Costs and benefits of the Bus Service Operators Grant

greener journeys

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Executive summary

Introduction

The Bus Service Operators Grant is a subsidy paid by the Department for Transport to operators in England of eligible local bus services and community transport organisations. The amount that each operator receives is based on their annual fuel consumption. The Department for Transport notes that the aim of BSOG is to benefit passengers by helping operators keep their fares lower and service levels higher than otherwise would be possible. Similar schemes operate in Scotland and in Wales albeit with important differences in the way in which the subsidy is paid.

Following a programme of changes to BSOG introduced in 2012, the Department for Transport is currently consulting on further reforms to the BSOG operating model in England. In light of this consultation, Greener Journeys has assessed the value for money provided by the current operating model and considered the potential impacts of alternative approaches.

Value for money

Working with KPMG and following the Department for Transport's core guidance on economic appraisal, our analysis of the costs and benefits arising from BSOG shows that the scheme delivers high value for money with each £1 spent generating between £2.50 and £3.50 in benefits, including wider economic and social impacts.

In helping to promote and deliver more efficient transport networks, the benefits of BSOG extend way beyond bus passengers themselves, to other road users and the wider community, leading to improvements in economic productivity, social inclusion, environmental sustainability and health.

Our analysis shows that around 70 percent of the benefits accrue directly and immediately to bus passenger in the form of lower fares and higher service levels, around 6 percent of the benefits accrue to other road users from transport network improvements, and the rest to the wider community from wider economic and social impacts.

BSOG reform

One of the main advantages of the current BSOG model is that it delivers benefits across a range of services and networks, arguably with a slight bias towards services operating on congested networks where the wider economic and environmental benefits are likely to be greatest. The scheme is relatively straightforward to administer and provides a reasonable degree of certainty in funding.

Alternatives to the current model, such as the Incentive Per Passenger (IPP) or distance based approaches, have advantages in that they move away from what is perceived by some to be an environmentally unacceptable subsidy on fuel consumption. They will however lead to a redistribution of funds between services and a redistribution of the costs and benefits of the Grant.

In weighing-up the alternatives to the current model, the Department for Transport will need to take a broad view on the size and distribution of the economic, social and environmental impacts of a potential change. The complexity of the market will mean that a good deal of ingenuity will be required when developing potential reforms but one thing is clear: whatever the method of allocating funds, this type of revenue support to the bus market delivers value for money and it should be maintained.

1 Introduction

1.1 Background

The Bus Service Operators Grant is a grant paid by the Department for Transport to operators in England of eligible local bus services and community transport organisations. The amount that each operator receives is based on their annual fuel consumption.

The scheme was established as Fuel Duty Rebate under Section 92 of the Finance Act 1965 and subsequently renamed as the Bus Service Operators Grant under the Transport Act 2000.

In 2012, the Department for Transport's Green Light for Better Buses announced a programme of changes to BSOG, which following consultation led to the first stage of reforms including:

- devolution of BSOG on supported services
- devolution of BSOG for services in London
- devolution of BSOG for 'in-house' community transport[1]
- changes to the eligibility rules
- introduction of Better Bus Areas.

More recently, the Department for Transport started a consultation on the second stage of the reform of BSOG which includes looking at commercial services, incentives, 'outsourced' community transport and scheme administration.

We have therefore taken this opportunity to explore some of the options for reform which have previously been discussed by the Department for Transport, the Commission for Integrated Transport and others.

The Government believes that the case for moving away from payment by fuel is a compelling one, with the DfT noting that BSOG is poorly linked to environmental objectives.

1.2 This report

Greener Journeys, with the help of KPMG, has reviewed the role of BSOG in the provision of local bus services and has undertaken a cost-benefit analysis to identify the value for money that it provides. The results of the analysis are presented in this report. This report also analyses wider strategic issues related to BSOG's effectiveness, and looks at the arguments for and against some of the policy options considered as suitable alternatives for BSOG.

This remainder of the report is structured as follows:

- Section 2 reviews the structure of the local bus market
- Section 3 presents the current BSOG arrangements and its history
- Section 4 presents the value for money from BSOG
- Section 5 discusses potential alternatives to BSOG.

[1] Community Transport services provided in-house by local authorities under section 19 of the 1985 Transport Act, administered and funded from within local authorities using local authority staff instead of relying on outsourcing.

2 Local bus market funding

2.1 Overview of the market

The local bus market in Great Britain is organised according to two different models. Within London, services are specified by Transport for London and put out to tender, with TfL taking the revenue risk and responsibility for network planning and fares. Outside of London, the bus market is deregulated with bus operators registering commercial routes and the timing of services with Traffic Commissioners and local authorities awarding subsidies for the provision of commercially non-viable but socially necessary services, following competitive tendering from bus operators. Commercial services constitute the bulk of the market with around 80 percent of vehicle kilometres and 90 percent of passenger kilometres outside of London.

The local bus market in England outside of London has estimated revenues of almost £3.5 billion, with passenger revenue accounting for 59 percent of the total, reimbursement for concession travel schemes accounting for 20 percent, support for tendered services accounting for 13 percent and the Bus Service Operators Grant accounting for 8 percent[2]. The market delivers 2.3 billion journeys per year, connecting passengers to employment, education, healthcare, retail and social activities, with overall passenger satisfaction with their journeys standing at 88 percent[3].

2.2 Rationale for support

It is clear from the evidence assembled by Greener Journeys[4] that local bus services generate substantial economic, social and environmental benefits.

In helping to deliver more efficient transport networks, the benefits of local bus services extend way beyond bus users themselves to include improvements in economic productivity, social inclusion, environmental sustainability and public health.

These wider economic, social and environmental benefits provide the rationale to stimulate demand by improving service quality and reducing fares. To that end the Government:

- invests in transport infrastructure and facilities to improve journey times and service reliability
- provides concessionary travel to older and disabled people to improve access to essential services and increase participation in social activities that would otherwise not be affordable
- through local authorities, enhances supply at specific locations and at specific times
- reduces operating costs and fares to passengers through the Bus Service Operators Grant.

It is important to recognise that the different types of Government expenditure work together to produce a combined impact that is greater than the sum of their separate effects, and furthermore, that a change in expenditure in one area will have knock-on implications for expenditure in other areas. So for example, a reduction in BSOG would lead to some combination of reduced supply, increased fares and a consequent reduction in demand. This in turn would lead to a further cut in

[2] All estimates taken from the latest Department for Transport statistics from 2013/14. https://www.gov.uk/government/collections/bus-statistics

[3] Passenger Focus (2014) Bus Passenger Survey, Autumn 2013 Report. http://www.passengerfocus.org.uk/research/publications/bus-passenger-survey-full-report-autumn-2013

[4] Greener Journeys Reports and Research, http://www.greenerjourneys.com/resources/report/

supply and a potential increase in the number of services that require support. At the same time, the increase in fares would increase operator reimbursement for carrying concessionary passengers.

In demonstrating the value of Government expenditure on local bus services it will be important to show that operators remain incentivised to:

- deliver the right services
- maintain high levels of passenger satisfaction
- drive down costs.

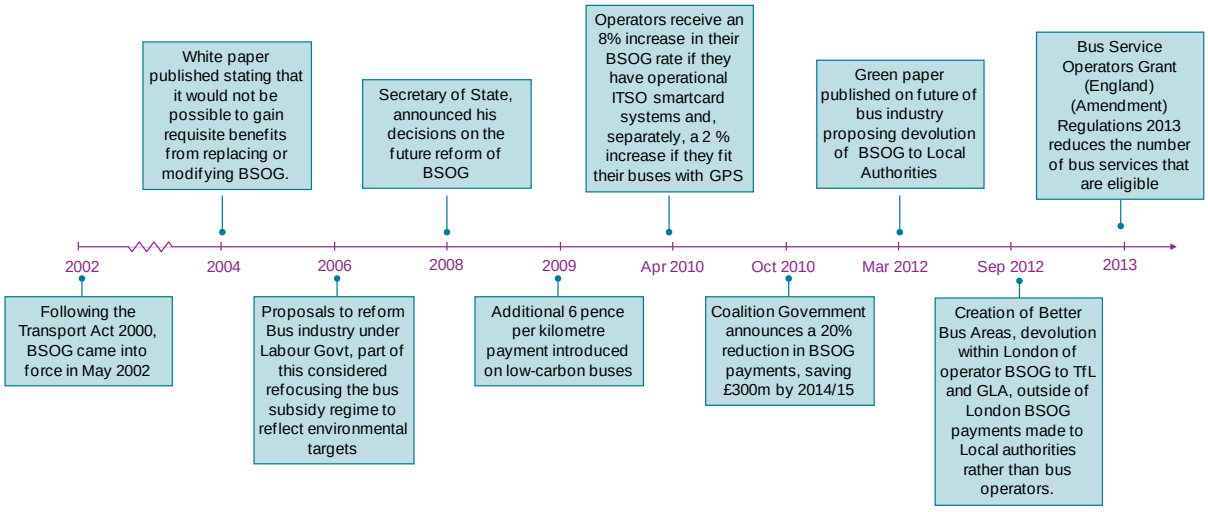
By maintaining the correct balance of different types of expenditure, the Government can retain flexibility to efficiently incentivise the market to deliver fares and services to maximise economic, social and environmental benefits.

3 The Bus Service Operators Grant

The Bus Service Operators Grant (formerly the Fuel Duty Rebate) is a scheme that refunds part of the fuel duty incurred by operators of eligible local bus services. The rebate was introduced 1965 in response to operators' concerns about the impact of fuel duty on the commercial performance of the sector.

The rate at which the rebate is given has varied over time from the full value of the excise duty from 1974 to 1993, with subsequent reductions leading to its current rate of a little under 60 percent of the cost of fuel duty. Following the Transport Act 2000, the rebate was renamed the Bus Services Operators Grant and de-coupled from the rate of fuel duty in 2002[5]. Some of the key changes related to the recent history of BSOG are provided in Figure 1 below.

Figure 1 - Recent timeline of events surrounding BSOG



As part of the Spending Review 2010, the Government announced a 20 percent reduction in BSOG from 2012/13 onwards, with further reductions in local authority budgets leading to a 25 to 30

[5] Bus Services Operators Grant (England) Regulations 2002 (SI 2002/1015). For a detailed history of BSOG – see 'Buses: grants and subsidies - Commons Library Standard Note' by Louise Butcher – available at http://www.parliament.uk/business/publications/research/briefing-papers/SN01522/buses-grants-and-subsidies

percent reduction the budget for tendered bus services. In both the Impact Assessment of the policy, as well as responses to the House of Commons Transport Committee[6], the government argued that the impact of the change in BSOG would be relatively modest, including a 1 percent reduction in services and 1 percent increase in fares. There is however limited evidence of what the actual impact of the reduction has been.

In 2012, the Government published *Green Light for Better Buses* setting out a series of reforms to improve local bus subsidy arrangements and regulations in England outside London, including proposals for reforming BSOG. The intention for reform culminated in the amendment of the BSOG regulations, which restricted the eligibility of operators to claim BSOG on certain types of bus services, and included the devolution of the BSOG budget for tendered services to local authorities.

Currently, further reform to BSOG is being considered, with the Government seeking ideas for alternatives to BSOG for commercially run services. Against this background, the analysis reported here considers the potential impact of removing BSOG on the performance of the sector.

4 Value for money

4.1 Introduction

In this section of the report we consider the extent to which BSOG provides value for money to the taxpayer. In doing so, we look at its impact on market behaviours and quantify the changes in costs and benefits to passengers, operators, and the wider community. Our analysis follows the Department for Transport's guidance on transport appraisal and uses the latest publicly available data.

4.2 Findings from previous studies

The impact of BSOG of on the performance of the local bus market has been previously reviewed by the Department for Transport and a series of studies sponsored by the Commission for Integrated Transport.

Department for Transport analysis

In its submission to the House of Commons Transport Committee's consultation on 'Bus Services after the Spending Review' the Department for Transport noted that BSOG helped make sure that, on average, fares were around 7 percent lower than they otherwise would be and bus service levels around 7 percent higher than they otherwise would be outside London. Based on these assumptions, they estimated that BSOG provides high value for money with around £2 worth of benefits per £1 spent, as well as additional non-monetised benefits such as greater accessibility. The DfT stated that 'the majority of the benefits of BSOG are from quicker and cheaper journeys for bus users (representing around 58 percent of the benefits of BSOG) and external benefits (representing around 27 percent including lower congestion and better environmental outcomes). The remaining benefits are estimated to fall to transport providers.'

Commission for Integrated Transport analysis

The Commission for Integrated Transport has led two substantial pieces of work looking at the impact of BSOG on the local bus market and has reviewed potential reforms to the way the subsidy is paid.

In its first report in 2002 CfIT examined opportunities to obtain better value from public subsidy going into the bus industry and noted that 'Fuel Duty Rebate is a reasonable efficient subsidy but offers no direct incentive for growth'. It then went on to recommend replacing the Fuel Duty Rebate with an

[6] Bus Services after the Spending Review http://www.publications.parliament.uk/pa/cm201012/cmselect/cmtran/750/750.pdf

Incentive Per Passenger (IPP), with additional funding to protect rural and inter-urban services affected by the change. It noted that 'because IPP is about growing patronage, it will give the most benefit to populated areas with the greatest scope for socially beneficial passenger growth. It is therefore focused on areas that have the greatest potential benefits from modal shift, decongestion, improved environment and accessibility'.

In 2008, the Department for Transport consulted on potential reforms for bus subsidy in England. As part of their response to this consultation, CfIT updated its earlier work in the light of changes to subsidy levels, costs and patronage[7]. Its report noted that 'BSOG continues to offer good value for money to the taxpayer. It is cheap and simple to administer, results in increased service frequency or lower fares, and there is little risk of fraudulent behaviour by the bus operator'. As previously, CfIT stated a preference to move towards a system that more strongly incentivises patronage growth through greater focus on the passenger carried. It estimated that a move to an IPP scheme could produce very high returns, with benefit-cost ratios between 4 and 5.

Importantly, it noted that to achieve the best results, the budget for IPP should not be capped, but should increase with patronage gains, providing the most direct incentive for operators to build their passenger base over the long term.

4.3 Market response to a reduction in BSOG

A change in the rate at which BSOG is paid will likely result in a change in the supply of bus services and/or fares, and a change in the level of public expenditure on bus services that goes beyond the initial change to BSOG itself. A summary of the potential changes is presented in Figure 2 below.

Figure 2 - Market response to a reduction in BSOG

First round impacts	Second round impacts
1. Government reduces BSOG, reducing its expenditure on bus services 2. Operators receive less revenue and must determine a suitable response, including increasing fares and reducing service levels 3. Passenger demand reduces following fare increase and/or service reduction **'Knock-on' impacts for concessionary schemes** 4. Reimbursement for concessionary travel increases as fares increase, although this may be offset by fewer concessionary journeys due to reduced service levels	1. Local authorities tender a percentage of de-registered services, increasing their expenditure on bus services where funding permits 2. Operators bid for newly tendered services 3. Some passengers who would have left the market under the first round impacts now remain

The potential impacts of a reduction in BSOG can be separated into 'first' and 'second' round impacts.

[7] Commission for Integrated Transport (2009) Public Subsidy for the Bus Industry: The Case for Incentive Per Passenger, HMSO

The first round impacts reflect the impacts on operator profitability and commercial incentives, their behavioural response in terms of setting fares and service levels, and the impact of these changes on passenger demand.

The first round impacts also include 'knock-on' implications for concessionary travel schemes arising from the potential increase in fare and reduction in service levels. Bus operators are reimbursed for carrying concessionary passengers under the principle that the operators are 'no better and no worse off' as a result. This means that operators are reimbursed for:

- revenue forgone from passengers who would otherwise have paid a fare
- net additional costs incurred.

If adult fares increase as a result of a reduction in BSOG, operator reimbursement should also increase, although the total reimbursement will be offset by any reduction in demand. Note that because the DfT re-imbursement model penalises price increases above general inflation, the full additional cost of lost BSOG for ENCT passengers may not be reimbursed to operators. This may result in marginally higher commercial fares or reduction in service supply to compensate.

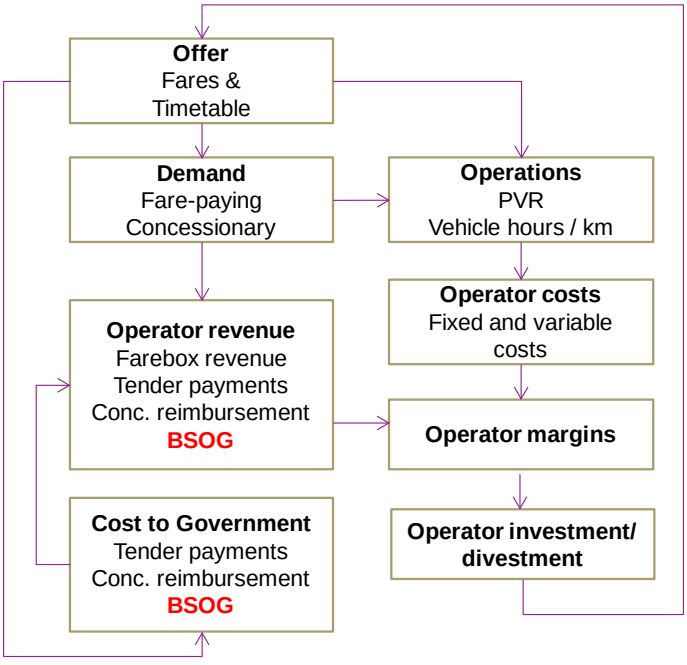
The second round impacts reflect the possibility that operators will de-register routes and services that are no longer commercially viable. The local authority will then need to form a view as to which, if any, of the de-registered services it will tender as 'socially necessary'. The value for money associated with tendering these de-registered services is a separate issue and not considered further in this report. The extent of any such additional tendering will also be dependent on the availability of funding within local authority budgets.

The potential operator response to a reduction in BSOG will depend in part on the intensity of competition in the market. Where markets are fiercely contested, it is likely that a reduction in BSOG may pass straight through to passengers as an increase in the fare. The subsequent reduction in passenger demand will lead to a reduction in supply as some operators go out of business. Where there is less competition, a reduction in BSOG will lead to some combination of a reduction in service levels, an increase in fares, and a change in operator profitability, the balance of which will influence the level economic, social and environmental benefits associated with the Grant. We return to this issue in the following Section.

4.4 Methodology

The potentially complex changes to fares and service levels brought about by a potential reduction in BSOG are assessed under the analytical framework set out in Figure 3. The framework includes analysis of demand and revenues, operator costs and cash flows between the government, local authorities and bus operators. The analysis is split by geography and market type (commercial, tendered) and passenger type (fare paying, concessionary) and includes an appraisal of the cost to government, the benefits to operators, benefits to passengers, benefits to other road users and wider economic and social impacts. Further details on the methodology and assumptions employed in this analysis are provided in Appendix B.

Figure 3 - Analytical framework



The combination of fare reductions and service level increases in response to the provision of BSOG will likely vary according to the conditions in local markets. We have therefore tested a range of possible operator responses and assessed their impact on demand, revenues, costs and overall economic welfare. A summary of the results, expressed in terms of the benefit-cost ratio is presented in Table 1 for commercial bus markets in England outside of London.

Table 1 – Benefit cost ratios (including wider economic impacts = WEIs) under alternative assumptions on BSOG's impact on fares and service levels

BCR with WEIs		BSOG's impact on service levels														
		0%	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	11%	12%	13%	14%
BSOG's impact on fares	0%	1.00	1.11	1.23	1.34	1.46	1.57	1.68	1.79	1.91	2.02	2.13	2.25	2.36	2.47	2.58
	-1%	1.07	1.19	1.31	1.42	1.54	1.66	1.77	1.89	2.00	2.12	2.23	2.35	2.47	2.58	2.69
	-2%	1.15	1.27	1.39	1.51	1.63	1.75	1.87	1.98	2.10	2.22	2.34	2.46	2.58	2.70	2.81
	-3%	1.23	1.35	1.47	1.60	1.72	1.84	1.97	2.09	2.21	2.33	2.45	2.57	2.70	2.82	
	-4%	1.31	1.44	1.57	1.69	1.82	1.94	2.07	2.20	2.32	2.45	2.57	2.70	2.82		
	-5%	1.40	1.53	1.66	1.79	1.92	2.05	2.18	2.31	2.44	2.57	2.70	2.83			
	-6%	1.49	1.63	1.76	1.90	2.03	2.17	2.30	2.43	2.56	2.70	2.83	2.96			
	-7%	1.59	1.73	1.87	2.01	2.15	2.29	2.42	2.56	2.70	2.84	2.97				
	-8%	1.70	1.84	1.99	2.13	2.27	2.41	2.56	2.70	2.84	2.98					
	-9%	1.81	1.96	2.11	2.26	2.40	2.55	2.70	2.85	2.99						
	-10%	1.93	2.09	2.24	2.39	2.55	2.70	2.85	3.00	3.16						
	-11%	2.06	2.22	2.38	2.54	2.70	2.86	3.02	3.17							
	-12%	2.20	2.37	2.54	2.70	2.87	3.03	3.19								
	-13%	2.36	2.53	2.70	2.87	3.05	3.22									
	-14%	2.52	2.70	2.88	3.06	3.24										
	-15%	2.70	2.89	3.08	3.27	3.45										
	-16%	2.90	3.10	3.30	3.49											
	-17%	3.12	3.33	3.54												
	-18%	3.37	3.59													
	-19%	3.64	3.88													

Operators generate between 1 and 2 percent lower operating margins than now

Operators generate similar operating margins to now

Table 1 shows the benefit-cost ratios for BSOG under alternative assumptions on its impact on fares and service levels. The range of fare and service level changes tested was determined by considering a scenario in which BSOG is withdrawn, with operators seeking to maintain their margins by increasing fares and reducing supply. Across the range of scenarios tested, the benefit-cost ratios are generally between 2.5 and 3.5 depending on the nature of the operator response. A full set of results are shown in Appendix A including the impact of alternative operator responses benefit-cost ratios with and without wider impacts and the impact on patronage which is estimated to increase by between 4 and 9 percent as a result of the Grant.

4.5 Results

The analysis outlined above shows the sensitivity of the benefit-cost ratio to alternative assumptions on the impact of BSOG on fares and service levels. By way of illustration, Table 2 provides a breakdown of the detailed costs and benefits arising from a scenario in which operators reduce fares by 12 percent and increase service levels by 5 percent. These changes allow operators to generate

margins similar to those typically earned today with a 7 percent increase in passenger demand over a situation where BSOG is not paid.

Table 2 - Benefits and costs arising from BSOG

Impacts for commercial markets in England, outside London	£ Million 2013/14
(a) User benefits	**£298**
From fare change	£154
From service change	£144
(b) Non-user benefits	**£25**
Option and non-use values	£9
Benefits to other road users (decongestion)	£27
Environmental improvements (noise, local air quality, GHG)	£3
Accident reductions	£5
Indirect tax revenues from modal transfer (fuel duty)	-£15
Bus operator impacts (change in profit)	-£5
(c) Wider economic impacts	**£43**
Economic	£38
Volunteering	£4
(d) Wider social impacts	**£48**
Health and wellbeing	£48
(e) Cost to the Government	**£136**
Change in BSOG	£198
Change in concessionary *fares*	-£62
Total benefits (a + b + c + d)	**£413**
Total costs (e)	**£136**
Benefit cost ratio (a + b + c + d) / (e)	**3.03**
Change in demand (million passengers)	**144 (7%)**

A short commentary on each of impacts is provided below with further details in Appendix C.

User benefits

The reduction in fares and increase in service levels arising from BSOG leaves bus passengers significantly better off. The increase in passenger benefits accounts for more than 70 percent of the total benefits. The change in fares accounts for 37 percent of the benefits and the change in service levels accounts for 35 percent of the benefits. Given the socio-demographic profile of bus users, it is important to note that BSOG has a disproportionally high impact on those on low or moderate incomes, and those without access to a car.

Non-user benefits

The reduction in fares and increase in service levels also leads to benefits to non-users.

The provision of BSOG may mean that some communities are able to support a viable bus service, generating option and non-use benefits to those who value the option of using the service or value the provision of the service for others.

Around a third of those passengers attracted to buses as a result of having lower fares and higher service levels are likely to have switched from cars. The corresponding reduction in car kilometres reduces traffic congestion, improves environmental quality and reduces the risk of traffic related accidents. It also means that the Treasury will collect less indirect tax revenue from fuel duty from cars.

Whilst their operating margins may be similar to a situation without BSOG, bus operators' absolute profit levels could increase as a result of the increased market size.

We have not, as part of this analysis, investigated whether BSOG introduces the sorts of market inefficiencies associated with operating subsidies, or the extent to which the full benefit of the subsidy is passed on to the passenger. Both could reduce the overall benefits associated with the scheme.

Wider economic impacts

The reduction in fares and increase in service levels makes it easier for workers to connect with the labour market and easier for those eligible for concessionary travel to participate in voluntary activity. The wider economic impacts estimated here include those associated with a more efficient labour market and an increase in formal and informal voluntary work.

The magnitude of these benefits is potentially substantial, accounting for around 10 percent of the total benefits.

Health and wellbeing impacts

Following our work on the benefits of concessionary travel, we have extended the analysis of the impact of BSOG to consider the health related impacts associated with an increase in use of public transport. The health related benefits from more active lifestyles are valued at around 12 percent of the total benefits.

Cost to Government

The cost to Government includes the cost of BSOG together with a reduction in the cost of reimbursing operators for concessionary travel following the potential reduction in adult fares.

4.6 What difference does BSOG make?

It is clear from the analysis summarised above that BSOG generates substantial economic, social and environmental benefits, providing high value for money to the taxpayer.

In helping to deliver bigger and more efficient transport networks, the benefits of BSOG extend way beyond those to bus users themselves to include improvements in economic productivity, social inclusion, environmental sustainability and public health.

Table 3 - Bus market revenues 2012/13

	London	Mets	Non-Mets	Scotland	Wales
BSOG	4%	6%	9%	8%	10%
Concessionary reimbursement	11%	19%	21%	25%	28%
Tendered services	25%	9%	17%	10%	18%
Passenger revenue	59%	65%	53%	58%	44%

Source: Department for Transport, Bus Statistics, Table BUS0501. Note data for Tendered services is not yet available for 2013/14

Table 3 shows that BSOG (now part of the Regional Transport Services Grant in Wales) is a material part of industry revenues. Its removal would induce significant changes to fares and service levels as operators adjust their behaviour to remain in business. The economic, social and environmental consequences of these changes would not only be substantial, they would likely be concentrated on services operating at the margins, requiring potential intervention from Local Authorities to tender socially necessary services.

5 Discussion on potential reforms

5.1 Options for reform

The Department for Transport is currently considering the second stage BSOG reform which includes looking at commercial services, incentives, 'outsourced' community transport and scheme administration. The Department for Transport has previously noted some possible options for reform, including moving to an alternative payment mechanism.

It is widely recognised that the current arrangements are both practical and relatively efficient, producing value for money for the taxpayer. The challenge facing the Department for Transport's reforms is to improve the way in which funds are allocated, delivering better outcomes, whilst at the same time potentially compensating those who are made worse-off as a result of the change and avoiding unintended or perverse consequences.

We briefly consider the potential impacts of three alternative models in Table 4 below. The analysis is high-level and qualitative in nature, focusing on the behavioural incentives associated with:

- Payment by fuel consumed
- Payment per passenger
- Payment by distance operated.

Table 4 - Qualitative assessment of the potential impact of BSOG reform

Options	Impact on market outputs	Impact on market outcomes
Payment by fuel consumed	The model provides a relatively even spread of funds based on the level of service, but slightly biased towards congested areas where fuel efficiency is relatively low. The approach allows operators reduce fares and increase service levels to suit local market conditions. It provides a relatively good degree of certainty on funding, providing greater stability for investment.	The model performs relatively well against economic, social and environmental objectives. Whilst there may be relatively more fuel consumed by buses, the ability to attract drivers from cars in congested markets may reduce total fuel consumed.

Incentive per passenger	The model will incentivise the allocation of funds to areas with high patronage levels and high growth potential. It incentivises operators to lower fares and increase quality as required. The is a risk that funds will be diverted away from marginal services leaving some areas in need of additional revenue to support socially necessary services. To have the biggest impact, the incentive needs to be uncapped, but there is a risk that adverse exogenous influences on demand could result in falling levels of subsidy.	Relative to the fuel based model, the approach will likely perform better with regard to the economic objective; about the same for the environmental objective and slightly lower on the social objective (unless a compensating mechanism is establish to redirect funds to services at the margin).
Payment by distance	The model will allocate funds in a similar way to the fuel based approach. Areas with high service levels will benefit most but there will be less biased towards areas and services that experience traffic congestion.	Relative to the fuel based model, the approach will likely perform less well against the economic and environmental objectives but marginally better against the social objectives as services at the margins receive a greater share of funds.

The argument for replacing BSOG with an IPP based scheme was made as early as 2002 by the Commission for Integrated Transport. The overall rationale for the reform is that it would incentivise operators to grow the market, directing service enhancements and fare reductions to areas in which they have the biggest impact. This would likely be urban areas where growth in demand can be expected to lead to wider economic benefits associated with agglomeration and better functioning labour markets.

The IPP model could therefore reasonably be expected to produce greater overall economic benefits compared with the current model, especially if the incentives are strong enough to stimulate a material increase in demand. The concern with the IPP model, however, is that resources may be concentrated on a smaller number of routes and services in urban areas, leaving socially necessary services at the margin in need of additional revenue support. Whilst the adverse affects of this re-distribution of resources could be mitigated by diverting a proportion the available funding to those marginal services, the overall level of government funding may need to increase to provide incentives for growth. This would likely require an uncapped budget.

Distance based models are similar to fuel based models in that they allocate funds on the basis of the level of service delivered. The main advantage of distance based approaches is that they potentially increase incentives to invest in more fuel efficient technology. The potential impact on the market is largely undetermined but given that operators are already incentivised to reduce costs as part of their commercial objectives, it is unlikely that a change to distance based models would generate material changes other than a shift of resource from fuel intensive services operating in congested conditions to relatively more fuel efficient services operating in less congested conditions. Although there may be some social benefit associated with diverting funds to more marginal services, a distance based approach is likely to perform less well in regard to environmental and economic objectives.

Some combination of passenger based and distance based incentives may provide a better balance meeting economic, social and environmental objectives but there are concerns that this type of model may be difficult to administer due to lack of, and inherent difficulties in collecting, data on passenger kilometres.

An alternative to support local bus services is to devolve the amount of money that would be spent on BSOG to local authorities. This is the idea behind the Better Bus Area Funds albeit these also benefit from a 20 percent enhancement in funding. Local authorities would then be able to spend the money according to the specific requirements of the area, incentivising operators' behaviours that are most likely to benefit local bus users. The benefits of devolution result from the possibility of targeting investment to local needs. The challenges around this model relate mainly to the

uncertainty on how the local authority may spend their allocated budget, adverse exogenous influences diluting the value of the expenditure and the potential risk that it will displace other bus related expenditure, and the potential that operators would be faced with an immediate cut in income requiring immediate service level cuts and fare increases, whereas additional local authority spend on bus infrastructure could take years to deliver growth.

5.2 Assessing the options

The Department for Transport's *Green Light for Better Buses* policy paper sets out a series of reforms to improve local bus subsidy and regulation in England. The paper notes that the proposals have been carefully formulated to attract more people onto buses, to ensure better value for the taxpayer and to give local transport authorities more influence over their local bus networks. The objectives of the reforms can be summarised under economic, social and environmental themes.

Given what we know about the costs and benefits of bus travel, we know that incentivising growth in passenger demand can contribute to meeting these objectives. We also know that people travel for different purposes, in different circumstances, and have different needs and travel behaviours. To meet the different objectives, we need to target the right incentive, at the right people, at the right time.

When looking at the potential reform of BSOG, we need to consider the:

- relative importance of each of the objectives
- range of incentives and interventions available
- range of market segments, and the inter-relationships between them
- behavioural response of each segment to different incentives
- distribution of costs and benefits associated with market change associated with the incentive.

It is important to note that given the diversity of the customer base, the range of transport and transport related policy issues and the list of potential market interventions possible, it is unlikely that a single 'solution' will suffice and that some flexibility will be needed to meet local requirements.

Further discussion on each of these issues is presented below before moving on to discuss the alternatives available.

Balance of objectives

The relative importance of each of the DfT's objectives will depend on the local conditions. For example, in areas with high levels of traffic congestion, the environmental objective may take precedence, whereas in with lower levels of traffic congestion the economic or social objective may be more important.

Range of incentives and interventions

The type of intervention needed to meet local priorities can be drawn from a range of available options including:

- investment in infrastructure and facilities for local buses
- incentives for new vehicles or those with improved environmental performance
- support for services that are socially necessary but not commercially viable

- concessionary fares for different groups in the community
- more general support in the form of BSOG

The interventions are aimed at improving the attractiveness of public transport by either reducing fares or improving service quality (eg network size, vehicle speeds, journey time reliability, service frequency, comfort, convenience) and each should be considered in the context of Local Transport Plans. It will also be important to consider possible unintended consequences, perverse incentives and the potential for fraud or 'gaming'.

Market segments

To incentivise the type of change to meet the objectives, we need to look at the needs and travel behaviours of different market segments. These segments might typically include:

- journey purpose (eg. commuting, leisure, business)
- geography (eg. rural, urban, metropolitan) and time of travel
- ticket type (eg. cash, season, concession)
- socio-economic characteristics (eg. age, income, employment status)

If the main objective is to generate economic growth for example, then it seems sensible to connect people to more productive jobs, targeting fare-paying commuters in urban and metropolitan areas where agglomeration economies are the greatest.

Different market segments will respond differently to different incentives and it will be important to give the right incentives to the right market segments. For some, affordability will be the main driver of change, and for others, service quality will be the main area of concern.

The distribution of costs and benefits

To make sure we are able to deliver the best value for money for each £1 spent, we need to look at both the magnitude of the costs and benefits arising from the intervention and their distribution across different segments. Changing the way in which we support the local bus market will benefit some more than others, and it will be important to consider how those who might lose out as a result of potential reforms can be effectively compensated.

5.3 A final word

The analysis reported here shows that BSOG delivers value for money to the taxpayer by reducing fares and increasing service levels. This enhanced offer to the customer stimulates demand, generating wider economic, social and environmental benefits. The complexity of the market will mean that a good deal of ingenuity will be required when developing potential reforms but one thing is clear: this type of revenue support delivers value for money and it should be maintained.

Appendices

6 Appendix A – Appraisal results

The detailed results of the appraisal are presented here. These include BCR with and without Wider Economic Impacts.

Table 5- BCR without WEIs

BCR without WEIs	0	Service km increased by 1%	Service km increased by 2%	Service km increased by 3%	Service km increased by 4%	Service km increased by 5%	Service km increased by 6%	Service km increased by 7%	Service km increased by 8%	Service km increased by 9%	Service km increased by 10%	Service km increased by 11%	Service km increased by 12%	Service km increased by 13%	Service km increased by 14%
0	1.00	1.09	1.18	1.28	1.37	1.46	1.55	1.64	1.73	1.82	1.91	2.00	2.09	2.18	2.27
Fares reduced by 1%	1.04	1.14	1.23	1.32	1.42	1.51	1.61	1.70	1.79	1.88	1.98	2.07	2.16	2.25	2.35
Fares reduced by 2%	1.08	1.18	1.28	1.37	1.47	1.57	1.66	1.76	1.85	1.95	2.05	2.14	2.23	2.33	2.42
Fares reduced by 3%	1.13	1.23	1.33	1.43	1.53	1.63	1.73	1.82	1.92	2.02	2.12	2.21	2.31	2.41	
Fares reduced by 4%	1.18	1.28	1.38	1.49	1.59	1.69	1.79	1.89	1.99	2.09	2.19	2.29	2.39		
Fares reduced by 5%	1.23	1.33	1.44	1.55	1.65	1.75	1.86	1.96	2.07	2.17	2.27	2.38			
Fares reduced by 6%	1.28	1.39	1.50	1.61	1.72	1.82	1.93	2.04	2.15	2.25	2.36	2.47			
Fares reduced by 7%	1.34	1.45	1.57	1.68	1.79	1.90	2.01	2.12	2.23	2.34	2.45				
Fares reduced by 8%	1.40	1.52	1.63	1.75	1.86	1.98	2.09	2.21	2.32	2.44					
Fares reduced by 9%	1.47	1.59	1.71	1.83	1.95	2.07	2.18	2.30	2.42						
Fares reduced by 10%	1.54	1.66	1.79	1.91	2.03	2.16	2.28	2.40	2.52						
Fares reduced by 11%	1.61	1.74	1.87	2.00	2.13	2.26	2.38	2.51							
Fares reduced by 12%	1.70	1.83	1.97	2.10	2.23	2.36	2.50								
Fares reduced by 13%	1.79	1.93	2.07	2.21	2.34	2.48									
Fares reduced by 14%	1.88	2.03	2.18	2.32	2.47										
Fares reduced by 15%	1.99	2.14	2.30	2.45	2.60										
Fares reduced by 16%	2.11	2.27	2.43	2.59											
Fares reduced by 17%	2.24	2.41	2.58												
Fares reduced by 18%	2.39	2.56													
Fares reduced by 19%	2.55	2.74													

Table 6 - BCR with WEIs

BCR with WEIs	0	Service km increased by 1%	Service km increased by 2%	Service km increased by 3%	Service km increased by 4%	Service km increased by 5%	Service km increased by 6%	Service km increased by 7%	Service km increased by 8%	Service km increased by 9%	Service km increased by 10%	Service km increased by 11%	Service km increased by 12%	Service km increased by 13%	Service km increased by 14%
£0	1.00	1.11	1.23	1.34	1.46	1.57	1.68	1.79	1.91	2.02	2.13	2.25	2.36	2.47	2.58
Fares reduced by 1%	1.07	1.19	1.31	1.42	1.54	1.66	1.77	1.89	2.00	2.12	2.23	2.35	2.47	2.58	2.69
Fares reduced by 2%	1.15	1.27	1.39	1.51	1.63	1.75	1.87	1.98	2.10	2.22	2.34	2.46	2.58	2.70	2.81
Fares reduced by 3%	1.23	1.35	1.47	1.60	1.72	1.84	1.97	2.09	2.21	2.33	2.45	2.57	2.70	2.82	
Fares reduced by 4%	1.31	1.44	1.57	1.69	1.82	1.94	2.07	2.20	2.32	2.45	2.57	2.70	2.82		
Fares reduced by 5%	1.40	1.53	1.66	1.79	1.92	2.05	2.18	2.31	2.44	2.57	2.70	2.83			
Fares reduced by 6%	1.49	1.63	1.76	1.90	2.03	2.17	2.30	2.43	2.56	2.70	2.83	2.96			
Fares reduced by 7%	1.59	1.73	1.87	2.01	2.15	2.29	2.42	2.56	2.70	2.84	2.97				
Fares reduced by 8%	1.70	1.84	1.99	2.13	2.27	2.41	2.56	2.70	2.84	2.98					
Fares reduced by 9%	1.81	1.96	2.11	2.26	2.40	2.55	2.70	2.85	2.99						
Fares reduced by 10%	1.93	2.09	2.24	2.39	2.55	2.70	2.85	3.00	3.16						
Fares reduced by 11%	2.06	2.22	2.38	2.54	2.70	2.86	3.02	3.17							
Fares reduced by 12%	2.20	2.37	2.54	2.70	2.87	3.03	3.19								
Fares reduced by 13%	2.36	2.53	2.70	2.87	3.05	3.22									
Fares reduced by 14%	2.52	2.70	2.88	3.06	3.24										
Fares reduced by 15%	2.70	2.89	3.08	3.27	3.45										
Fares reduced by 16%	2.90	3.10	3.30	3.49											
Fares reduced by 17%	3.12	3.33	3.54												
Fares reduced by 18%	3.37	3.59													
Fares reduced by 19%	3.64	3.88													

Table 7 – Change in demand

Change in demand	0	Service km increased by 1%	Service km increased by 2%	Service km increased by 3%	Service km increased by 4%	Service km increased by 5%	Service km increased by 6%	Service km increased by 7%	Service km increased by 8%	Service km increased by 9%	Service km increased by 10%	Service km increased by 11%	Service km increased by 12%	Service km increased by 13%	Service km increased by 14%
0	0.0%	0.3%	0.6%	0.9%	1.2%	1.5%	1.8%	2.1%	2.4%	2.7%	3.0%	3.2%	3.5%	3.8%	4.1%
Fares reduced by 1%	0.5%	0.8%	1.1%	1.4%	1.7%	2.0%	2.3%	2.6%	2.9%	3.2%	3.4%	3.7%	4.0%	4.3%	4.6%
Fares reduced by 2%	1.0%	1.3%	1.6%	1.9%	2.2%	2.5%	2.8%	3.1%	3.4%	3.6%	3.9%	4.2%	4.5%	4.8%	5.1%
Fares reduced by 3%	1.5%	1.8%	2.1%	2.4%	2.7%	3.0%	3.3%	3.5%	3.8%	4.1%	4.4%	4.7%	5.0%	5.3%	
Fares reduced by 4%	2.0%	2.3%	2.6%	2.9%	3.2%	3.4%	3.7%	4.0%	4.3%	4.6%	4.9%	5.2%	5.5%		
Fares reduced by 5%	2.5%	2.8%	3.0%	3.3%	3.6%	3.9%	4.2%	4.5%	4.8%	5.1%	5.4%	5.6%			
Fares reduced by 6%	2.9%	3.2%	3.5%	3.8%	4.1%	4.4%	4.7%	4.9%	5.2%	5.5%	5.8%	6.1%			
Fares reduced by 7%	3.4%	3.7%	4.0%	4.3%	4.5%	4.8%	5.1%	5.4%	5.7%	6.0%	6.3%				
Fares reduced by 8%	3.9%	4.1%	4.4%	4.7%	5.0%	5.3%	5.6%	5.8%	6.1%	6.4%					
Fares reduced by 9%	4.3%	4.6%	4.9%	5.2%	5.4%	5.7%	6.0%	6.3%	6.6%						
Fares reduced by 10%	4.7%	5.0%	5.3%	5.6%	5.9%	6.2%	6.4%	6.7%	7.0%						
Fares reduced by 11%	5.2%	5.5%	5.7%	6.0%	6.3%	6.6%	6.9%	7.1%							
Fares reduced by 12%	5.6%	5.9%	6.2%	6.4%	6.7%	7.0%	7.3%								
Fares reduced by 13%	6.0%	6.3%	6.6%	6.9%	7.1%	7.4%									
Fares reduced by 14%	6.4%	6.7%	7.0%	7.3%	7.5%										
Fares reduced by 15%	6.8%	7.1%	7.4%	7.7%	7.9%										
Fares reduced by 16%	7.2%	7.5%	7.8%	8.1%											
Fares reduced by 17%	7.6%	7.9%	8.2%												
Fares reduced by 18%	8.0%	8.3%													
Fares reduced by 19%	8.4%	8.7%													

7 Appendix B - Analytical framework

This appendix describes the modelling framework used to calculate the costs and benefits of the removal of BSOG. We initially describe the inputs, key assumptions, calculations used in the revenue and demand modelling, and finally the calculations used in the welfare analysis.

7.1 Inputs

The inputs for the framework are derived from the Department for Transport and National Travel Survey (NTS) data except where specified.

Table 8 - Data sources

Input	Source
Number of passenger trips	DfT Bus Statistics, 2013/14, Table BUS0103
Patronage by ticket type	*Green Light for Better Buses,* DfT 2012, Figure 2.7
Patronage by journey purpose	NTS, 2012, Table NTS0409
Average revenue per passenger	DfT Bus Statistics, 2013/14, Table BUS0402
Mode share (car and bus)	NTS, 2012, Table NTS9903
Operating cost per vehicle km, vehicle hours & passenger numbers	ITS study on concessionary fares (2010)[8]
Vehicle kilometres travelled	DfT Bus Statistics, 2013/14, Table BUS0203b
Number of Vehicles	DfT Bus Statistics, 2013/14, Table BUS0602
Government support for bus services	DfT Bus Statistics, 2013/14, Table BUS0501a, Local Transport Capital Block Allocations

The model calculates impacts in the following geographical zones: London; English Metropolitan Areas; English Non-Metropolitan Areas; Scotland and Wales. Bus patronage is further broken down by ticket type categories, which are: Ordinary Adult; Season Ticket; Concessionary Fare; and Other.

The inputs listed above provide the base data for the year 2013/14. The model is then programmed to calculate the following:

- A Do Minimum scenario, which estimates the future year values for patronage and fares under no further government intervention
- A Do Something scenario, which estimates the impacts of the appraised scheme on patronage by modelling the impact of changes in fares and service levels.

The Do Minimum scenario requires assumptions about underlying patronage and fares growth.

The Do Something scenario requires further inputs on how fares and service levels will change, which need to be input by the user. In the case of BSOG, different combinations of fare and service level changes have been implemented.

To derive the changes in demand as a result of the removal of BSOG, we assume the following

[8] http://assets.dft.gov.uk/publications/research-into-the-reimbursement-of-concessionary-fares/report9.pdf

factors.

Table 9 - Modelling assumptions

Input	Value	Source
Generalised Journey time factors		
In-vehicle-time Elasticity	-0.58	Balcombe et al (2004)
Wait Time value of time factor	2.00	WebTAG A1.3 (May 2014)
Fares factors		
Fare elasticity - Ordinary Adult	-0.8	Balcombe et al (2004)
Fare elasticity - Season Ticket	-0.6	Balcombe et al (2004)
Fare elasticity - Concessionary Pass	0.0	
Fare elasticity – whole market	-0.5	Weighted average

The weighted average fare elasticity across ordinary, season and concessionary travel is approximately -0.5. This value corresponds with the latest evidence produced for the Department for Transport[9].

7.2 Demand, revenue and cost modelling

7.2.1 Demand

The demand model is the driver of the entire modelling framework. Changes in demand for bus services lead to economic benefits, changes in revenue and changes in costs as a result of service level changes.

The model is based on a transport user's demand curve, where the price of travel is the generalised cost of travel. This model keeps the impact of fare changes and the impact of generalised journey time changes separate:

Generalised Cost = Fare + Generalised Journey Time

Changes in either element of generalised cost will affect demand. The magnitude of the impact on demand is determined by the elasticity of demand for the relevant elements of generalised cost:

Change in Demand (%) = Fare elasticity x Change in Fare (%) + Travel Time elasticity x Change in Generalised Journey Time (%)

Changes in frequency change the generalised journey time because average wait times decrease. Every minute of wait time saved is worth two minutes of journey time saved. We use this value of time factor to convert changes in frequency to changes in generalised journey time (based on WebTAG A1.3). The travel time elasticity of -0.58 is then applied to these changes in generalised journey time to calculate the percentage change in demand.

7.2.2 Revenue

Changes in demand directly drive any changes in revenue. Revenue is calculated as demand multiplied by fare for each individual geographical area. Concessionary travel reimbursement reflects both changes in fares and demand.

7.2.3 Cost

The modelling framework assumes that operators will have the following profit margins in the base year:

- Non-London Areas: 8.8%

[9] Wheat, P and Toner, J.P (2010) Whole market demand elasticity variation, Concessionary Fares Project, Research Report 8. Institute for Transport Studies, University of Leeds.

- London: 2.6%

This is a national average of 6.7 percent, as reported by TAS in its most recent bus industry monitor summary[10]. The model fixes these profit margins to calculate the base costs based on revenue obtained from the NTS. The revenue used to estimate base costs based on profit margins includes BSOG.

Base operating costs are split into 4 categories based on an operating cost formula and unit costs from a report published by ITS[11]. This is done by taking the necessary bus metrics and multiplying them by the unit costs. Vehicle km and demand are taken from the NTS, while vehicle hours are based on vehicle km and an assumed bus speed of 16 km/hr, and peak demand is assumed to be equal to 7.4 percent of total daily demand. These costs are then uplifted to match the total costs that were obtained based on the assumed profit margin. The operating costs formula is shown below:

*Total operating costs =a*PVR +b*Vhours+c*Vkms+d*Passengers*

Unit costs are shown below based on evidence assembled by the Department for Transport in its work on concessionary fares[12].

Table 10 - Unit costs

Bus metrics	Unit costs
PVR (as a function of annual peak hourly demand passengers) RURAL	£1.50
PVR (as a function of annual peak hourly demand passengers) URBAN	£1.20
PVR - weighted average	£1.25
Vehicle hours	£14.90
Vehicle kms	£0.44
Passengers	£0.072

7.3 Cost-benefit analysis and appraisal

The purpose of the cost benefit analysis is to analyse the economic costs and benefits of a removal of BSOG. The DfT's WebTAG guidance provides the framework under which the majority of the analysis sits. However, in the case of some wider economic benefits, these are calculated differently in order to keep the analysis simple and transparent. We have noted these cases below.

The appraisal is based on one year of bus operations, corresponding to 2015/2016. All results are shown in 2013/14 prices and discounted from 2013/14.

7.3.1 Benefits

Benefits and disbenefits are experienced by those directly affected by the policy and also by third parties who have acquired some sort of benefit as a result of the policy. The benefits are grouped as follows: bus-user benefits, non-bus-user benefits, private sector provider impacts and wider impacts.

[10] http://www.tas.uk.net/content/index.php/news/112-bus-profits-down-for-second-year-in-a-row-as-real-term-revenue-falls-again

[11] Concessionary Fares Project, 2010: http://assets.dft.gov.uk/publications/research-into-the-reimbursement-of-concessionary-fares/report9.pdf

[12] Ibid

7.3.2 Bus-user benefits

User benefits are formed of two separate elements:

Fare benefits: the change in fares enjoyed by all passengers who are affected by policy, including generated passengers. This is calculated using the rule of a half:

Fares benefits = ½ x – change in fare x (Demand under Do Minimum + Demand under Do Something)

Generalised Journey Time (GJT) benefits: the change in generalised journey time caused by changes in frequency, in-vehicle time and delay times. This is also calculated using the rule of a half and values of time as included in WebTAG A1.3.1 according to the following formula:

GJT benefits = ½ x – change in GJT x Value of Time x (Demand under Do Minimum + Demand under Do Something)

The values of time employed in the calculation are presented below. A weighted average of 10.95 pence per minute for 2015/2016 (in 2010 prices) based on journey purpose splits from WebTAG A1.3.4 has been used for the calculation of time benefits.

Table 11 - Values of time and journey purpose split for bus passengers (WebTAG A1.3)

Bus Passenger	Business	Commute	Leisure
Value of time (£/hr, 2010)	16.63	6.81	6.04
Journey purpose split	1.4%	24.3%	74.3%

7.3.3 Non-bus-user benefits

Non-user benefits are calculated on principles set out in WebTAG unit A5.4. Whilst this unit is usually used for rail appraisal, we have adapted it for use in this context. We have assumed a diversion factor of 31 percent for the number of kilometres travelled by a car driver as a result of an increase in the number of bus kilometres travelled[13]. Simply put, for every 10km additional bus kilometres travelled, we assume 3.1km of the additional 10km came from car drivers shifting mode to bus.

The remainder of the methodology is based on values provided in the WebTAG unit A5.4: The diverted car kilometres are split by five congestion traffic bands, and by road type. Once split, we calculated the decongestion benefits by using the following values (also from WebTAG A5.4):

Table 12 - Valuing traffic congestion

Values, pence, 2010			
Weighted Average p/car km	**2010-2014**	**2015-2019**	**2020-2024**
Congestion Band 1	1.2	1.2	1.3
Congestion Band 2	2.8	2.9	3.2
Congestion Band 3	9.9	9.8	10.7
Congestion Band 4	87.6	78.3	63.3
Congestion Band 5	155.0	167.2	213.2
Infrastructure	0.1	0.1	0.1
Accident	1.6	1.7	1.9
Local Air Quality	0.1	0.1	0.0

[13] As stated in the document 'The Demand for Public Transport: a practical guide', TRL 2004

Noise	0.1	0.1	0.1
Greenhouse Gases	0.9	0.8	0.7
Indirect Taxation	-5.1	-5.0	-4.5

7.3.4 Private sector provider benefits

Private sector provider benefits are based predominantly on the financial impacts on the bus companies. This includes the difference between the Do Something scenario and the Do Minimum scenario in:

- Operating costs: these forecasts are based on changes in demand and vehicle km
- Revenue: based on fares and estimated demand
- Total government support: concessionary reimbursement, BSOG and other relevant forms of government support

7.3.5 Wider Impacts

Labour market impacts

The labour market impacts calculated in this analysis corresponds to the value of jobs generated. Jobs are generated as a result of improved labour market accessibility and improved retail access.

In the case of labour market accessibility, the methodology used to calculate the generated number of jobs is based on the ability to continue carrying out activities as a result of the removal of bus services. This is covered in detail in papers produced by the Institute for Transport Studies, University of Leeds[14]. The estimated proportion of bus trips where the bus user is completely dependent on the bus to commute to work is formed through the following rationale:

- Percentage of trips which are commuting = 19%
- Percentage of bus commuters with no car access = 43%
- Percentage of bus commuters with no car access where the trip is greater than 3 miles = 59%

By multiplying all of these proportions, we can infer that 5 percent of all bus trips are dependent on the bus to commute to work. This is multiplied by the proportion of bus trips that are not diverted from car drivers (assumed to be 21 percent), which leads to a compound impact on 1 percent of all generated bus trips. Assuming that one full-time commuter will have to undertake 220 return trips per year (based on the number of working days in a year), which translates to 440 single trips, the generated number of jobs is:

New jobs through access = 1% x generated demand / 440

There are similarly jobs created through improved retail access. The 2013 ITS study indicated that the percentage of bus users who *'wouldn't have otherwise have undertaken (retail or leisure) activity if the bus service was removed'* is 16 percent. Combined with a newly generated trips factor of 21 percent, and the proportion of bus trips that are shopping trips (16 percent) we assume that the compound proportion of new generated trips that are shopping trips is 16% x 16% x 21% = 0.5%. The same report reported that every return bus trip generates £49 of retail spend – or £24.50 per single trip. Recent government figures suggest that £36,000 of retail spend[15] holds up one job in the retail sector. Therefore:

[14] *Buses and Economic Growth, 2012* and *Buses and the Economy II, 2013*

[16] Table NTS0801 2012

New jobs through retail spend = 0.5% x generated demand x £24.50 /£36,000

These generated jobs are then monetised by multiplying the number of jobs by the average between the national median salary (£26,500 in 2012/13 prices) and the annualised full-time minimum wage (£10,833 in 2012/13 prices), which is £18,035 per job.

Health impacts

Initiatives that encourage the use of public transport increase levels of physical activity which in turn improve physical and mental health. This improves quality of life and provides a cost effective way to achieve public health objectives.

Health impacts are estimated based on guidance from the New Zealand Transport Agency. Based on this guidance, there is a health value of £1.52 per walked km in 2013 prices. It is assumed that each return bus journey involves 1.3 walked km while each return car journey involves on average 0.52 walked km, based on a study undertaken by Mindlab International for Greener Journeys. This value has been multiplied by the number of bus trips that would not go ahead as well as the trips that would switch to car if BSOG is removed, based on the car diversion factor, in order to obtain total health benefits.

Option values

Option values have been obtained from WebTAG. These have only been applied to the percentage of households that will lose access to bus as a result of reduced bus services. According to the NTS[16], 95% of households currently have access to a local bus service. In order to estimate the number of households that would lose access to bus, we have multiplied the percentage change in vehicle km by the number of households, who currently do not have a local bus service available.

7.3.6 Costs

The costs of implementing the policy being appraised are made up of three categories:

1. Broad transport budget

This is the change in subsidy for the bus market, caused by increases in concessionary travel reimbursement as a result of service level changes and other devolved funding.

2. Government investment

This is the amount of money the government would save as a result of the removal of BSOG.

3. Indirect tax revenue

This is the loss in fuel duty formerly paid by car users that have now transferred to bus. It is usually included as a negative benefit in WebTAG appraisal, but has been included in the costs here to fully represent the costs to Government as a whole. However, we have not modelled the potential increase in fuel duty net of BSOG paid by bus operators to the government as a result of increased services. Therefore, this figure is likely to over-estimate the loss in indirect tax revenue to the government.

7.3.7 Voluntary work

Volunteering benefits estimate the benefits from voluntary activity undertaken by retired people, assumed to equal to people over the age of 65, as a result of free access to buses, thanks to the concessionary fare scheme. In our analysis, we assume that voluntary activity would decrease as a result of reduced service levels.

[16] Table NTS0801 2012

These benefits are quantified using the research from RVS report[17]. The report uses survey evidence to identify the average annual hours per month of formal and informal volunteering, and using shadow prices for these activities, comes up with annual average value at 2010 prices.

Taking the RVS findings, we estimate what percentage of these activities would not be undertaken in the absence of the concessionary scheme. We do this using by asking three specific questions:

- Is the volunteering activity likely to require transport? This is done by taking a conservative estimate of whether each of the activities outlined is likely to require transport.
- What proportion of these travel journeys would be undertaken by bus? We estimate that volunteering journeys are likely to have the same distribution as total journeys by those in the 65+ age group. Therefore, we estimate that 7% of volunteering journeys would be undertaken by bus.
- What proportion of bus journeys would not be undertaken in the absence of the scheme? We take here the estimates based on estimates of trip generation and cross modal diversion factors[18].

By combining these figures, we can estimate the total value of volunteering that would *not* be undertaken in the absence of the scheme. We have estimated that on average, the annual value of the volunteering benefits that may be lost from the scheme is approximately £25 per person.

7.3.8 Appraisal Summary

The results of the appraisal are summarised in a table listing all monetised costs and benefits. This shows the benefits or disbenefits of the Do Something scenario compared to the Do Minimum scenario. The table presents the net present value over one year (2015/16) at 2013/14 prices. Wider impacts are included in the results but a separate BCR excluding wider impacts is also provided.

[17] Royal Voluntary Service (2011) Gold Age Pensioners: Valuing the socio-economic contribution of older people in the UK – available at http://www.royalvoluntaryservice.org.uk/our-impact/reports-and-reviews/gold-age-pensioners

[18] For a further discussion of this number see section 8.5.2 below