Underpinning Policy

Modelling Bus Subsidy in English Metropolitan Areas

Report for Passenger Transport Executive Group

August 2011

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Document Control

Project Title:	Modelling Bus Subsidy in English Metropolitan Areas
MVA Project Number:	C3A37200
Document Type:	Final Report
Directory & File Name:	M:\Tp\C3A372 PTEG Modelling Bus Subsidy\Report\20110808 Modelling Bus Subsidy In English Metropolitan Areas Final Report (Abridged) V5.0.Doc

Document Approval

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Distribution

Issue	Date	Distribution	Comments
1	01/06/2011	Passenger Transport Executive Group	Draft scenarios and content for discussion
2	08/06/2011	Passenger Transport Executive Group	Full draft for discussion
3	24/06/2011	Passenger Transport Executive Group	Revised draft final report
4	07/07/2011	Passenger Transport Executive Group	Final report
5	08/08/2011	Passenger Transport Executive Group	Final report with concessionary entitlement functionality added

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1 Executive Summary

The English bus industry faces an uncertain future due to the wider socio-economic outlook, recent policy changes (such as the announcement of a 20% cut in Bus Subsidy Operators Grant) and substantial cuts in local government funding. The main objective of this report is to produce forecasts of the medium term implications for English metropolitan areas of changes in these and other key industry drivers.

As part of this project, MVA developed an aggregate modelling framework of the English bus industry, consistent with the DfT's National Bus Model but with enhanced capabilities in terms of the representation and modelling of subsidy flows and operator responses. The model takes into account factors both internal and external to the bus industry, including central and local government policy and funding, as well as key cost and demand drivers.

Three main scenarios were tested:

- The Reference Case (Scenario 0) assumes the continuation of pre-election policies and trends.
- Scenario 1 takes into account the impact of the announced 20% cut in BSOG combined with changes in the concessionary travel entitlement age and the impact of the increase in the Green Bus Fund (GBF).
- Scenario 2 takes into account the same changes as scenario 1 as well as the cuts in the Integrated Transport Block and Road Maintenance grants to local authorities. It also assumes that announced cuts in local government funding will translate into an overall 23% cut in the budget to support the tendered network.

In addition, a further scenario was considered (Scenario 3), which assumes that as a result of the Competition Commission's on-going investigation into the local bus market, it will be possible to radically reduce the detrimental effect on consumers its provisional report identified. However, this is intended merely as an exploratory scenario and relies necessarily on more substantial assumptions than the previous three.

The table below summarises the changes in key indicators forecast by the model between 2009 (taken as the base year due to constraints on data availability) and 2014.

Scenario	0 Reference Case (continuation of pre-election trends)	1 BSOG and GBF changes	2 Local Gov. cuts	3 C.C. success
Patronage	-16%	-18%	-20%	-7%
Fares	18%	21%	24%	0%
Service-kms	-13%	-15%	-19%	-4%
Government Support				
Central (BSOG)	-14%	-32%	-35%	-23%
Local (Concessions)	10%	11%	9%	-9%
Local (Tendered)	0%	0%	-23%	-23%
Total	4%	1%	-7%	-15%
Increased congestion	+£53M	+£64M	+£68M	+£24M

N.B.: Note that all figures in this table are rounded to the nearest integer.

The **Reference Case** shows a continued decline in patronage and service mileage, mirrored by an almost equivalent increase in fares. These changes largely reflect the impact of external cost and demand drivers allied with past trends in operator's commercial behaviour. On the public expenditure side, BSOG falls in line with service mileage, whereas concessionary reimbursement continues to increase, reflecting both increases in commercial fares and demographic trends. Given the subsidy mix in PTE areas, net public expenditure would be expected to grow by 4% in real terms between 2009 and 2014.

Scenario 1 shows a further reduction in patronage, largely as a result of the increase in fares and cuts in commercial mileage that follow from the change in BSOG payments. Although this scenario leads to a substantial reduction in direct government payments to operators, there is likely to be an increase in concessionary reimbursement payments by local authorities due to the additional fares rise. Overall, net public expenditure increases only marginally.

Scenario 2 shows a more marked decline in service mileage due to the withdrawal of some tendered services, alongside an increase in commercial fares aimed at recouping the revenue lost by operators and the increase in costs that result from the fall in capital grants to local authorities. Overall, the additional decline in patronage is marginal relative to the previous scenario. In terms of concessionary reimbursement, this is slightly below the previous scenario as the increase in fares is outweighed by the loss in concessionary demand due to the decline in service mileage. Unlike in the previous scenarios, there is now a net real terms reduction in public expenditure over the 5 year period.

Scenario 3 paints a substantially different picture. If we assume a reduction in the market power of incumbent operators, then the result would be a more balanced sharing of cost increases and subsidy decreases between operators and passengers. As a result, fares are

kept close to their 2009 levels and mileage is reduced by a much smaller proportion than in any of the other scenarios. Given the modest increase in fares, patronage is also less affected as is the case with concessionary reimbursement, which falls in real terms over the period. Overall, this leads to the lowest level of public expenditure of any scenario.

These results show that the trend towards rising fares and falling demand, observed over the past decades in metropolitan areas, are likely to continue into the foreseeable future. If anything, this trend is likely to be compounded by the current economic climate and confirmed cuts in central and local government funding. The immediate effect of the deterioration of local bus networks will be an increase in congestion, with a cost to society, due to increased congestion alone, close to £70million in the worst case scenario. There are also likely to be substantial distributional implications across different segments of the population, although these have not been quantified in our analysis. Much of this expected decline in patronage could be averted, but at the expense of operator profit margins, if the current Competition Commission investigation led to reductions in the market power of incumbent operators.

2 Introduction

2.1 Summary

2.1.1 The English bus industry is facing an uncertain climate due to several recent or planned changes in Government policy which will impact, either directly or indirectly, on its cost and revenue structures. Whilst the effect of each can be relatively easily understood in isolation, their combined impact is much more difficult to gauge. The purpose of this report is therefore to provide:

- context for recent trends, and forthcoming changes, affecting the performance of the English bus industry and the outcomes achieved;
- aggregate analysis of the effect of proposed changes in policy, cost trends, and external influences on networks, with a focus on the impact in metropolitan areas; and
- discussion on how the proposed changes to subsidy and support streams will affect the outcomes achieved from funding to the bus industry.

2.1.2 The aim is not to advocate a particular course of action or changes in policy, but rather to articulate, with the best available evidence base at this moment in time, the most likely outputs and outcomes from changes in one or more of the key factors affecting performance of the English bus industry.

2.1.3 These objectives have been met through the development and application of an aggregate modelling framework, described in Chapter 3.

2.2 Context

2.2.1 The English bus industry is facing a series of challenges and issues which could fundamentally alter the supply of, and demand for, bus services. These include:

- changes in policy, and the associated revenue and capital support mechanisms provided by Central and Local Government;
- shifts in the industry's cost base and cost structure; and
- trends in external (exogenous) factors that are outside of its direct control, eg economic performance or the costs of owning and operating a car.

2.2.2 The vast majority of these factors do not act in isolation; that is, there are often interactions or multiplier effects whereby a change in one factor brings about (a possibly unforeseen) change in another. The analysis framework used to assess changes within this report has been set up to account for such interactions wherever possible.

2.2.3 In the following sections within this chapter we provide:

- general context for key trends in the English bus industry; and
- description of the main revenue support mechanisms, including recent related policy changes.

2.3 Background trends in the English Bus Industry

2.3.1 In 2009/10, bus industry revenue in England came in almost equal parts from fare paying passengers and from the public purse. There are three main public streams into the industry: general network support and subsidy from local transport authorities, which pays for the running of non commercial services (47%), reimbursement for concessionary travel (37%) – specified by Central Government but administered by local authorities, and a rebate on fuel duty (16%) through the Bus Service Operators Grant (BSOG) from Central Government.

2.3.2 However, it is important to understand that revenue structures vary considerably across the country as does the competitive position of the bus relative to other modes. For example, general network subsidy represents 35% of total industry revenue in London, compared to only 10% in the metropolitan areas[1]. Conversely, concessionary reimbursement is relatively more important to the industry in the metropolitan areas (23%) than in the capital (11%).

2.3.3 Over time, both the revenue and cost structures of the industry have suffered significant changes, with a knock-on effect on the performance of bus networks. For example, the introduction of free concessionary travel for older and disabled people led, over the past five years, to a very substantial rise in public support outside of London and the metropolitan areas. Another example was the dramatic increase in general network subsidy in London, ahead of the introduction of congestion charging, in order to increase service-kms and improve service quality.

2.3.4 On the costs side, it is well known that fuel prices have been rising well above general price inflation in recent years, hence making up an increasing proportion of industry costs. Figure 1 shows typical operating costs for UK bus operators. Bus operation is also inherently labour intensive – every bus requires a driver, and at best each bus can carry only around 90 passengers. Recent above inflation increases in wage levels within the industry have therefore been another important driver of industry costs.

[1] We define 'metropolitan areas' as the conurbations of Tyne & Wear, West Yorkshire, South Yorkshire, Greater Manchester, Merseyside and the West Midlands.

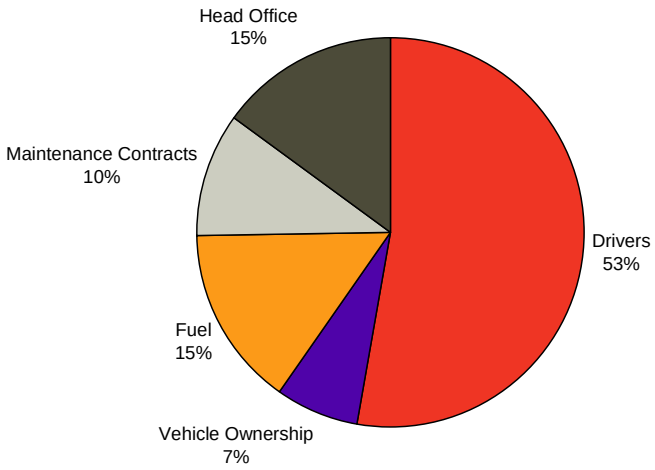

Figure 1: Costs by Category – UK Bus Industry 2009[2]

2.3.5 In a relatively high wage environment, such as UK cities, this means that labour costs are the decisive factor in determining commercial viability – operators work hard to minimise the resources required to meet the demand they face. Other factors, whilst of importance, are generally less crucial – although changes to other variable costs (such as fuel or maintenance costs) can be of local importance where commercial viability is marginal. In extreme cases, operators may economise by delaying investment such as fleet replacement – however, if they cannot afford to put a driver in a bus, then they cannot afford to put a service on the road, meaning fewer service-kms and less bus patronage.

2.3.6 Operators' responses to changes in policy, costs and external factors are therefore extremely sensitive to the impact that they have on the resources they need to deploy (most simplistically thought of as the number of buses required to operate a particular level of service and in turn carry a particular level of demand).

2.3.7 Figure 2 illustrates recent trends in both demand and supply side bus statistics for English metropolitan areas. Whilst patronage and service-kms (until 2008/9) have been maintained at constant levels, all other statistics have risen in the last five years. Total operating costs rose sharply from 2004/5 to 2006/7, and then again in 2009/10. Total net public support has outstripped changes in all other statistics, and has, since 2006/7, been closely mirrored by the operating revenue received per passenger journey. This latter metric includes 'farebox' revenue plus all support streams provided by Central and Local Government, based on either kilometres provided or passengers carried.

[2] Source: Bus Industry Monitor, online version.

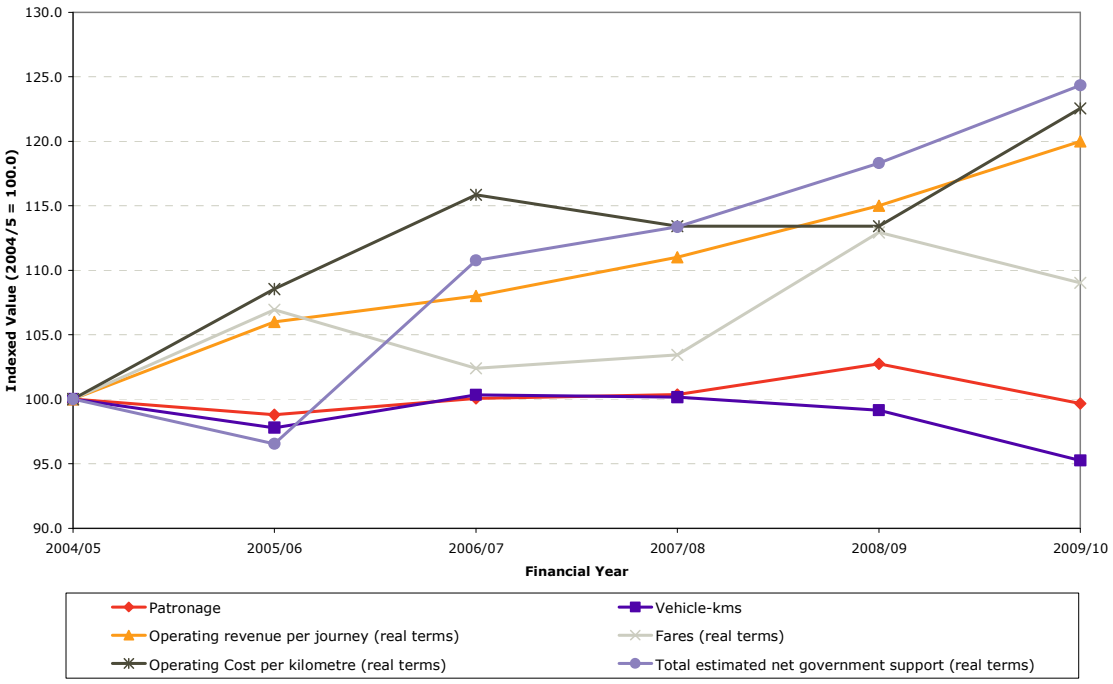

Figure 2: Recent Trends in Metropolitan Bus Statistics (Source: DfT STATS100 Data)

2.4 Government Support

2.4.1 There are multiple sources of support for the bus industry, administered at both Central and Local Government levels, including:

- Bus Service Operators Grant (BSOG);
- Concessionary Travel reimbursement;
- Tendered Service Support;
- Green Bus Fund (GBF); and
- Integrated Transport Block (ITB).

2.4.2 Set against these sources of public support is revenue generated through the farebox. Figure 3 illustrates the percentage contribution of each stream to overall operator revenues in English metropolitan areas for 2009[3].

[3] The effects of the Green Bus Fund on operator fleets were yet to be observed in 2009, whilst the Integrated Transport Block

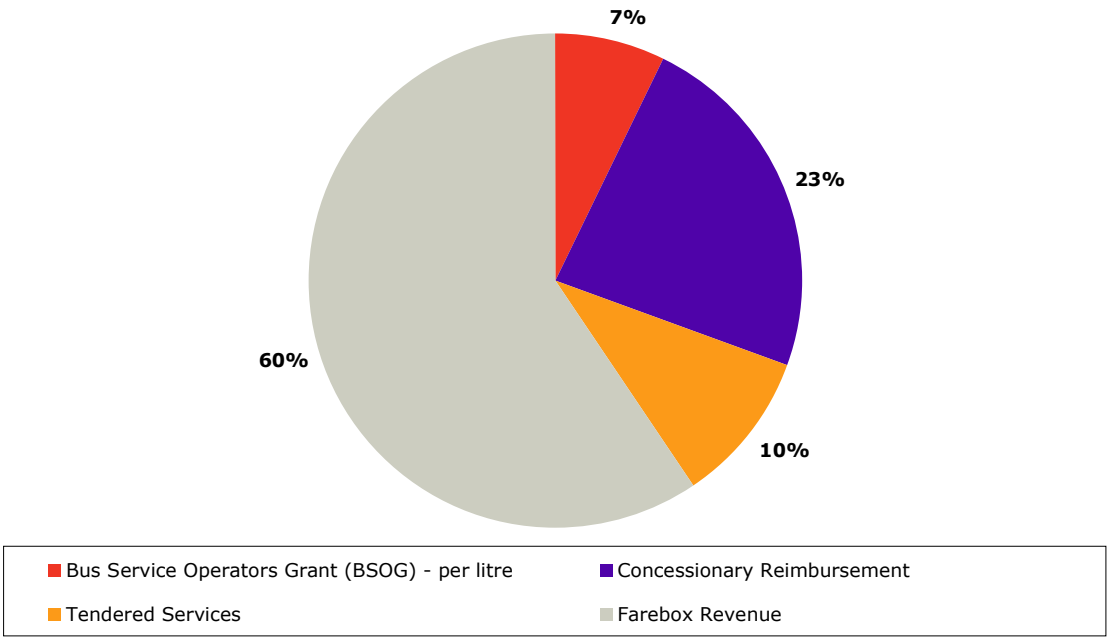

Figure 3: 2009 Metropolitan Areas Bus Industry Revenue Structure (Source: Department for Communities and Local Government Financial Statistics, and Department for Transport STATS100 data)

Bus Service Operators Grant

2.4.3 Bus Service Operator Grant (BSOG) is designed to insulate bus operations from the impact of duty on their fuel consumption. Operators are reimbursed on a pence per litre (ppl) or pence per kilogram (ppkg) basis, which varies according to fuel type; for example, biodiesel, bioethanol, and natural gas all receive, as of 2011, a 100% rebate on fuel duty. The equivalent rebate for diesel is between 75 to 80%. Although the mechanism for claiming and paying the subsidy remains closely linked to fuel consumption and the supply of service-kms, BSOG has also been seen as a policy lever to encourage technological innovation. Incentives included:

- a Fuel Efficiency Incentive – a 3% increase in the BSOG rate for one year after an improvement of 6% in kilometres per litre has been made;
- Low Carbon Emission Bus (LCEB) Incentive - whereby an additional payment per kilometre is made if a 30% reduction in Greenhouse Gas Emissions, compared to an equivalent Euro 3 class diesel vehicle, takes place;
- Smartcard Incentive – an 8% increase in the BSOG rate where an operator has an operational ITSO[4] compliant smartcard system; and
- Automatic Vehicle Location (AVL) Incentive – a 2% increase in the BSOG rate if the operator has fitted their buses with the relevant equipment.

[4] ITSO is a government-backed non-profit organisation which sets a common technical standard for the provision of smart cards. More information available at: http://www.itso.org.uk/.

2.4.4 All incentives are cumulative on the base rate, which in 2009 was equivalent to 41ppl, or around 16 pence per average service-km.

2.4.5 From 2012/13, the Department for Transport (DfT) plans to make a reduction of 20% in BSOG. The incentives for smartcards, low carbon buses and automatic vehicle location will be maintained at the same percentage rates.

Concessionary Travel Reimbursement

2.4.6 A National Concessionary Travel Scheme (NCTS) currently operates throughout England, entitling elderly and disabled people to free bus travel across the country. Travel Concession Authorities (the PTEs in metropolitan areas and counties or unitary authorities elsewhere) are required to reimburse bus operators for carrying these passengers. Concessionary Travel reimbursement is tied specifically to two key metrics, the revenue foregone by operators by allowing elderly and disabled passengers to use their services for free, plus the additional operating cost caused by the new passengers generated by the concession, according to a 'no better, no worse off' principle. The DfT published updated guidance for TCAs on reimbursement formulae for calculating payments to operators in November 2010[5].

2.4.7 This public support for travel which is undertaken largely off-peak helps maintain a robust network of "commercial" services throughout the day, with benefits beyond the target user group. The boosting of off-peak demand also helps maximise the utilisation of resources (labour and capital), which in turn supports a more cost-effective provision of peak services. This is a (positive) indirect impact from a Government policy targeted at addressing other outcomes.

2.4.8 As of June 2011, the UK Government is committed to protecting the England-wide concessionary travel scheme for older and disabled people although there will be gradual changes in entitlement linked to retirement age. Efficiency savings have also been identified in this area, focused on the way the scheme is administered in county areas[6]. However, these savings will not take place in metropolitan areas where scheme administration has not changed. From 2010 to 2020 the State Pension Age (SPA) for women, to which concessionary entitlement is linked for both men and women[7], is rising from 60 to 66[8].

Tendered Service Support

2.4.9 Local transport authorities are allowed to subsidise operators to run a specific journey or service which they would otherwise not run on a commercial basis, following a transparent tendering process. In some cases tendered services may contribute towards supporting the overheads required for otherwise "commercial" services in the area – for example, by contributing to depot and central administration costs. The definition of a tendered service within this report excludes school, community transport and other forms of specialist, more bespoke provision, and concentrates solely on scheduled service-kms.

[5] Available at: http://www.dft.gov.uk/publications/reimbursing-bus-operators-for-concessionary-travel/

[6] As detailed at:

http://nds.coi.gov.uk/clientmicrosite/Content/Detail.aspx?ClientId=202&NewsAreaId=2&ReleaseID=416118&SubjectId=36

[7] As detailed at: http://www2.dft.gov.uk/pgr/regional/buses/concessionary/changes/qa.html

[8] As detailed at: http://www.dwp.gov.uk/consultations/2010/spa-66-review.shtml

Green Bus Fund

2.4.10 The Green Bus Fund (GBF), administered by the DfT, provides targeted capital funding to encourage a particularly beneficial type of investment; in this case the purchase of [more] environmentally friendly, low carbon, buses which would otherwise have been unaffordable for "commercial" bus operations. A second round of the GBF was completed in March 2011.

Integrated Transport Block

2.4.11 The Integrated Transport Block (ITB) is a capital grant provided by the DfT since 2000 as part of the Local Transport Plan (LTP) process and is typically used by local authorities to fund small scale schemes costing less than £5M. For the bus industry, this includes priority, travel information, and ticketing schemes. Following the 2010 Comprehensive Spending Review (CSR), total funding available from the ITB to all non-London transport authorities is programmed to fall from £590M in 2009/10 to £450M in 2010/11, and £300M in 2011/12, in nominal terms. There then follows a nominal increase to £320M in both 2012/13 and 2013/14. As of 2009/10, ITB funding for metropolitan areas amounted to approximately a third of the total allocation for England.

2.4.12 The highways maintenance capital grant is funding to help local authorities plan and mange the road networks, and is administered in the same way as ITB funding.

Summary

2.4.13 The proportion of total revenue support provided by BSOG, Concessionary Travel Reimbursement, and Tendered Service Support varies by area type. Figure 4 shows that the tendered service proportion is highest in small town and rural areas; London is excluded from this analysis due to the unique nature of the tendered support provided in the capital. As average occupancies are typically lower in small town and rural areas, the proportion received from concessionary fare reimbursement is lower, and BSOG payments and tendered support are correspondingly higher.

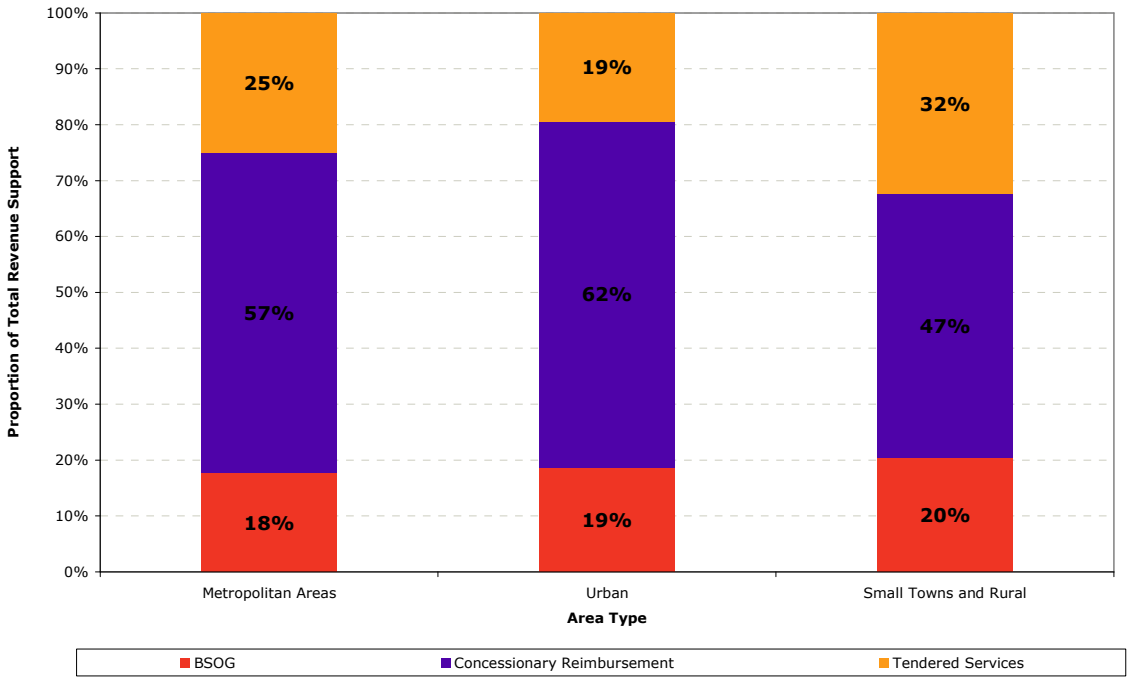

Figure 4: Revenue Support by Area Type

3 Forecasting Future Performance

3.1 Modelling Framework

3.1.1 In order to understand the relative impact of changes in the factors affecting supply and demand in the English bus industry an aggregate modelling framework was developed for ***pteg***. Figure 5 illustrates the structure of the framework, which takes predefined data and assumptions on policy, parameters/assumptions, external influences, and industry costs and simulates an operator response(s) until a series of key criteria and constraints are satisfied (as far as possible).

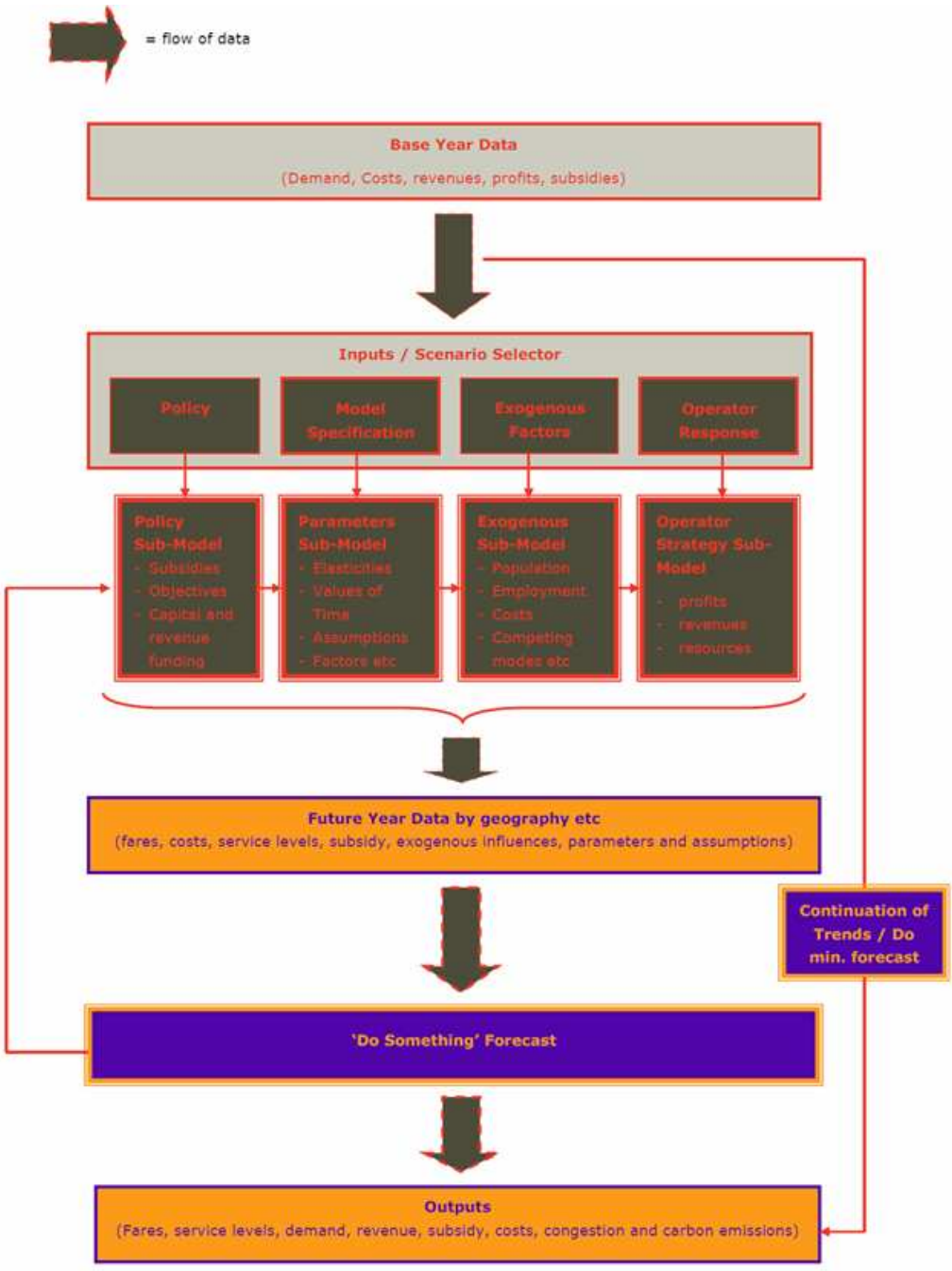

Figure 5: Analytical Framework

3.1.2 In the following sections we detail key data and assumptions underpinning subsequent scenario forecasts broken into:

- internal demand drivers;
- external demand drivers;
- industry costs;
- market conditions; and
- operator strategies and response.

3.1.3 Underlying assumptions and relationships are held constant across all scenarios, unless otherwise stated, in order that the true impact of changes in policy and Government support can be objectively assessed.

3.1.4 Whilst the focus in this analysis has been on metropolitan areas, the framework also has the capability to separately model London, 'Urban' areas, and 'Small Towns and Rural' areas.

3.2 Internal Demand Drivers

3.2.1 The aggregate modelling framework is sensitive to all principal internal, to the English bus industry, factors affecting passenger demand. Future year levels are determined by a combination of operator strategies and responses and and/or Government investment. Those influenced by operator strategies and response include:

- fares, real tem changes from year-to-year by ticket type;
- service-kms, converted into the equivalent frequency which passengers experience 'on the ground', and, for certain types of service access and egress times for getting to and from the bus network; and
- fleet renewal rates affecting vehicle quality.

3.2.2 Those influenced by Governmental investment include:

- journey time, through investment (or otherwise) in measures which improve bus priority and/or reduce boarding and alighting times;
- vehicle quality, through capital grants to support the purchase of better vehicles;
- stop quality, by investing in infrastructure which improves passengers experiences at bus stops and stations; and
- support for the Tendered Network, influencing network coverage, and thus access and egress times, and frequencies of service.

3.2.3 Sensitivities of passenger demand to each of the internal demand drivers were sourced from standard UK bus industry evidence; for example the Transport Research Laboratory (TRL) report 'The demand for public transport: a practical guide'.

3.3 External Demand Drivers

3.3.1 In addition to internal variables there are a range of external factors which affect the demand for bus services but are to a large extent independent of decisions taken by

operators and/or the different tiers of Government. At a relatively high spatial level these can be grouped under three main headings, namely:

- economic indicators, such as regional Gross Value Added (GVA) and employment levels, driving overall demand for travel, sourced from regional economic forecasts produced by Oxford Economics and the Department for Transport (DfT) via TEMPRO;
- demographic indicators, particularly in relation to the size of different groups such as working age adults or those eligible for concessionary travel, again sourced from the DfT via TEMPRO. All else equal, an increase in population will lead to a corresponding increase in the demand for travel; and
- the level of attractiveness of competing modes, primarily the car, including levels of ownership/availability, sourced from the DfT via TEMPRO and the Department for Energy & Climate Change (DECC) resource cost forecasts for fuel.

3.3.2 The background trends in a number of these factors have been positive for increased demand for bus travel, but, in recent decades, they have been more than offset by opposing effects from increased car ownership and a concurrent (real terms) decrease in motoring costs.

3.3.3 Figure 6 illustrates the observed and forecast combined effect of economic performance (GVA and employment), population, and changes in competing modes on each of the passenger groups considered within the analysis. Growth is strongest for the 'concessions-elderly' market due to population increases (prior to planned changes in the entitlement age for concessionary travel). All else equal, the picture presented is one of a growing demand for travel, including bus travel.

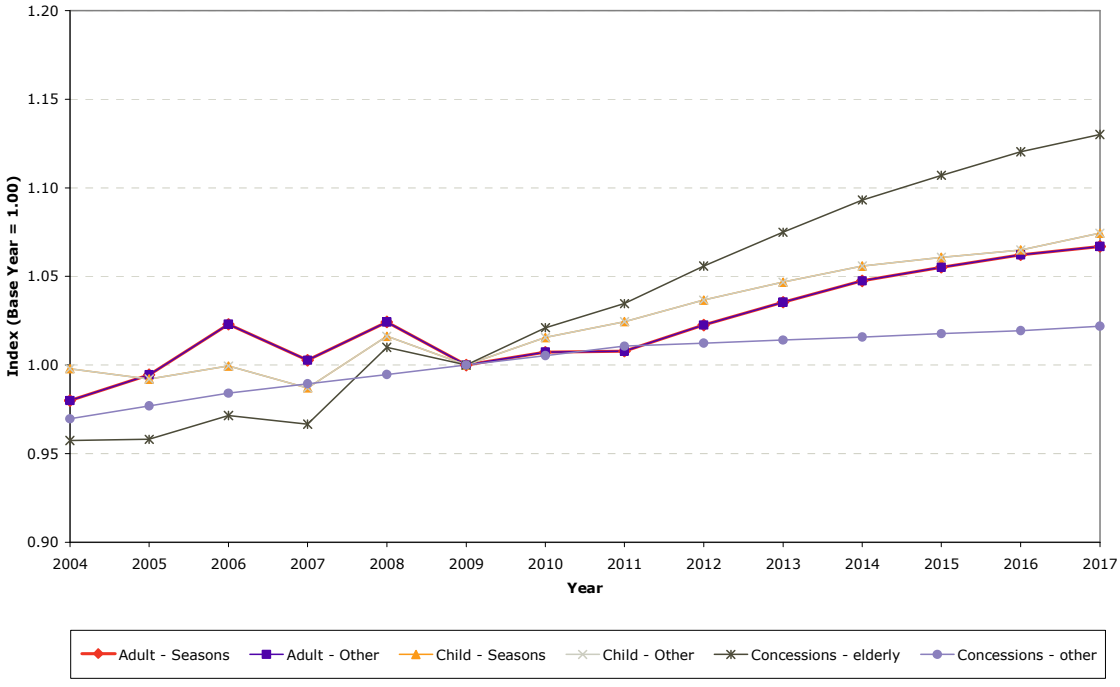

Figure 6: Trend in External Influences by Passenger Group

3.4 Industry Costs

3.4.1 Capital and revenue costs were broken down into:

- non-staff operating costs, representing fuel and maintenance and driven by vehicle-kms, Peak Vehicle Requirement (PVR), and associated costs;
- staff operating costs, dependent on the PVR, operating staff per bus, and labour cost;
- vehicle ownership, including depreciation of assets and the purchase of new buses; and
- non-staff overhead costs, driven by both PVR and depot/headquarter costs.

3.4.2 Figure 7 illustrates the assumed real term change per annum in diesel retail costs from the latest Department for Energy and Climate Change (DECC) forecasts. These forecasts are inclusive of fuel duty, and represent the change in the retail price customers experience at the pumps (in real terms). For the bus industry, it is thus necessary to calculate this initial cost, and then, separately, the cumulative BSOG rate based on assumed fuel consumption across the fleet. An age distribution for the fleet was included to account for different levels of efficiency, and is provided in Appendix A. This distribution also allowed for different rates to be applied for maintenance and depreciation.

3.4.3 In line with recent trends showing above inflation cost pressures being experienced within the bus industry, labour costs are assumed to rise at 2.5% above inflation during the forecasting period up to 2014, with maintenance, depreciation, overheads, and the purchase cost of new buses assumed to rise at 1% above inflation over the same period. As seen earlier, wage rates are a key driver of industry costs and these assumption are therefore critical in determining the future baseline cost for the industry.

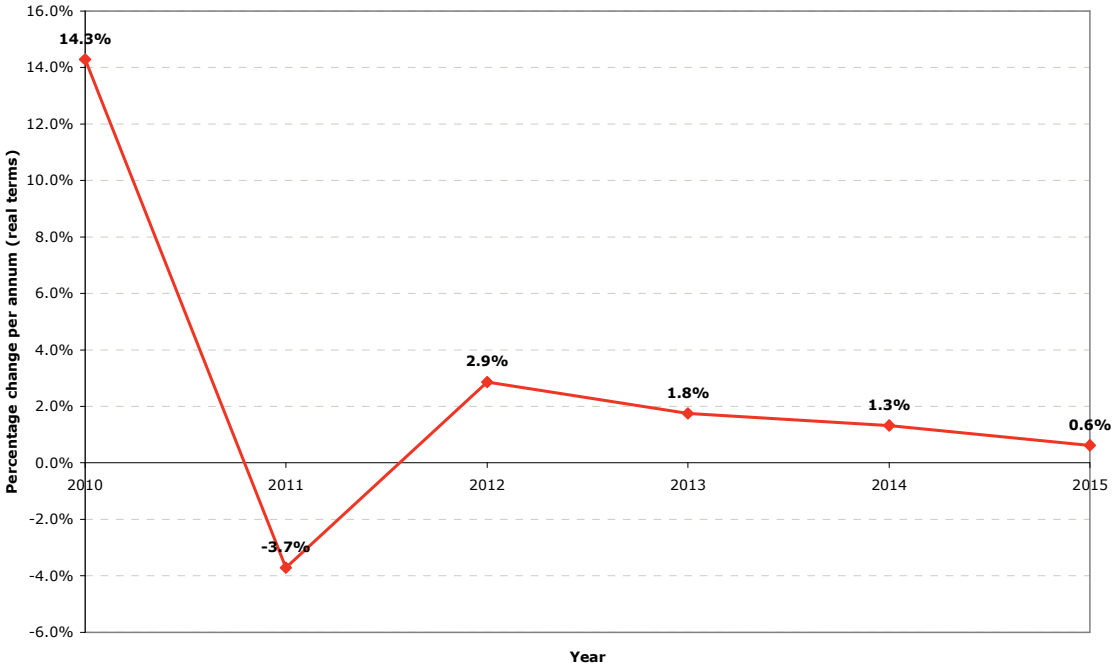

Figure 7: Assumed per annum change in retail cost of diesel, 2009 to 2014 (Source: Department for Energy and Climate Change)

3.5 Competitive/Regulatory Environment

3.5.1 The local bus market outside of London is characterised by two interacting themes, namely the:

- relative extent of the "commercial" and "tendered" markets; and
- degree of freedom available to operators to respond to changes in market conditions, largely constrained by the degree of competition from other operators and/or modes.

3.5.2 The commercial market is open to on-street competition between operators with service levels and fares being commercially determined, whereas in the tendered market service levels and fares are specified and contracted by local authorities. Whilst there are differences in the level of public sector support to each market it is important to recognise that all bus services benefit from some degree of public funding. Within the analytical framework we account for these sub-markets separately, whilst also defining a third 'grey' area covering "semi-commercial" services which are those parts of the network, either geographically or by time of day, where profit margins are substantially lower than on core parts of the network (but still currently positive). Changes in public policy, external factors and key cost drivers could easily change the extent to which these services will continue to be provided on a commercial basis.

3.5.3 The degree of commercial freedom available to operators is constrained by the availability of competing modes, by the conduct of competing operators and by regulatory actions. These constraints affect an operator's ability to change fares, service-kms, or the rate of fleet renewal (thus influencing quality) in order to try and meet a predefined strategy, such as the maintenance of an existing level of profit margin or profit margin. In a more "constrained" environment, the scale of change, in fares, service-kms etc, available to operators is lower as they try and maintain market share (or their position in the market place) in the face of potential abstraction from other [competing] operators and modes.

3.5.4 The form of competition and degree of market concentration (and hence constraints placed on operator strategies) vary considerably depending on local conditions. In geographical areas where two operators adjoin, there may be considerable overlapping competition, or a threat thereof, which could serve to constrain operator responses. In areas with long-established and thriving local operators, tendered service competition may be healthy, and head-on competition may have developed. It is not unusual, however, for there to be stark contrasts even between different corridors within the same city, and it certainly varies significantly between conurbations.

3.5.5 Within the "**tendered**" market, **competition** is delivered during the tendering process in which operators compete for the right to operate services. Where competition for the market is strong, the tendering process can generate economically efficient outcomes; however, where competition for the market is weak, the tendering process can deliver relatively poor value for money.

3.5.6 The framework employed within this analysis is sensitive to the constraints placed on operators by market conditions. For transparency, and to aid understanding, subsequent results within the main body of this report assume an unconstrained environment. We also consider an additional scenario which explores the potential implications of introducing greater competitive constraints in metropolitan bus markets.

3.6 Operator Strategies

3.6.1 In line with the types of competition described above and their imperative for resource optimisation, operators may well adopt different strategies in different geographical markets – and some of these markets may be extremely localised. For example, if a major depot is located in the south west of a city, an operator's strategy in that sector may be very different to that adopted in the north east of the same city – where operational convenience, and thus resource utilisation, will be more challenging. Table 1 presents a summary of common operator response strategies, many of which share common themes. In practice, we would typically expect the final response to be a composite of the available responses. The model addresses this issue by iteratively seeking an operator response which allows as many of the operating criteria to be met. These include profits, profit margin, revenue, costs, service-kms, and patronage. If the criteria can be met through multiple responses, the operator is then assumed to follow a strategy which maximises profit.

3.6.2 It is also necessary to consider the cumulative effect of marginal changes caused by changing circumstances. For example, whilst withdrawal of a single tendered service might not – in itself – cause any knock-on effects for the rest of an operator's network, withdrawal of many tendered services may undermine the overall viability of its surrounding commercial network, to such an amount that services previously provided "commercially" will be withdrawn too. The extent to which this is currently the case in metropolitan areas is not clear, and this effect would be over and above that detailed within subsequent chapters [should it occur].

Table 1: Bus Industry Operator Responses

Strategy	Description
Target Profit Margin	Operators will respond to ensure revenue generates sufficient profit to meet a predefined threshold, eg X% of their cost base.
Profit Maximisation	Operator responds to try and generate maximum absolute profit (ie total revenue minus total costs). Typically informed by a short term view and at risk of eroding the market for bus travel in the longer term, thereby reducing profits in later years.
Revenue Maximisation	Similarly to profit maximisation, the operator response attempts to grow total revenue whilst maintaining 'healthy' profit levels (either absolute or percentage). It would typically involve attempts to grow market share through increased service-kms and other initiatives, plus changes in fare structures.
Resource Minimisation	In a limited number of cases, eg when there are substantial pressures on costs, operators may try and reduce their resource base as far as practically possible, particularly in relation to fleet size and staff or when depot and other overhead costs from large sites cannot be maintained and a smaller operational base would deliver efficiencies.
Defend core territories	In a constrained environment, where there is real or potential competition from other operators or modes, operators may seek to defend their existing markets from abstraction by increasing service-kms and/or changing fare structures. In some cases this may be at the expense of service provision elsewhere. Historically, this strategy tends to have been short lived, ie it only operates until the prospect has receded or the market has stabilised, ie by reaching some form of equilibrium.
Patronage Maximisation	Patronage maximisation relates closely to the desire to 'defend core territories', but may also be driven by political goals, eg mode shift. Typically we would expect it to be at the expense of profit.
Do Nothing	In a favourable climate, eg positive external demand drivers and falling cost base(s), the operator may be able to adopt a *laissez faire,* reactive, approach by following past trends in fares and service-kms.

4 Future Scenarios for the English Bus Industry

4.1 Scenario Generation

4.1.1 Our aggregate modelling framework was used to test the impact of the following scenarios on the English bus industry over the coming years:

- Scenario (0): A 'Reference Case' assuming the continuation of the trends in public funding, operator behaviour, costs and external factors as observed prior to the 2010 election;
- Scenario (1): Confirmed changes in BSOG and concessionary entitlement, plus continued commitment in investment via the GBF by Central Government, introduced in 2010; and
- Scenario (2): Similar to Scenario (1) but including changes in Local Government funding via the Local Government Funding Settlement (potentially affecting tendered budgets), Integrated Transport Block and Road Maintenance capital grants.

N.B.: Scenarios 0, 1 and 2 assume that the market is operating under an "unconstrained" scenario, ie reflecting the continued trend towards increased market concentration.

Constrained Environment

- In addition we also looked at a Scenario (3), based on similar policy changes as Scenario (2), but assuming a much more constrained operating environment, which might develop as the result from the on-going Competition Commission investigation into the local bus market.. However, it's important to emphasise that this is an exploratory scenario which necessarily relies on more substantial assumptions than the previous three and should therefore be seen as merely indicative of the potential magnitude of changes to the regulatory framework.

4.1.2 Unless explicitly stated, each scenario is underpinned by the same standard set of assumptions and trends for external influences and costs. All scenarios assume that local transport authorities are not able to respond to any deregistration of semi-commercial services by increasing the tendered service budget in order to provide replacement service-kms. The entitlement age for concessionary travel is assumed to increase to 62 by 2014, in line with the plan to equalise entitlement with the State Pension Age (SPA) of 66 by 2020. Investment through the Integrated Transport Block (ITB) is assumed to be at a level which only allows for very small scale reductions in journey time and only marginal improvements in the quality of bus stops and stations.

4.1.3 The objective of this analysis is to appraise the economic and social implications of reductions in Local and Central Government support to the bus market in metropolitan areas, in the context of current trends in costs and external demand drivers. The appraisal considers the impact on the public purse, operators, and passengers and covers a five year period between 2009 and 2014.

4.2 Scenario 0: Reference Case

4.2.1 Table 2 shows the continuation of recent trends with a protection of profit, and associated profit margin, as the assumed operator responses in an unconstrained market are sufficient

to close the 'gap' which begins to emerge as changes in cost and demand drivers impact. These responses result in:

- patronage falling by 16%, between 2009 and 2014, due to reductions in service-kms of 13% and average fares increasing by 18% in real terms (RPI +3.5% per annum);
- Government Support increases slightly overall due to the increased Concessionary Travel reimbursement payments (due to rising average fares), even despite the reduction in BSOG; and
- increasing mode shift from the bus to the car resulting in £53M of disbenefits from worsening congestion.

Table 2: Reference Case Summary (forecast % change in key indicators between 2009 and 2014)

Operator		**Passenger**	
Patronage	-16%	Fares	18%
Revenue	-4%	Service-kms	-13%
Government Support		**Economic**	
Central (BSOG)	-14%	Congestion	+£53M
Local (Concessions)	10%		
Local (Tendered)	0%		
Total	4%		

4.3 Scenario 1: Confirmed Central Government Policy Changes

4.3.1 This scenario involves the confirmed reduction in BSOG and changes to concessionary fare entitlement, but continued investment in the fleet via the Green Bus Fund, as follows:

- a total reduction of 20% in the BSOG rate, introduced in a phased manner between 2012 and 2014;
- increases in the concessionary fare entitlement age, bringing it in line with the State Pension Age (SPA), of 66, by 2020; and
- sufficient capital support via the GBF such that approximately 11% of all new buses purchased in metropolitan areas are 'Green' by 2014.

4.3.2 Table 3 provides a summary of the forecast changes produced by this scenario between 2009 and 2014.

Table 3: Reduction in BSOG, Changes in Concessionary Entitlement, and Investment in GBF Summary (forecast % change in key indicators between 2009 and 2014)

Operator		**Passenger**	
Patronage	-18%	Fares	21%
Revenue	-3%	Service-kms	-15%
Government Support		**Economic**	
Central (BSOG)	-32%	Congestion	+£64M
Local (Concessions)	11%		
Local (Tendered)	0%		
Total	1%		

4.3.3 Internal commercial pressures on operators to maintain margins in declining markets lead to fare increases and service level reductions, with a significant impact on overall demand.

4.3.4 The increase in adult fares also leads to an increase in concessionary reimbursements which perversely leads to an increase in the overall level of public support to the industry.

4.4 Scenario 2: Changes in Local Government Support

4.4.1 Scenario 2 combines confirmed changes in BSOG, concessionary entitlement, and GBF with confirmed cuts in the Integrated Transport Block and Maintenance capital grants allied to a reduction in tendered budgets reflecting local government funding cuts, as follows:

- a total reduction of 20% in the BSOG rate, introduced in a phased manner between 2012 and 2014;
- increases in the concessionary fare entitlement age, bringing it in line with the State Pension Age (SPA), of 66, by 2020;
- sufficient capital support via the GBF such that approximately 11% of all new buses purchased in metropolitan areas are 'Green' by 2014;
- a 12.5% cut in the tendered services budget in both 2012 and 2013;
- a 5% year-on-year reduction in the road maintenance budget from 2012 to 2014, leading to increased operator costs; and
- ITB investment which is only marginally greater than that required to keep journey times and bus stop and station quality 'as now', leading to only very small improvements for passengers.

4.4.2 The additional reduction in public funding leads to a further (slight) decline in patronage, and increase in fares but, critically, an additional 4% reduction in service levels. Most of the lost service mileage is due to the withdrawal of non-commercial, but socially necessary,

services. The social and distributional impacts of this policy could therefore be significant and should be considered as part of a wider welfare assessment.

Table 4: Reduction in BSOG, Changes in Concessionary Entitlement, GBF Investment, and Reductions in Tendered Services and Road Maintenance Summary (forecast % change in key indicators between 2009 and 2014)

Operator		**Passenger**	
Patronage	-20%	Fares	24%
Revenue	-4%	Service kms	-19%
Government Support		**Economic**	
Central (BSOG)	-35%	Congestion	+£68M
Local (Concessions)	9%		
Local (Tendered)	-23%		
Total	-7%		

4.5 Scenario 3: Introduction of Greater Market Constraints On Operators' Commercial Behaviour

4.5.1 In the recent provisional report from its local bus market investigation the Competition Commission (CC) concludes that the current market structure and a number of other features of the deregulated UK bus market lead to an adverse effect on competition (AEC). This results in incumbent operators being able to recoup excess profits and confirms the findings of an earlier piece of work by L.E.K. for the DfT. In Scenario 3, we have attempted to forecast the potential impact of introducing more effective competitive constraints into metropolitan bus markets. The results are presented in Table 5.

4.5.2 The effect of introducing greater constraints on the extent to which operators can change fares, service-kms and fleet renewal rates is to reduce total Government support by 14%, with decreases in concessionary fare reimbursement being the principal difference from preceding scenarios as average fares cannot be increased at the same rate. Patronage decline is half that of the reference case, largely due to differences in fares and service-kms, with congestion disbenefits reduced from £53M to £24M.

4.5.3 It's important to emphasise that this is an exploratory scenario which necessarily relies on more substantial assumptions than any of the previous scenarios and should therefore be seen as merely indicative of the potential magnitude of changes to the regulatory framework.

Table 5: Introduction of Greater Market Constraints On Operators' Commercial Behaviour combined with Changes in Central and Local Government Funding (forecast % change in key indicators between 2009 and 2014)

Operator	Competitive Market	Passenger	Competitive Market
Patronage	-7%	Fares	0%
Revenue	-6%	Service kms	-4%
Government Support		**Economic**	
Central (BSOG)	-23%	Congestion	+£24M
Local (Concessions)	-9%		
Local (Tendered)	-23%		
Total	-15%		

5 Conclusion and Discussion

5.1 Overview

5.1.1 The analysis contained within this report has attempted to quantify the impact of the challenges and policy changes likely to affect the English bus industry in the short term future (up to 2014) within a single consistent modelling framework. By doing so, it explicitly aims to recognise the interactions that exist between the different factors, policies and assumptions at play.

5.1.2 The factors considered include:

- Central and Local Government policy decisions, translated into planned changes in subsidies and revenue support streams;
- changes in the industry cost base and cost structure;
- patronage responses to internal market factors, taken from industry standard sources, and, where evidence permits, distinct for different population groups, by ticket type and by network function;
- external influences such as economic performance, demographics, or changes in competing modes;
- competitive market pressures, affecting individual operators' ability to change fares, service-kms and fleet renewal rates; and
- operator responses and strategies.

5.1.3 A spatially aggregate modelling framework was developed to analyse the impact of these factors and trends. Once the factors and assumptions driving a given scenario have been defined, the framework seeks an operator response which allows as many of the operating criteria to be met. If the criteria can be met through multiple responses, the operator is then assumed to follow a strategy which maximises profit.

5.1.4 Unless otherwise stated, the framework has been set up to assume they do this in a manner which is consistent with maintaining existing profit margins within a set of wider criteria on issues such as absolute profit, patronage, cost and revenue.

5.1.5 Planned policy changes were largely taken from recent Central Government announcements and expected trends in Local Government (discretionary) expenditure, and included:

- a total reduction of 20% in the BSOG rate, introduced in a phased manner between 2012 and 2014;
- increases in the concessionary fare entitlement age, bringing it in line with the State Pension Age (SPA), of 66, by 2020;
- sufficient capital support via the GBF such that approximately 11% of all new buses purchased in metropolitan areas are 'Green' by 2014;
- a 12.5% cut in the tendered services budget in both 2012 and 2013; and
- a 5% year-on-year reduction in the road maintenance budget from 2012 to 2014, leading to increased operator costs.

- a reduction in the ITB from £590M in 2009/10 to £450M in 2010/11 and £300M in 2011/12 (in nominal terms). A nominal increase to £320M is assumed for both 2012/13 and 2013/14. These changes are applied pro-rata to PTE areas, based on current ITB allocations.

5.1.6 In recent years a number of key industry costs have been rising at a rate greater than background inflation. These trends have been carried through into this analysis, with labour costs rising at 2.5% in real terms and the 'pump price' for diesel following stated Department for Energy and Climate Change (DECC) forecasts.

Modelling Framework

5.1.7 The framework used to model these factors and trends was spatially aggregate, with metropolitan areas considered as a single entity. The behavioural responses of passengers to changes in the network or fares were taken from industry standard sources, and, where evidence permits, differ by the population group involved. Once the factors and assumptions driving a given scenario have been defined, the framework seeks an operator response which allows as many of the criteria as possible to be met. If the criteria can be met through multiple responses, the operator is then assumed to follow a strategy which maximises profit.

5.2 Summary of Results

5.2.1 Table 6 summarises the results of this work in terms of changes in key indicators forecast by the model between 2009 and 2014, based on four scenarios:

- The Reference Case (Scenario 0) assumes the continuation of pre-election policies and trends and a continuation of a trend towards increased market concentration in urban areas.
- Scenario 1 takes into account the impact of the announced 20% cut in BSOG, combined with proposed changes to the concessionary entitlement age, plus the impact of the increase in GBF funding.
- Scenario 2 takes into account the 20% cut in BSOG, increase in the concessionary entitlement age to 66 by 2020, the increase in GBF funding, the cuts in the Integrated Transport Block and Road Maintenance grants to local authorities. It also assumes that announced cuts in local government funding will translate into a 23% cut in tendered budgets.
- In addition, we also looked at a Scenario 3 which assumes that as a result of the Competition Commission's investigation into the local bus market, it will be possible to radically reduce the adverse effect on competition its provisional report identified. However, it's important to emphasise that this is an exploratory scenario which necessarily relies on more substantial assumptions than the previous two and should therefore be seen as merely indicative of the potential magnitude of changes to the regulatory framework.

Table 6: Forecast change in bus network indicators between 2009 and 2014

Scenario	**0**	**1**	**2**	**3**
	Reference Case (continuation of pre-election trends)	BSOG and GBF changes	Local Gov. cuts	C.C. success
Patronage	-16%	-18%	-20%	-7%
Fares	18%	21%	24%	0%
Service-kms	-13%	-15%	-19%	-4%
Government Support				
Central (BSOG)	-14%	-32%	-35%	-23%
Local (Concessions)	10%	11%	9%	-9%
Local (Tendered)	0%	0%	-23%	-23%
Total	4%	1%	-7%	-15%
Increased congestion	+£53M	+£64M	+£68M	+£24M

N.B.: Note that all figures in this table are rounded to the nearest integer.

5.2.2 The Reference Case shows a continued decline in patronage, mirrored by an almost equivalent increase in fares. At the same time, service mileage also continues to fall, albeit at a slightly slower rate. These changes largely reflect the impact of external cost and demand drivers allied with past trends in operator's commercial behaviour. On the public expenditure side, BSOG falls in line with service mileage, whereas concessionary reimbursement continues to increase, reflecting increases in commercial fares (which is a key factor in concessionary reimbursement). Given the subsidy mix in PTE areas, net public expenditure would be expected to grow by 4% between 2009 and 2014.

5.2.3 Scenario 1 shows a further reduction in patronage, largely as a result from the increase in fares and cut in commercial mileage that follow from the change in BSOG payments. It is assumed that service cuts will primarily affect marginally commercial services and will hence have a small effect on demand. However, the reduction in the scale and density of local networks will affect operator cost structures, which explains the need for an additional fares increase. Although this scenario leads to a substantial reduction in direct government payments to operators, there is likely to be an increase in concessionary reimbursement payments by local authorities due to the additional fare rise. Overall, net public expenditure falls only marginally.

5.2.4 Scenario 2 shows a more marked decline in service mileage due to the withdrawal of some tendered services, alongside an increase in commercial fares aimed at recouping the revenue lost by operators and the increase in costs that result from the fall in the ITB and maintenance grants. Note that the required increase in fares is smaller relative to the previous scenario, which reflects the lower occupancy (and hence revenues), unit costs and smaller economies of scale/density (relative to the rest of the network) inherent to tendered

services. Overall, the additional decline in patronage is marginal relative to the previous scenario. In terms of concessionary reimbursement, this is slightly below the previous scenario as the increase in fares is outweighed by the loss in concessionary demand due to the decline in service mileage. Unlike in the previous scenarios, there is now a net real terms reduction in public expenditure over the 5 year period.

5.2.1 Scenario 3 shows a substantially different picture. By reducing the adverse effect on competition of the current market structure, this scenario sees a more balanced sharing of cost increases and subsidy decreases between operators and passengers. As a result, fares are kept close to their 2009 levels and mileage is reduced by a much smaller proportion than in any of the other scenarios. Given the modest increase in fares, patronage is also less affected as is the case with concessionary reimbursement, which actually goes down over the period. Overall, this leads to the lowest level of public expenditure of any scenario. However, it's important to emphasise that this is an exploratory scenario which necessarily relies on more substantial assumptions than the previous three and should therefore be seen as merely indicative of the potential magnitude of changes to the regulatory framework.

5.3 Discussion

5.3.1 In a declining market facing public funding cuts, the ability of operators to change fares and service levels is a key determinant of the distribution of costs and benefits arising from a change in government support.

5.3.2 In unconstrained markets, operators have significant scope to independently set fares and service levels and are therefore more able to manage profitability. Under these conditions, fares are increased and service levels reduced to maintain margins.

5.3.3 Remaining passengers are clearly worse-off (paying more for less) and the cost savings to government are eroded as increases in fares lead to an increase in concessionary reimbursement. Reductions in BSOG alone, whether driven by operators cutting service-kms or Central Government reducing the rate, may therefore not result in a decrease in net public subsidy, despite the declining market size.

5.3.4 The only scenarios to generate a decline in net subsidy were those with reductions in the tendered budget, which may impact on those most at risk of social exclusion, and where there is a more tightly constrained market environment. Substantial reductions in service-kms (-19%) by operators, both tendered and semi-commercial, eventually feeds through into a cut in BSOG (-35%) which is sufficient to offset the rising concessionary reimbursement.

5.3.5 The message for wider outcomes is mixed. With patronage falling and fares rising, we would expect a welfare disbenefit when measured using standard transport appraisal methodologies. Similarly, any transfer from the bus to the car, would result in significant congestion disbenefits in metropolitan areas. Under planned BSOG changes, this amounts to an increase in congestion of £64M between 2009 and 2014, which is increased to £68M with the assumed change in tendered service support.

5.3.6 Under greater competitive pressure (Scenario 3), operators would have limited scope to increase fares and reduce service levels and therefore are more likely to shoulder some of the burden of funding cuts and changes in external factors. The degree of constraint in the

market appears to have a substantial influence on the distribution of the costs and benefits arising from a change to BSOG payments. In more constrained markets, Government is better-off as a result of a reduction to the overall level of support, passengers are neither better nor worse-off as fares and services are largely unaltered, but operators are worse-off suffering a substantial reduction in profits. By contrast, in less constrained markets, the government is worse-off as the burden of subsidy switches between BSOG and concessionary reimbursements, passengers are worse-off as fares increase and service levels fall, and operators are able to maintain profit margins and are assumed "no better, no worse" off.

5.3.7 The strength of market constraint is hence a key determinant of the distribution of costs and benefits accruing to operators, passengers and government. The less constrained the market, the more aggressive the operator response, the more the burden of a declining market transfers from the operator to the passenger. The extent to which such strategies are sustainable in the long run will depend upon the ease to which new operators can enter the market and the extent of market regulation to control monopoly power.

5.3.8 It is clear that the various subsidy and support mechanisms provided to the English bus industry do not act in isolation. Before any Central Government policy changes, total BSOG would reduce if operators reduced service-kms, eg due to cost pressures, or there were declines in the tendered service support from local government. In an unconstrained environment, reductions in BSOG can be offset by operators through increases in average fares, and thus lead to an increase in concessionary reimbursement. In reality, such a pressure could also lead to an increased strain on the tendered service budget, as a competing priority, setting in turn a further iteration of BSOG change. Likewise, de-registration of semi-commercial services following BSOG changes will force local transport authorities to make difficult decisions as to whether such services should now be tendered.

5.3.9 Overall, a full welfare assessment would be required to determine whether the benefits accruing to one group are sufficient to offset the disbenefits accruing to another group and ultimately determine the wider social and economic impact of recent and planned policy changes.

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