td><strong>Costs in response</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of incidents</td>
<td>Y</td>
<td>The data for the “extended 2006” model was based on information obtained from Fire Damage Report 1 data (and in the case of false alarms, secondary fires or chimney fires were obtained from Fire Damage Report 3 data). The same sources were used in the “original 2004” model but included incidents in Wales.</td>
<td>No action required.</td>
<td>Y</td>
</tr>
<tr>
<td>Average appliance hours</td>
<td>N</td>
<td>Time spent dealing with fires in the 2006 model was taken from Fire Damage Report 1 data. It was assumed that time taken to attend secondary fires was the same as for primary fires. The inclusion of information about false alarms in the “extended 2006” model was different to the “original 2004” model. This better reflected the costs apportioned to different types of fire-related incidents but had no effect on the overall resource costs.</td>
<td>No action required – although approach was different the result was identical.</td>
<td>Y</td>
</tr>
<tr>
<td>Cost or impact</td>
<td>Comparable approach (Y/N)?</td>
<td>What is the difference in approach?</td>
<td>Action undertaken</td>
<td>Comparable results (Y/N)?</td>
</tr>
<tr>
<td>---------------</td>
<td>-----------------------------</td>
<td>--------------------------------------</td>
<td>-------------------</td>
<td>--------------------------</td>
</tr>
<tr>
<td>Costs in response</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average number of pumps per incident</td>
<td>N</td>
<td>Whilst the “extended 2006” model assumed the same number of crew per pump as the “original 2004” model (4.5 per pump in attendance), different data was available for 2006 regarding the average number of pumps per incident. This better reflected the costs apportioned to different types of fire-related incidents but had no effect on the overall resource costs.</td>
<td>No action required. Overall results were comparable.</td>
<td>Y</td>
</tr>
<tr>
<td>Response resource costs</td>
<td>Y</td>
<td>Figures regarding the total annual the Fire and Rescue Service resource cost were available for the “extended 2006” model from the Chartered Institute of Public Finance and Accountancy and were adjusted to remove costs that were included in costs in anticipation (labour cost of fire safety, non-pay related costs of fire safety and resource costs apportioned to special service incidents).</td>
<td>No action required. Methods were comparable.</td>
<td>Y</td>
</tr>
<tr>
<td>Cost or impact</td>
<td>Comparable approach (Y/N)?</td>
<td>What is the difference in approach?</td>
<td>Action undertaken</td>
<td>Comparable results (Y/N)?</td>
</tr>
<tr>
<td>---------------</td>
<td>-----------------------------</td>
<td>-------------------------------------</td>
<td>------------------</td>
<td>--------------------------</td>
</tr>
<tr>
<td>Firefighting capital cost</td>
<td>N</td>
<td>Total capital cost figures were taken directly from expenditure in the Chartered Institute of Public Finance and Accountancy Fire and Rescue Service statistics and adjusted to remove capital costs for fire safety and training which were then incorporated into the costs in anticipation. These costs were double counted in the “original 2004” model. Capital costs of special service incidents were also removed. The exclusion of these additional elements may decrease the overall cost element compared to 2004 but will depend on the various factors such as the lifetime and usage of firefighting equipment, machinery and vehicles.</td>
<td>2004 data was used with the 2006 method to estimate 2004 results and ensure comparability between the two years.</td>
<td>Y</td>
</tr>
<tr>
<td>Cost or impact</td>
<td>Comparable approach (Y/N)?</td>
<td>What is the difference in approach?</td>
<td>Action undertaken</td>
<td>Comparable results (Y/N)?</td>
</tr>
<tr>
<td>----------------------------------------</td>
<td>-----------------------------</td>
<td>-------------------------------------</td>
<td>-------------------</td>
<td>---------------------------</td>
</tr>
<tr>
<td>Marginal cost of false alarms</td>
<td>N/A</td>
<td>This data was not estimated in the “original 2004” model.</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Costs of attacks made on firefighters</td>
<td>N/A</td>
<td>This data was not estimated in the “original 2004” model.</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>
Comparing the underlying data

This section compares some of the underlying data both between the two years in question but also over a longer time period.

Comparing 2004 and 2006

The table below summarises the changes in underlying cost elements that contribute to the overall cost of fire estimates.

<table>
<thead>
<tr>
<th>Data element</th>
<th>Change 2004 to 2006²</th>
<th>Relevance to costs in anticipation</th>
<th>Relevance to costs as a consequence</th>
<th>Relevance to costs in response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of incidents</td>
<td>-3%</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Number of fatalities</td>
<td>+8%</td>
<td></td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Number of injuries</td>
<td>-5%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Population</td>
<td>+1.28%</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Net Capital of Building Stock</td>
<td>+5.3%</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Value of Association of British Insurers claims as a result of fire</td>
<td>+32%</td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Total Fire and Rescue Service net expenditure¹</td>
<td>+4%</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

¹ In order to determine Fire and Rescue Service resource costs, the costs in anticipation (i.e. fire safety activities, fire investigations and community fire safety) and costs of Special Service Incidents were removed to avoid double counting costs.

² adjusted for inflation where appropriate using the retail price index

Longer term trends in the data

This section provides an overview of some of the key data elements over a longer time period. This was in order to investigate to what degree changes observed from 2004 to 2006 were consistent with longer term trends.

The first three figures give an overview of some of the key fire incident data that was used for the cost of fire estimates, and gives an indication of trends in this data from 2001 to 2006. The overall number of fires decreased from 2001, although there was a marked increase in 2003 (and subsequent decrease thereafter).
Figure D.1: Total number of fires (including chimney fires) over time

Source: DCLG

Figure D.2 and Figure D.3 below show the numbers of fatalities and injuries recorded from 2001 to 2006. The number of fatalities fluctuated; and despite an overall decrease in 2006 since 2001, the last two years (2005 and 2006) saw an increase in recorded fatalities from a historical low in 2004. The number of injuries showed a steady decrease over time.

Figure D.2: Total number of fatalities over time

Source: DCLG
The figure below summarises the Association of British Insurers gross claims from fire damage from 1988 to 2006. Whilst domestic claims saw a fairly steady increase over the time period, commercial claims fluctuated over the time period. Therefore comparisons between any two years will be affected by the years chosen. For example, commercial claims increased by 44 per cent between 2004 and 2006, however commercial claims decreased by four per cent between 2003 and 2006.

Source: Association of British Insurers

Note this value differs from that quoted in The Economic Cost of Fire: Estimates for 2006 report as additional cost elements have been removed from this version of the estimate to enable comparability with 2004
Similarly business interruption claims as a result of fire damage from the Association of British Insurers fluctuated over a longer period of time. The time period that this study was interested in coincided with a significant increase in the value of claims from a particularly low period of claims values in 2003 and 2004.

**Figure D.5: Total value of business interruption claims (constant 2006 prices) over time**

Source: Association of British Insurers

The figure below summarises the total Fire and Rescue Service net expenditure (excluding capital costs) over the period 2000-2006 using data available from Chartered Institute of Public Finance and Accountancy. The net expenditure (excluding capital costs) deducted income from gross expenditure.
Comparison of the results

This section presents the results of the work undertaken to compare the cost of fire in 2004 and 2006 using the adjusted model. Costs are presented for England in 2006 prices. The total estimated cost of fire increased from £6.9bn in 2004 to £7.6bn\(^{49}\) in 2006 (a real increase of 11\%).

Of this the greatest increase was observed in costs in anticipation which increased by 19 per cent. The cost of fire protection in buildings constituted almost 80 per cent of the total costs in anticipation for both years and increased by approximately 23 per cent between 2004 and 2006. The difference was very likely due to the differing methods used for estimating costs of fire protection in buildings in 2004 and 2006. The 2006 method was based on a survey of the markets for active and passive protection in buildings undertaken in 2006 and was considered more robust than the 2004 method.
The total costs as a consequence also saw a significant increase of 10 per cent between 2004 and 2006. Of the various cost elements, the greatest increase was seen in costs of property damage (25%) and costs of lost business (52%). As seen in the Association of British Insurers data in Figure D.4 and Figure D.5 above, there were significant increases in the value of claims from 2004 and 2006 in both these categories. By contrast other consequential costs saw a much more modest increase, for example injuries and fatalities only increased by 2 per cent. Response costs only saw a modest increase from 2004 to 2006 of 0.2 per cent.

These costs are presented in Table D.3 and Figure D.7 below.

<table>
<thead>
<tr>
<th></th>
<th>Costs in Anticipation (£m)</th>
<th>Costs as a Consequence (£m)</th>
<th>Costs in Response (£m)</th>
<th>Total costs (£m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
<td>£2,589m</td>
<td>£2,656m</td>
<td>£1,621m</td>
<td>£6,866m</td>
</tr>
<tr>
<td>2006</td>
<td>£3,071m</td>
<td>£2,925m</td>
<td>£1,625m</td>
<td>£7,621m</td>
</tr>
<tr>
<td>% change</td>
<td>19%</td>
<td>10%</td>
<td>0.2%</td>
<td>11%</td>
</tr>
</tbody>
</table>

Figure D.7: Comparison of elements of the cost of fire in 2004 and 2006 using the reduced model
The figures below summarise the changes in total costs by region. All regions saw an increase in costs between 2004 and 2006, with the greatest increase observed in the North West (£120m) and London (£125m). The smallest increase was observed in Yorkshire and the Humber (£51m).

**Figure D.8: Comparison of total cost of fire by region using the reduced model**

**Figure D.9: Percentage change in the total cost of fire in each region using the reduced model**
The tables below provide a further more detailed summary of cost changes by region and by each element.

### Table D.4: Estimated cost of fire in 2004 using the reduced model (in million £s)

<table>
<thead>
<tr>
<th>Region</th>
<th>Anticipation (£m)</th>
<th>Consequence (£m)</th>
<th>Response (£m)</th>
<th>Total (£m)</th>
<th>Cost per 1,000 population (£)</th>
<th>Cost per person (£)</th>
</tr>
</thead>
<tbody>
<tr>
<td>North East</td>
<td>£101m</td>
<td>£141m</td>
<td>£102m</td>
<td>£344m</td>
<td>£137,756</td>
<td>£138</td>
</tr>
<tr>
<td>North West</td>
<td>£309m</td>
<td>£550m</td>
<td>£244m</td>
<td>£1,103m</td>
<td>£164,566</td>
<td>£165</td>
</tr>
<tr>
<td>Yorkshire &amp; The Humber</td>
<td>£251m</td>
<td>£312m</td>
<td>£174m</td>
<td>£737m</td>
<td>£148,124</td>
<td>£148</td>
</tr>
<tr>
<td>East Midlands</td>
<td>£272m</td>
<td>£222m</td>
<td>£112m</td>
<td>£607m</td>
<td>£144,166</td>
<td>£144</td>
</tr>
<tr>
<td>West Midlands</td>
<td>£225m</td>
<td>£262m</td>
<td>£169m</td>
<td>£656m</td>
<td>£125,089</td>
<td>£125</td>
</tr>
<tr>
<td>East of England</td>
<td>£313m</td>
<td>£226m</td>
<td>£161m</td>
<td>£700m</td>
<td>£129,183</td>
<td>£129</td>
</tr>
<tr>
<td>South East</td>
<td>£444m</td>
<td>£352m</td>
<td>£243m</td>
<td>£1,040m</td>
<td>£131,175</td>
<td>£131</td>
</tr>
<tr>
<td>South West</td>
<td>£315m</td>
<td>£206m</td>
<td>£141m</td>
<td>£662m</td>
<td>£134,603</td>
<td>£135</td>
</tr>
<tr>
<td>London</td>
<td>£361m</td>
<td>£384m</td>
<td>£274m</td>
<td>£1,019m</td>
<td>£139,707</td>
<td>£140</td>
</tr>
<tr>
<td><strong>England</strong></td>
<td><strong>£2,589m</strong></td>
<td><strong>£2,656m</strong></td>
<td><strong>£1,621m</strong></td>
<td><strong>£6,866m</strong></td>
<td><strong>£139,624</strong></td>
<td><strong>£140</strong></td>
</tr>
</tbody>
</table>

### Table D.5: Estimated cost of fire in 2006 using the reduced model (in million £s)

<table>
<thead>
<tr>
<th>Region</th>
<th>Anticipation (£m)</th>
<th>Consequence (£m)</th>
<th>Response (£m)</th>
<th>Total (£m)</th>
<th>Cost per 1,000 population (£)</th>
<th>Cost per person (£)</th>
</tr>
</thead>
<tbody>
<tr>
<td>North East</td>
<td>£120m</td>
<td>£184m</td>
<td>£109m</td>
<td>£413m</td>
<td>£163,231</td>
<td>£163</td>
</tr>
<tr>
<td>North West</td>
<td>£366m</td>
<td>£613m</td>
<td>£245m</td>
<td>£1,224m</td>
<td>£179,209</td>
<td>£179</td>
</tr>
<tr>
<td>Yorkshire &amp; The Humber</td>
<td>£297m</td>
<td>£319m</td>
<td>£173m</td>
<td>£788m</td>
<td>£156,130</td>
<td>£156</td>
</tr>
<tr>
<td>East Midlands</td>
<td>£324m</td>
<td>£237m</td>
<td>£119m</td>
<td>£680m</td>
<td>£158,316</td>
<td>£158</td>
</tr>
<tr>
<td>West Midlands</td>
<td>£270m</td>
<td>£282m</td>
<td>£165m</td>
<td>£717m</td>
<td>£134,303</td>
<td>£134</td>
</tr>
<tr>
<td>East of England</td>
<td>£373m</td>
<td>£235m</td>
<td>£158m</td>
<td>£767m</td>
<td>£138,457</td>
<td>£138</td>
</tr>
<tr>
<td>South East</td>
<td>£525m</td>
<td>£364m</td>
<td>£247m</td>
<td>£1,136m</td>
<td>£139,001</td>
<td>£139</td>
</tr>
<tr>
<td>South West</td>
<td>£377m</td>
<td>£238m</td>
<td>£137m</td>
<td>£752m</td>
<td>£148,047</td>
<td>£148</td>
</tr>
<tr>
<td>London</td>
<td>£419m</td>
<td>£452m</td>
<td>£272m</td>
<td>£1,144m</td>
<td>£151,263</td>
<td>£151</td>
</tr>
<tr>
<td><strong>England</strong></td>
<td><strong>£3,071m</strong></td>
<td><strong>£2,925m</strong></td>
<td><strong>£1,625m</strong></td>
<td><strong>£7,621m</strong></td>
<td><strong>£151,226</strong></td>
<td><strong>£151</strong></td>
</tr>
</tbody>
</table>
Summary

The total cost of fire increased by approximately 11 per cent between 2004 and 2006, from an estimate of £6.9bn to an estimate of £7.6bn. Both costs in anticipation and costs as a consequence increased during this time and of these the greatest contributors to increased costs were the following:

- Costs of implementing fire protection in buildings – due to fundamental differences in method of estimating the value of implementing and maintaining protection devices in buildings and
- Costs of property damage and lost business – due to considerable increases in the value of claims recorded by the Association of British Insurers during these two years. However differences in the categorisation of Association of British Insurers data between the two years meant that the data was not comparable.

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50 Somerset Fire and Rescue Service merged with Devon Fire and Rescue Service on April 1st 2007.
51 Devon Fire and Rescue Service merged with Somerset Fire and Rescue Service in 2007.
Appendix E

Additional statistics

E1.1 Overview

The following tables record how fire and rescue services were classified by region and the population data used for the 2006 model:

<table>
<thead>
<tr>
<th>Region</th>
<th>Fire and Rescue Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>North East</td>
<td>Northumberland</td>
</tr>
<tr>
<td></td>
<td>Cleveland</td>
</tr>
<tr>
<td></td>
<td>Durham and Darlington</td>
</tr>
<tr>
<td></td>
<td>Tyne and Wear</td>
</tr>
<tr>
<td>North West</td>
<td>Cumbria</td>
</tr>
<tr>
<td></td>
<td>Cheshire</td>
</tr>
<tr>
<td></td>
<td>Lancashire</td>
</tr>
<tr>
<td></td>
<td>Greater Manchester</td>
</tr>
<tr>
<td></td>
<td>Merseyside</td>
</tr>
<tr>
<td>Yorkshire &amp; Humber</td>
<td>Humberside</td>
</tr>
<tr>
<td></td>
<td>North Yorkshire</td>
</tr>
<tr>
<td></td>
<td>South Yorkshire</td>
</tr>
<tr>
<td></td>
<td>West Yorkshire</td>
</tr>
<tr>
<td>East Midlands</td>
<td>Lincolnshire</td>
</tr>
<tr>
<td></td>
<td>Northamptonshire</td>
</tr>
<tr>
<td></td>
<td>Derbyshire</td>
</tr>
<tr>
<td></td>
<td>Leicestershire</td>
</tr>
<tr>
<td></td>
<td>Nottinghamshire</td>
</tr>
</tbody>
</table>
Table E.1: Fire and Rescue Services classified by region (continued)

<table>
<thead>
<tr>
<th>Region</th>
<th>Fire and Rescue Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>West Midlands</td>
<td>Warwickshire</td>
</tr>
<tr>
<td></td>
<td>Hereford and Worcester</td>
</tr>
<tr>
<td></td>
<td>Shropshire</td>
</tr>
<tr>
<td></td>
<td>Staffordshire</td>
</tr>
<tr>
<td></td>
<td>West Midlands</td>
</tr>
<tr>
<td>East of England</td>
<td>Hertfordshire</td>
</tr>
<tr>
<td></td>
<td>Norfolk</td>
</tr>
<tr>
<td></td>
<td>Suffolk</td>
</tr>
<tr>
<td></td>
<td>Bedfordshire and Luton</td>
</tr>
<tr>
<td></td>
<td>Cambridgeshire</td>
</tr>
<tr>
<td></td>
<td>Essex</td>
</tr>
<tr>
<td>South East</td>
<td>Isle of Wight</td>
</tr>
<tr>
<td></td>
<td>Oxfordshire</td>
</tr>
<tr>
<td></td>
<td>Surrey</td>
</tr>
<tr>
<td></td>
<td>West Sussex</td>
</tr>
<tr>
<td></td>
<td>Royal Berkshire</td>
</tr>
<tr>
<td></td>
<td>Buckinghamshire</td>
</tr>
<tr>
<td></td>
<td>East Sussex</td>
</tr>
<tr>
<td></td>
<td>Hampshire</td>
</tr>
<tr>
<td></td>
<td>Kent</td>
</tr>
<tr>
<td>South West</td>
<td>Cornwall</td>
</tr>
<tr>
<td></td>
<td>Gloucestershire</td>
</tr>
<tr>
<td></td>
<td>Somerset&lt;sup&gt;50&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Isles of Scilly</td>
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<tr>
<td></td>
<td>Avon</td>
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<td></td>
<td>Devon&lt;sup&gt;51&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Dorset</td>
</tr>
<tr>
<td></td>
<td>Wiltshire</td>
</tr>
<tr>
<td>London</td>
<td>London Fire and Emergency Planning Authority</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Regions</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>North East</td>
<td>2,529,500</td>
</tr>
<tr>
<td>North West</td>
<td>6,832,400</td>
</tr>
<tr>
<td>Yorkshire &amp; The Humber</td>
<td>5,049,300</td>
</tr>
<tr>
<td>East Midlands</td>
<td>4,295,800</td>
</tr>
<tr>
<td>West Midlands</td>
<td>5,336,500</td>
</tr>
<tr>
<td>East of England</td>
<td>5,537,300</td>
</tr>
<tr>
<td>South East</td>
<td>8,172,900</td>
</tr>
<tr>
<td>South West</td>
<td>5,079,900</td>
</tr>
<tr>
<td>London</td>
<td>7,562,100</td>
</tr>
</tbody>
</table>

Source: Chartered Institute of Public Finance and Accountancy Fire and Rescue Service statistics 2006/07
Appendix F

Suggestions for further research

This study was based on available data relating to the various cost elements contributing to the total cost of fire. Where previous research in particular areas was not available this study made use of best estimates or did not quantify the cost element. There are a number of areas where future research could be targeted in order to better estimate various cost elements. These are summarised in the table below:

<table>
<thead>
<tr>
<th>Cost category</th>
<th>Summary of suggestions for further research</th>
</tr>
</thead>
<tbody>
<tr>
<td>Costs in anticipation</td>
<td>• Detailed breakdown of commercial and public building stock by region to facilitate a better understanding of how the total value of the fire protection in buildings (both active and passive) may be broken down regionally and by building type.</td>
</tr>
<tr>
<td>Costs as a consequence</td>
<td>• The use of Association of British Insurers insurance payouts underestimated the total cost of fire damage because they did not capture excesses paid. Research is required into appropriate average values for insurance excesses to capture this element of fire damage.</td>
</tr>
<tr>
<td></td>
<td>• Additional research is required to better understand the total value of damages incurred by the public sector. This relates particularly to the amounts claimed through internal insurance funds and not from commercial insurers (which was measurable through Association of British Insurers data).</td>
</tr>
<tr>
<td></td>
<td>• Costs of lost business as a result of fire – in particular estimating an appropriate value of ‘redistribution’ in the national economy of losses incurred to individual businesses.</td>
</tr>
<tr>
<td></td>
<td>• The costs of arson estimates require further research into the various assumptions employed. Collaboration with the Home Office or the Ministry of Justice is recommended in this respect.</td>
</tr>
</tbody>
</table>
### Table F.1: Suggestions for further research (continued)

<table>
<thead>
<tr>
<th>Cost category</th>
<th>Summary of suggestions for further research</th>
</tr>
</thead>
<tbody>
<tr>
<td>Costs in Response</td>
<td>• Reporting Chartered Institute of Public Finance and Accountancy data in a manner that allows resource and capital expenditure to be allocated between different types of Fire and Rescue Service activities is recommended.</td>
</tr>
<tr>
<td></td>
<td>• More research is required into understanding the nature of attacks on firefighters and reporting on the financial implications of such attacks.</td>
</tr>
<tr>
<td></td>
<td>• With regards to the opportunity costs of false alarms – a better understanding is required of the benefits foregone from alternative activities that the Fire and Rescue Service could undertake if they did not have to respond to false alarms.</td>
</tr>
<tr>
<td></td>
<td>• It may be useful from a policy perspective to determine the marginal costs as well as the average costs of responding to fires. Marginal costs can more accurately portray the benefits or costs of reductions/increases of responding to additional incidents. Because marginal costs only consider the costs associated with attending one more incident, they do not include the fixed cost elements (which must be spent irrespective of the number of incidents).</td>
</tr>
</tbody>
</table>