

Title: Dartford-Thurrock River Crossing Revised Charging Regime IA No: DfT00086 Lead department or agency: Department for Transport (Roads Policy) Other departments or agencies: The Highways Agency	Impact Assessment (IA)			
	Date: 07/03/2012			
	Stage: Final			
	Source of intervention: Domestic			
	Type of measure: Secondary legislation			
Contact for enquiries: Tim Lawson Programme Lead, Roads Policy Division				
Summary: Intervention and Options			RPC: AMBER	

Cost of Preferred (or more likely) Option				
Total Net Present Value	Business Net Present Value	Net cost to business per year (EANCB on 2009 prices)	In scope of One-In, One-Out?	Measure qualifies as
£111.7m	£14.8m	£-3.0m	No	NA

What is the problem under consideration? Why is government intervention necessary?

The Dartford-Thurrock River Crossing is a key part of the strategic road network, forming a link in the M25 motorway. The Crossing suffers from significant levels of congestion with over 50 million vehicles using it annually, and due to high levels of use relative to capacity it currently provides a poor level of service due to delays and congestion. As the Crossing is Government owned, operated and maintained, only Government can intervene to mitigate the negative impacts caused by congestion at the Crossing.

What are the policy objectives and the intended effects?

The Government's policy objective is to reduce congestion at the Crossing (by improving traffic flow) to support economic activity and improve social well being. We aim to do this in two ways: through the continued management of demand at the current crossing, and through the use of revenues raised through charges, to allow Government to prioritise development and funding of improvements, particularly provision of additional crossing capacity in the Lower Thames. The combination of these will reduce journey times and the variability in journey times; making journeys more "reliable" and thereby boosting economic growth.

What policy options have been considered, including any alternatives to regulation? Please justify preferred option (further details in Evidence Base)

- Do Nothing - keeping the existing charges unchanged.
- Option 1 – increasing annually the road user charge for all vehicles in line with the Retail Price Index.
- Option 2 – increasing the charges in October 2012 and October 2014, followed by annual increases in line with the Retail Price Index up to 2015. This is the Department's preferred option as it balances achievement of the policy aims and objectives, operational performance and the timing of increases to the levels of charges.
- Option 3 – Removing the charges at the Crossing.

Also included is consideration of the theoretical "welfare optimising" charge levels at the Crossing.

Will the policy be reviewed? Yes If applicable, set review date: 2015					
Does implementation go beyond minimum EU requirements?			N/A		
Are any of these organisations in scope? If Micros not exempted set out reason in Evidence Base.	Micro Yes	< 20 Yes	Small Yes	Medium Yes	Large Yes
What is the CO ₂ equivalent change in greenhouse gas emissions? (Million tonnes CO ₂ equivalent)			Traded: N/A		Non-traded: 0.03mt

I have read the Impact Assessment and I am satisfied that (a) it represents a fair and reasonable view of the expected costs, benefits and impact of the policy, and (b) that the benefits justify the costs.

Signed by the responsible Minister: _____ Date: 7th March 2012

Summary: Analysis & Evidence

Policy Option 1

Description: Annual increases to the current road user charges paid by users based on increases in line with the Retail Price Index (RPI).

FULL ECONOMIC ASSESSMENT

Price Base Year 2010	PV Base Year 2011	Time Period Years 5	Net Benefit (Present Value (PV)) (£m)		
			Low: N/A	High: N/A	Best Estimate: £19.4m

COSTS (£m)	Total Transition (Constant Price) Years	Average Annual (excl. Transition) (Constant Price)	Total Cost (Present Value)
Low	N/A	N/A	N/A
High	N/A	N/A	N/A
Best Estimate	£0.8m	£5.6m	£28.8m

Description and scale of key monetised costs by 'main affected groups'

Costs incurred by Government include revisions to on-road signage, information provision to users (e.g. leaflets and publicity), and the costs of IT changes to manage the payments of charges electronically, and a decrease in indirect tax revenues from fuel duty. Overall costs to Government are estimated at £6.02m, including decreased indirect tax revenue of £3.94m. User charges increase by £12.85m for businesses, by £2.03m for commuters and by £5.94m for other transport users.

Other key non-monetised costs by 'main affected groups'

No other significant costs are expected.

BENEFITS (£m)	Total Transition (Constant Price) Years	Average Annual (excl. Transition) (Constant Price)	Total Benefit (Present Value)
Low	N/A	N/A	N/A
High	N/A	N/A	N/A
Best Estimate	£0.0m	£9.9m	£46.2m

Description and scale of key monetised benefits by 'main affected groups'

Commuters, businesses and other transport users benefit from reduced journey times and from decreased vehicle operating costs. The benefits to businesses from reduced journey times are estimated at £14.6m. Travel time benefits to commuters are estimated at £1.03m and these benefits to other transport users are estimated at £6.80m. Vehicle operating costs for all three groups decline. Revenues from crossing charges increase by £18.85m. There is a decline in carbon emissions, valued at £0.41m.

Other key non-monetised benefits by 'main affected groups'

No other significant benefits are expected.

Key assumptions/sensitivities/risks

Discount rate (%) 3.5%

This impact assessment assumes that in this option road user charges for use of the Crossing will increase in line with the Retail Price Index (RPI) each year over the appraisal period. Traffic growth forecasts are estimated using DfT data sets (called 'NTEM') that use economic projections published by Government. It is possible that the actual outcome for key variables (e.g. economic growth, traffic growth and the response of users of the Crossing to increased charges) will differ from the projections used in this impact assessment. These risks have been minimised by using published economic forecasts and applying transport modelling and appraisal methods that are in line with Department for Transport guidance.

BUSINESS ASSESSMENT (Option 1)

Direct impact on business (Equivalent Annual) £m:	In scope of OIOO?	Measure qualifies as
Costs: £2.8m	No	NA
Benefits: £3.4m		
Net: -£0.6m		

Summary: Analysis & Evidence

Policy Option 2

Description: Increases to the current road user charges paid by users in October 2012 and October 2014, followed by annual increases in line with the Retail Price Index (RPI). For cars the cash charges would increase from £1.50 to £2.00 in Oct 2012 and to £2.50 in 2014. Charges for other vehicles would increase by similar proportions.

FULL ECONOMIC ASSESSMENT

Price Base Year 2010	PV Base Year 2011	Time Period Years 5	Net Benefit (Present Value (PV)) (£m)		
			Low: N/A	High: N/A	Best Estimate: £111.7m

COSTS (£m)	Total Transition (Constant Price) Years	Average Annual (excl. Transition) (Constant Price)	Total Cost (Present Value)
Low	N/A	N/A	N/A
High	N/A	N/A	N/A
Best Estimate	£0.6m	£43.2m	£202.3m

Description and scale of key monetised costs by 'main affected groups'

Costs incurred by Government include revisions to on-road signage, information provision to users (e.g. leaflets and publicity), and the costs of IT changes to manage the payments of charges electronically. Indirect tax revenues from fuel duty decline by £45.13m. Costs to Government are estimated at £47.17m. User charges increase by £98.66m for businesses, by £14.64m for commuters, and by £41.82m for other transport users.

Other key non-monetised costs by 'main affected groups'

No other significant costs are expected.

BENEFITS (£m)	Total Transition (Constant Price) Years	Average Annual (excl. Transition) (Constant Price)	Total Benefit (Present Value)
Low	N/A	N/A	N/A
High	N/A	N/A	N/A
Best Estimate	£0.0m	£67.2m	£314.0m

Description and scale of key monetised benefits by 'main affected groups'

Businesses, commuters and other transport users benefit from reduced journey times. These benefits to business are estimated at £103.98m, to commuters these benefits are estimated at £9.61m, and benefits to other transport users are estimated at £34.46m. Vehicle operating costs fall for all three groups, reflecting a fall in the number of journeys and improved journey times. Revenues from crossing charges increase by £123.87m. There is a decline in carbon emissions, which is valued at £5.27m.

Other key non-monetised benefits by 'main affected groups'

No other significant benefits are expected.

Key assumptions/sensitivities/risks

Discount rate

3.5%

This impact assessment assumes that in this option road user charges for use of the Crossing will increase in April 2012 and again in October 2014. Traffic growth forecasts are estimated using DfT data sets (called 'NTEM') that use economic projections published by Government. It is possible that the actual outcome for key variables (e.g. economic growth, traffic growth and the response of users of the Crossing to increased charges) will differ from the projections used in this impact assessment. These risks have been minimised by using published economic forecasts and applying transport modelling and appraisal methods that are in line with Department for Transport guidance.

BUSINESS ASSESSMENT (Option 2)

Direct impact on business (Equivalent Annual) £m:			In scope of OIOO?	Measure qualifies as
Costs: £21.0m	Benefits: £24.0m	Net: -£3.0m		

Summary: Analysis & Evidence

Policy Option 3

Description: The removal of the road user charging regime at the Dartford-Thurrock River Crossing from October 2012.

FULL ECONOMIC ASSESSMENT

Price Base Year 2010	PV Base Year 2011	Time Period Years 5	Net Benefit (Present Value (PV)) (£m)		
			Low: N/A	High: N/A	Best Estimate: £236.3m

COSTS (£m)	Total Transition (Constant Price)	Years	Average Annual (excl. Transition) (Constant Price)	Total Cost (Present Value)
Low	N/A	1	N/A	N/A
High	N/A		N/A	N/A
Best Estimate	£18.1m		£107.3m	£519.7m

Description and scale of key monetised costs by 'main affected groups'
 Costs incurred by Government include foregone revenues, the costs of changes to road infrastructure and the costs of information provision to users. Overall costs to Government are estimated at £440.12m, including £18.09m investment costs and £422.03m in decreased revenues. Vehicle operating costs increase for road users by a total of £70.58m. There is an increase in carbon emissions, valued at £9.02m.

Other key non-monetised costs by 'main affected groups'
 No other significant costs are expected.

BENEFITS (£m)	Total Transition (Constant Price)	Years	Average Annual (excl. Transition) (Constant Price)	Total Benefit (Present Value)
Low	N/A	0	N/A	Optional
High	N/A		N/A	Optional
Best Estimate	£0.0m		£162.0m	£756.0m

Description and scale of key monetised benefits by 'main affected groups'
 There are benefits to Government estimated at £15.18m from a reduction in operating costs by removal of the charge collection process (i.e. staffing costs, contractual costs, and on-going staff pension costs). Businesses, commuters and other transport users benefit from reduced journey times. The benefits to businesses are estimated at £132.42m. Travel time benefits to commuters are estimated at £20.94m and these benefits to other transport users are estimated at £64.49m. User charges fall by £247.16m for businesses, by £44.14m for commuters, and by £127.76m for other transport users. Indirect tax revenues from fuel duty increase by £103.87m.

Other key non-monetised benefits by 'main affected groups'
 No other significant benefits are expected.

Key assumptions/sensitivities/risks	Discount rate	3.5%
This impact assessment assumes that in this option road user charges will be removed at the Crossing from October 2012. Traffic growth forecasts are estimated using DfT sets (called 'NTEM') that use economic projections published by Government. It is possible that the actual outcome for key variables (e.g. economic growth, traffic growth and the response of users of the Crossing to increased charges) will differ from the projections used in this impact assessment. These risks have been minimised by using published economic forecasts and applying transport modelling and appraisal methods that are in line with Department for Transport guidance.		

BUSINESS ASSESSMENT (Option 3)

Direct impact on business (Equivalent Annual) £m:			In scope of OIOO?	Measure qualifies as
Costs: £3.3m	Benefits: £81.2m	Net: -£77.9m	No	NA

Evidence Base (for summary sheets)

1. Problem under consideration

Background

- 1.1 The Dartford-Thurrock River Crossing ('the Crossing') is a key part of the strategic road network. The Crossing spans the River Thames between Dartford and Thurrock, forming a trunk road link (the A282 Trunk Road) in the M25 orbital motorway. There is a continuing high demand for its use. It consists of two two-lane tunnels carrying traffic to the north, and a four-lane cable stayed bridge (the Queen Elizabeth II Bridge) carrying traffic to the south.
- 1.2 The Dartford River Crossing Study into Capacity Requirement which was published by DfT in 2009¹ provided a comprehensive analysis of the current and future performance of the Crossing. The 2009 study pointed to the importance of the Crossing in catering particularly for strategic movements of people and goods. For example, over 40% of journeys by light vehicles using the Crossing were relatively long distance, travelling 50 miles or more. Over 30% of HGV trips involved Dover port traffic and particularly long distance travelling, while around half had origins and destinations within the east and south east of England.
- 1.3 The majority of trips using the Crossing are travelling between the large conurbations to the north and south of the Crossing. Only a relatively small proportion of trips using the Crossing were very local. For example, 6% were travelling less than 12 miles. The study also noted that 22-32% of trips using the Crossing were for business purposes. This proportion was significantly higher than the national average of 17% on a normal weekday between 7.00am and 7.00pm.

Current performance of the Dartford Crossing

- 1.4 The Crossing suffers from significant levels of congestion, with over 50 million vehicles using it each year. The design capacity of the Crossing is 135,000 vehicles a day. The 2009 study concluded that the Crossing had been operating at its design capacity over a number of years, providing poor journey time reliability for its millions of users and offering little resilience to any incidents that may occur.
- 1.5 Evidence from the Highways Agency Traffic Information System² over the past 5 years consistently shows average delays of between 7-11 minutes for the slowest 10% of journeys on the M25 J30-7 section which includes the Crossing. This is among the highest level of delay on the strategic road network nationwide.
- 1.6 At times of high demand even minor incidents at the Crossing can result in flow-breakdown, causing worsening levels of performance. Congestion at the Crossing leads to problems of delays, with extensive queues affecting all users of the Crossing and roads in the surrounding area.
- 1.7 Daily flows of vehicle journeys over the Crossing were estimated in 2009 at between 145,000 to 150,000 vehicles per day, split fairly evenly by direction. The study concluded that the number of vehicle journeys over the Crossing each day, both in the morning and evening and at other times of the day, was above the number for which the Crossing had capacity. The typical AM and PM peak period (7:00am – 9:00am and 17:00 – 19:00) flows would be expected to be significantly higher than the rest of the day, however, this is not the case at the Crossing.

¹ Dartford River Crossing Study into Capacity Requirement (Department for Transport - April 2009)

<http://webarchive.nationalarchives.gov.uk/+http://www.dft.gov.uk/about/strategy/capacityrequirements/dartfordrivercrossing/>

² The Highways Agency currently maintains, operates and develops three traffic databases and associated applications. The Traffic Flow Data System (TRADS) holds information on traffic flows at sites on the network. The Journey Time Database (JTDB) system holds information on journey times and traffic flows for links of the network. These two databases are known collectively as the HA Traffic Information System (HATRIS). Further information is provided at <http://www.hatris.co.uk/>

The report found that although the overall number of vehicle journeys using the Crossing had reduced slightly in the last few years, the make up of traffic had changed, with a greater number of HGV movements³. The report found that the Crossing did not demonstrate typical flow patterns, as there was no pronounced morning or evening peak. Instead flows were consistently high during the daytime period with the maximum flows around 5:00pm to 6:00pm each day.

- 1.8 The 2009 study highlighted that the injury accident rate for the road network surrounding and including the Crossing was high and that the range of these incidents were caused by complex and inter-related factors. These ranged from the complexity of the surrounding network and spacing between junctions, to the merging and weaving of traffic approaching the Crossing, breakdowns and the physical capacity of the northbound tunnels. Combined with the high levels of demand flows in both directions, this meant that the Crossing had little resilience to incidents when they occurred.

Future levels of performance

- 1.9 The 2009 Dartford River Crossing Study into Capacity Requirement assessed the future performance of the Crossing, given the predicted levels of traffic growth, the impacts of the planned expansion of the Port of Dover, and the predicted growth in the Thames Gateway area.
- 1.10 The situation was anticipated to worsen as a result of forecast traffic growth, with the 2009 study concluding that the Crossing would be unable to cater for the forecast growth in traffic and predicted increases in travel demand. It also concluded that the level of performance would deteriorate further.
- 1.11 Given the continuing predicted longer term growth in traffic, driven by economic and population growth, Government has to consider how additional road capacity or more effective use of road capacity, can be delivered cost-effectively in those places where it is most critically needed. In developing future plans, and in the light of funding constraints, it is important to ensure that Government is managing road capacity effectively to meet the needs of users and others affected by transport. As part of the continuing and planned spending programme, the Department for Transport is currently upgrading sections of the M25, for which the Dartford Crossing forms a vital link for crossing the Thames between Kent and Essex.
- 1.12 The Department for Transport has recognised that, based on projections of traffic growth, in the longer term additional capacity is needed at the Dartford Crossing. The Department for Transport has committed to undertake a review of potential locations for a new crossing, followed by public consultation on the merits of the different possible options. It is predicted that construction of a new crossing would take about a decade to achieve, but the operational performance of the Crossing at the current time remains a key issue in the short and medium term.

Charges at the Crossing

- 1.13 Toll charges at the Crossing were levied until 2003 when the debts associated with the construction of the bridge and tunnels had been fully discharged. A road user charge has been collected at the Crossing since 2003, using the powers in the Transport Act 2000⁴, in order to manage the high demand for use of the Crossing.
- 1.14 The Department for Transport (DfT) revised the charging regime in 2008, with details of the current charging regime set out in the A282 Trunk Road (Dartford-Thurrock Crossing Charging Scheme) Order 2008⁵. The current road user charge rates at the Crossing are set out below:

³ Ibid; the report noted that the proportion of light vehicles had decreased by 9-10%, while the proportion of heavy goods vehicles (HGVs) had increased by 11-12%, with the greatest increases in a northbound direction.

⁴ Sections 167, 168, 171 and 172(2) of the Transport Act 2000(a)
<http://www.legislation.gov.uk/ukpga/2000/38/contents>

⁵ (SI No.1951) <http://www.legislation.gov.uk/uksi/2008/1951/contents/made>

Dartford Crossing Road User Charges (6am-10pm)

Vehicle Type	Cash	DART-Tag
Motorbikes	Free	Free
Cars	£1.50	£1.00
2 Axle Goods	£2.00	£1.75
Multi Axle Goods	£3.70	£3.20

- 1.15 The current charging regime has been in place since November 2008, which was the first time it was revised since its introduction as a road user charge in 2003. Although the Secretary of State can vary the charge in line with changes to the Retail Price Index (RPI), such changes have not been made since 2008, given that the majority of payments are cash based, and RPI increases to the cash charge rates would have resulted in multiple coin payments, making the transaction times for cash payments longer, and impacting the operational performance of the Crossing.

Details of the current road user charging regime

Timing of road user charging operations

- 1.16 The road user charges are currently levied every day between 6:00am and 10:00pm, whilst crossings made between 10:00pm and 6:00am are free.

Discounts for electronic pre-payment (DART-Tags)

- 1.17 Discounts from the level of cash charge at the Crossing are provided to all vehicle classes where users have pre-paid the relevant charge through the electronic DART-Tag system⁶. The discounted charge rates for each vehicle are set out in the table of charges above.

Discounts for local residents

- 1.18 The current charging regime provides enhanced discounts for local residents of Dartford and Thurrock. Private car drivers, with a registered vehicle in the local authority boundaries of Dartford Borough Council and Thurrock Council, can, by payment of an £10 annual administration fee, receive 50 free crossings a year, followed by a discounted charge of 20 pence per further crossing trip.

Exemptions

- 1.19 A number of vehicle types are exempt from the crossing charge, including motorcycles and armed forces vehicles, and users of the Crossing who are exempt from road vehicle excise tax by way of a disability exemption, are also exempt from the charge.

Revenues from road user charging and transport investment

- 1.20 The road user charges at the Crossing are determined under powers agreed by Parliament, and found in the Transport Act 2000⁷. Amongst other things the Act also provides that revenues from a trunk road user charge must be spent on transport (see schedule 12 paragraph 13(1)). Ministers have made clear that they do not intend to change the law to further ring fence such income.
- 1.21 Currently revenues from the Crossing are around £74 million a year. In the region of £36 million is spent on maintenance and operating costs for the Crossing a year, and the remainder, around £37 million, is invested in transport. Detailed accounts for the road user charging regime are published annually by the Highways Agency⁸. Previous appraisal of these investments show that users of the Crossing have directly benefited from major enhancements, such as those made on the main roads south of the Crossing.

⁶ <http://www.dart-tag.co.uk/nossl/home.php>

⁷ Sections 167, 168, 171 and 172(2) of the Transport Act 2000(a)

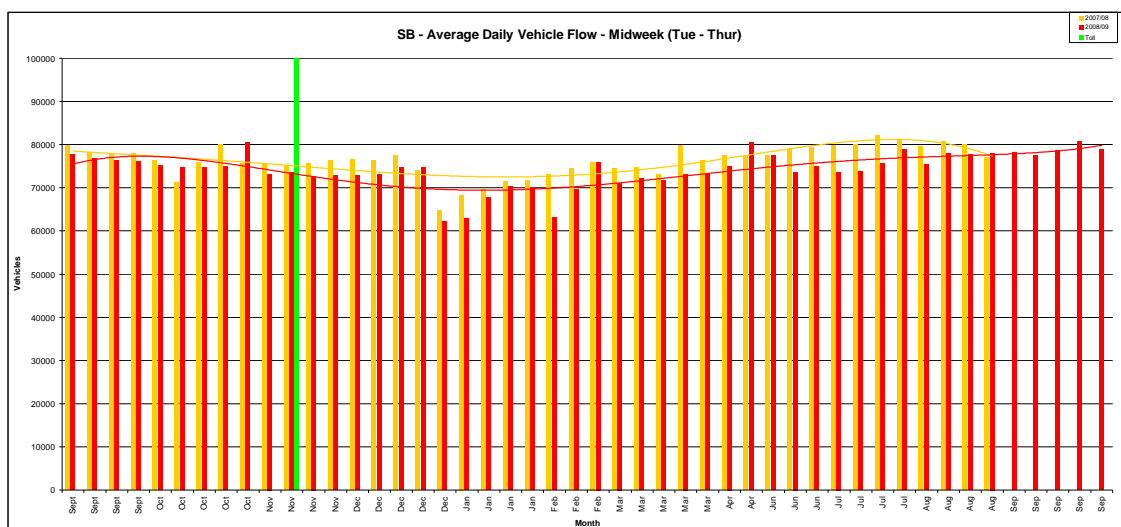
⁸ Dartford-Thurrock Crossing Charging Scheme Accounts 2009-10

http://www.highways.gov.uk/roads/documents/S100293_Dartford_Crossing_Account_2009-10_for_print.pdf

Impacts from previous changes to the charging regime

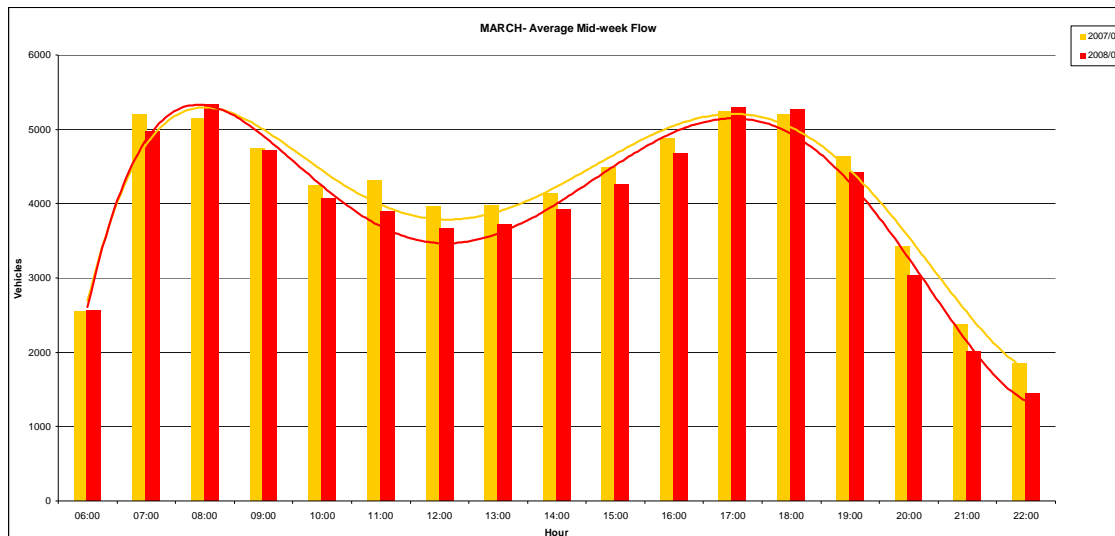
- 1.22 In November 2008 following consultations in December 2006 and February 2008, the Department implemented an increase in the road user charge at the Crossing, raising the cash charge for a car from the then £1.00 charge to £1.50 for cars. Increases in charges were also implemented for other vehicle classes and discounts for DART-Tag users also changed (from 7% to 33% for cars).
- 1.23 Direct comparisons between the impacts of the previous charge increase and that now proposed are not straightforward, as the changes to the charging regime in November 2008 also saw changes to the time of the charging period, from a previous 24 hour charge to charging between 6:00 am and 10:00 pm. There were also changes to the charging operation which saw the introduction of a local residents discount scheme.
- 1.24 The analysis of the changes to traffic patterns following the 2008 increase provides a useful evidence base in terms of the expected benefits from further proposed increases.
- 1.25 The main impacts of the changes to the charging regime implemented in November 2008 were as follows:
- Overall decrease in daytime traffic of 5.5% during the period 16 November 2008 to 31 August 2009 when compared with the same period in 2007-08.
 - An increase in night time traffic resulting in an overall decrease in traffic of 2.8% during the period December 2008 to 31 August 2009 compared with the corresponding period the year before.
 - An increase in the number of DART-Tag customer accounts of 84% from July 2008 to the end of August 2009.
 - Car cash payers reduced by 6% overall during the period 16 November 2008 to 31 August 2009 when compared with the corresponding period the previous year.
 - Van cash payers reduced by 1% overall during the period 16 November 2008 to 31 August 2009 when compared with the corresponding period the previous year.
 - DART-Tag usage for cars (including local residents) increased by 7% overall during the period 16 November 2008 to 31 August 2009 when compared with the corresponding period the previous year.
 - An increase in the overall average weekday transaction times 10.38 seconds during the period 1 March to 31 August 2008 to 11.74 seconds during the corresponding period in 2009.
- 1.26 In terms of the impacts on traffic flows from the charge increases in November 2008, the following charts illustrate the changes in traffic flows, in comparison with previous traffic flows.

Comparison of weekly daily flows: 2007-08 and 2008-09



- 1.27 In the relatively short-term, weekly traffic flows at the Crossing decreased in the immediate aftermath of the introduction of the 50 pence increase in the road user charge for cars, with mid-week traffic flows consistently lower during 2008-09, compared to the same period in the comparative period in 2007-08.

Comparison of charge period traffic flows: March 2008 and March 2009



- 1.28 For traffic flows during the charging period (6:00am to 10:00pm) there was a more pronounced reduction in traffic flow in the off-peak periods, between 10:00am and 4:00pm, and from 7:00pm till 10:00pm, compared to similar comparable traffic flow in the morning and evening peaks.
- 1.29 In terms of comparative traffic flows, the increases in charges impacted on the more “discretionary trips” i.e. the non-commuting type journeys. Where users of the Crossing do need to make trips, such as daily commuting, the impacts of the increased charge are less pronounced.
- 1.30 The impacts from the previous revisions to the road user charging regime have been taken into account in this assessment of the potential impacts from further changes to the charging regime at the Crossing.

2. Rationale for intervention

The need for change

- 2.1 The Department for Transport has made clear that providing improvements to the performance of the Crossing is a priority in view of its role in the movement of goods and people, and its contribution to the economy.
- 2.2 Government had to make hard choices at the time of the 2010 spending review⁹. The outcome was that the DfT accepted the need to raise additional revenue both from increasing the cap on rail fares and from the Dartford Crossing charges. Recognising the importance of the Crossing and accepting the need to raise additional revenue from the Crossing, the Department was able to prioritise expenditure during this spending review period for short, medium and long term measures to improve flow at the Crossing. These included
- suspension of charges to allow free use of the Crossing at times of severe congestion
 - introduction of free-flow charging which will require capital investment to reconfigure the infrastructure and build back-office systems at the Crossing, and
 - review options for additional Crossing capacity - undertaking a comparative economic evaluation of the three schemes identified previously would be the first step in the process of developing a full business case for the construction of additional capacity.

⁹ HM Treasury Spending Review 2010: http://cdn.hm-treasury.gov.uk/sr2010_complereport.pdf

- 2.3 The proposed increased charges at the Dartford-Thurrock River Crossing, and the subsequent increases in net revenues from charge receipts, would allow the Department to continue to prioritise up-front investment in measures at the Crossing in the short and medium term and in developing and funding additional crossing capacity in the Lower Thames area in the long term.

3. Policy objective

Aim

- 3.1 The aim of Government's policy is to reduce congestion on the Dartford Crossing.

Objectives

- 3.2 The objectives of this policy are to:
- continue to manage demand for use of the Crossing and reduce the impacts caused by levels of congestion at the Crossing.
 - Provide Government with additional revenues to allow the Department for Transport to continue to prioritise development and funding of proposals, particularly for the provision of additional crossing capacity in the Lower Thames.

4. Consultation

- 4.1 The Department for Transport published detailed proposals for revisions to the road user charging regime for consultation on 29 June 2011¹⁰, as required by legislation¹¹. The consultation period closed on 23 September 2011.
- 4.2 In developing the proposals, Government took account of a number of factors, including:
- (a) Prior to the implementation of a free-flow charging scheme which makes better use of newer charging technologies, there was a need to keep cash transactions as simple as possible. Rounding prices enables payments to be made more easily and avoids increasing transaction times.
 - (b) To facilitate a move to more non-cash (account) payment methods prior to the introduction of a free-flow charging scheme, there is a need to encourage further take-up of DART-Tags.
 - (c) There is a need to maintain the fairness of the Crossing charge for local residents who continue to suffer the adverse effects of the Crossing in their vicinity.
- 4.3 The Department for Transport therefore proposed to:
- (a) Increase the charges in two successive steps to assist users in adjusting to the overall increase;
 - (b) Increase the charge rates for cash payments by approximately a third within those two successive steps, rounded to the nearest 50p to keep transaction costs low;
 - (c) Apply existing discount levels by category of vehicle for those choosing to pay in advance using DART-Tag; and,
 - (d) Retain the other elements of the current charging regime at least until such time as newer charging technologies are introduced.

¹⁰ Revising the Charges at the Dartford-Thurrock River Crossing, June 2011

¹¹ The Trunk Road Charging Scheme (Bridges and Tunnels)(England) Procedure Regulations 2001
<http://www.legislation.gov.uk/uksi/2001/2303/regulation/4/made>

Proposed Charge rates

4.4 The Department proposed to implement the first increase late in 2011. A second increase would then take effect in spring 2012. The proposed charge rates consulted upon were as follows:

Proposed increases to the road user charging rates

Dartford Crossing Day Charges (6am-10pm)			
Note: no charges apply 10pm-6am			
	Current	Proposed	
		2011	2012
Motorbikes	Free	Free	Free
Cash charge			
Cars	£1.50	£2.00	£2.50
2 Axle Goods	£2.00	£2.50	£3.00
Multi Axle Goods	£3.70	£5.00	£6.00
DART-Tag charge			
Cars	£1.00	£1.33	£1.67
2 Axle Goods	£1.75	£2.19	£2.63
Multi Axle Goods	£3.20	£4.33	£5.19

Provision for discretionary power to vary charges in line with RPI

4.5 The 2008 Charging Order¹² includes the provision for charges to be varied in future in line with changes to the Retail Price Index (RPI) to maintain the future effectiveness of the charge. The Department's proposals included retention of the provision to allow changes in line with RPI to take place in the future. The percentage by which charges can be varied would be by reference to the RPI percentage change determined over a period of 12 months.

Consultation Questions

4.6 The consultation asked respondents about:

- The approach to increasing charges for cash payments for all categories of vehicles by broadly equivalent rates;
- The proposal to continue with the current levels of discounts provided to DART-Tag users;
- The proposal to increasing charges in 2011 and 2012;
- The draft Charging Order;
- The proposals to maintain the current terms and rates for the Local Residents Discount Scheme;
- The proposals to maintain unchanged other aspects of the charging regime (times of operation, vehicle categories, exemptions); and,
- The assessment of the impacts of the proposals, particularly on small firms and protected equality groups.

Responses to the consultation

4.7 The Department for Transport received over 1,300 responses during its consultation period. Responses were received from both the statutory consultees set out in the relevant legislation¹³ and also from a range of organisations and members of the public. Ministers have made clear in advance of the publication of the formal Government response to the consultation that the proposals made in the consultation for increases late in 2011 and again in spring 2012, would not be implemented as planned. A written ministerial statement was made to Parliament on 24th November 2011 to that effect¹⁴.

¹² (SI No.1951) <http://www.legislation.gov.uk/ukxi/2008/1951/contents/made>

¹³ The Trunk Road Charging Scheme (Bridges and Tunnels)(England) Procedure Regulations 2001
<http://www.legislation.gov.uk/ukxi/2001/2303/regulation/4/made>

¹⁴ Charges at the Dartford – Thurrock River Crossing, 24 November 2011 <http://www.dft.gov.uk/news/statements/penning-20111124>

- 4.8 The responses to the consultation have been taken into account, especially in determining the Department's preferred option. Although maintaining a two-step approach to increasing the charges at the Crossing, the proposed timing of the increases (October 2012 and October 2014) responds to views expressed in the consultation on the proposed timing of the increases in relation to the current economic climate. The preferred option also responds to views made about the impact of the planned charges on the management of traffic during the period of the Olympic and Paralympic Games, and the implementation of newer charging technology at the Crossing.
- 4.9 Additionally, in response to the views provided in the recent consultation exercise on proposed revisions to the road user charging regime, the Department has undertaken analysis to assess the impacts from removal of the road user charging regime at the Crossing. The vast majority of the responses to the consultation said that the charging regime should be removed, given that the debts associated with the construction of the QEII Bridge at the Crossing had been repaid, and that it was the charging mechanism itself that was the root cause of delays at the Crossing.
- 4.10 Views and evidence from the consultation process on the Department's initial assessment of impacts from its proposed changes to the charging regime have also been considered in finalising the assessment of wider impacts (paragraph 10.14).

5. Description of options considered (including Do Nothing)

- 5.1 This impact assessment considers options related to revising the current road user charging regime at the Crossing in the short term. This is one measure to achieve the policy objective of reducing congestion at the Crossing, and should be viewed in the context of the Department developing additional medium and longer term measures to address congestion at the Crossing (see paragraph 2.2).
- 5.2 This assessment provides a detailed economic assessment of two policy options that involve increasing the road user charges at the Crossing. Following views expressed during the recent consultation process, analysis of a further option of removing the charging has also been assessed. These assessments are against a Do Nothing option of retaining the details of the current road user charging regime at the Crossing. In addition, consideration of an option for implementation of an "optimised" charge rate has been considered and included.
- 5.3 Descriptions of the Do Nothing option and the economic assessment of the three policy options are set out below, illustrated by tables showing the costs and benefits for each option during the five years of the appraisal period. All three options were appraised against the baseline provided by the Do Nothing option. All options focus on changes to the level of charges, as all other aspects of the charging regime (Local Residents Scheme, vehicle classifications, DART-Tag discounts) are intended to remain unchanged.

Do Nothing Option

- 5.4 The Do Nothing option assumes the continuation of the current road user charging regime throughout the appraisal period including times of operation and the specific charges levied for individual vehicle classes. Allowing for inflation, the Crossing charge rates being constant would decrease in real terms over time. The rates for the current road user charges are set out in the Background section.
- 5.5 The Do Nothing option of no changes to the current charging regime is the most appropriate counterfactual against which to assess the impacts of the other options. This is because under the current legislative framework that applies to the Dartford Crossing (The 2008 Charging Order)¹⁵, amendments to the cash rates of the road user charges can only occur if a decision is specifically taken by the Secretary of State, to amend the rate of the charge in line with changes to the Retail Price Index.

¹⁵ Schedule 3, Variation of the Charging Regime in line with the Retail Price Index, <http://www.legislation.gov.uk/ukSI/2008/1951/schedule/3/made>

- 5.6 If no decision is made by the Secretary of State, the charges would remain at their existing levels in nominal terms. Since 2003 when the charges were first introduced, the charges have been changed only once, in 2008, following the necessary statutory public consultations in 2006¹⁶ and 2008¹⁷.
- 5.7 The level of increases in the cash charges rates in 2008 was approximately equivalent to the same level of increase had charges increased regularly in line with the retail price index over the previous 5 years. When the charges were increased in 2008, the charge rates were also rounded because increases exactly in line with increases in the retail price index over the previous years would result in more multiple coin payments, making the transaction times for cash payments longer, and impacting the operational performance of the Crossing.

Policy Option 1 – Increases in line with Retail Price Index (RPI) increases

- 5.8 Policy Option 1 would see changes to the road user charging rates for the specific vehicle classes, varied on an annual basis in line with the increases in the Retail Price Index (RPI), as permitted in the current Charging Order when a decision is specifically taken by the Secretary of State. No other changes to the current charging regime are considered in this option.
- 5.9 The table below illustrates the levels of road user charges for this option over the appraisal period by applying the average annual RPI rate assumed in the transport model used (i.e. 3.11%) from 2011. The cash charges have been rounded to the nearest 10p in accordance with the requirements of the existing Charging Order. The proposed charges take account of the differential rates between different categories of vehicle, as well as the differential discount rates for DART-Tag users by category of vehicle.

Road User Charges at the Dartford-Thurrock River Crossing increased in line with RPI

Proposed Day Charge (6am-10pm)					
Year	2011-12	2012-13	2013-14	2014-15	2015-16
Motorbikes	Free	Free	Free	Free	Free
Cash charge					
Cars	£1.50	£1.60	£1.60	£1.60	£1.70
2 Axle Goods	£2.00	£2.10	£2.10	£2.20	£2.30
Multi Axle Goods	£3.70	£3.80	£3.90	£4.10	£4.20
DART-Tag charge					
Cars	£1.00	£1.07	£1.07	£1.07	£1.13
2 Axle Goods	£1.75	£1.84	£1.84	£1.93	£2.01
Multi Axle Goods	£3.20	£3.29	£3.38	£3.55	£3.64

¹⁶ Proposed changes to the charges at the Dartford-Thurrock River Crossing (Department for Transport – December 2006)

¹⁷ Dartford-Thurrock River Crossing – Discounted Charges for Local Residents using the Crossing (Department for Transport – February 2008)

Policy Option 2 – 50 pence increases in October 2012 and October 2014, followed by increases in line with the Retail Price Index (RPI) – (Preferred Option)

- 5.10 Policy Option 2 proposes a two-step increase to the charges, with a 50 pence rise in October 2012 and a further 50 pence rise 2014. The preferred option has been developed following the responses made during the Department’s consultation process, particularly the views expressed in terms of the timing of the proposed increases in charges, and the need to reflect the current economic climate but also the challenge of traffic management during period of the Olympic and Paralympic Games, and the timing of the introduction of new charging technology at the Crossing.
- 5.11 The table below illustrates the road user charges for this option over the appraisal period. For 2012 and 2014 the cash rate for cars is to be increased from £1.50 to £2.00 and again to £2.50, while prices for other vehicles classes are increased proportionately. Cash charges are rounded to the nearest 50p in order to further reduce transaction costs associated with time taken to give change for cash payments. Rates for DART-Tag users are then discounted at the present level of discount according to category of vehicle.
- 5.12 From 2014 to 2015 annual variations are made by applying the average annual RPI rate assumed in the model used (i.e. 3.11%) to the 2014 rates of charges. The cash charges are again rounded to the nearest 10p to reduce transaction costs. The rates for DART-Tag users were calculated by applying the differential discount rates by category of vehicle.

Road User Charges at the Dartford-Thurrock River Crossing increased in 2012 and 2014, followed by RPI increase.

Proposed Day Charge (6am-10pm)					
Year	2011-12	2012-13	2013-14	2014-15	2015-16
Motorbikes	Free	Free	Free	Free	Free
Cash charge					
Cars	£1.50	£2.00	£2.00	£2.50	£2.60
2 Axle Goods	£2.00	£2.50	£2.50	£3.00	£3.10
Multi Axle Goods	£3.70	£5.00	£5.00	£6.00	£6.20
DART-Tag charge					
Cars	£1.00	£1.33	£1.33	£1.67	£1.73
2 Axle Goods	£1.75	£2.19	£2.19	£2.63	£2.72
Multi Axle Goods	£3.20	£4.33	£4.33	£5.19	£5.37

- 5.13 As with Policy Option 1, no other changes to the other elements of the current charging regime are proposed.

Policy Option 3 - Removal of the road user charging regime

- 5.14 Policy Option 3 would see the removal of the road user charging from October 2012. The option would see the removal of the physical infrastructure involved in the road user charge collection process i.e. the toll booths, and associated works on the highway to configure and align the road layout for free flowing traffic.

5.15 In addition, the option involves the cessation of the charge collection process in terms of the staff currently employed for such purposes, as well the stopping of the supporting activities, such as the management of the current pre-payment charge accounts and management of the local residents discount scheme. This policy option also includes the necessary changes to the current contractual arrangements in the M25 Design, Build, Finance and Operate (DBFO) contract, under which the Highways Agency arrange for the charge collection process.

Other policy options considered

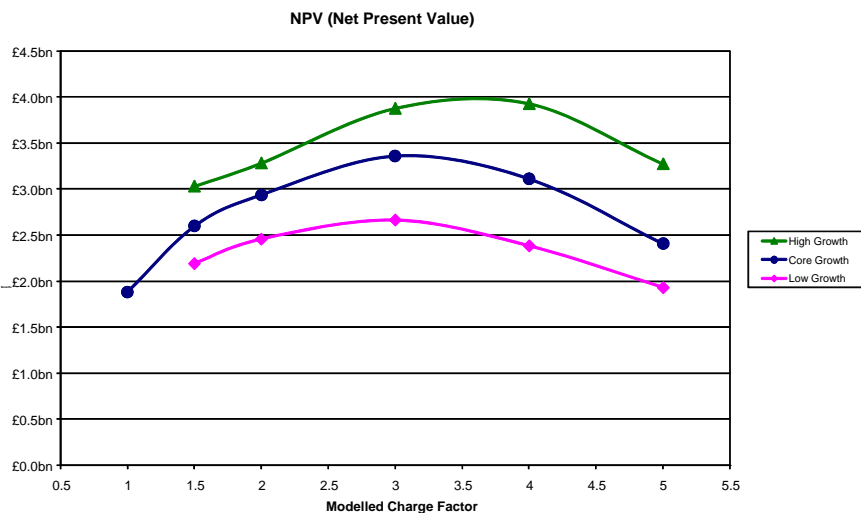
Optimised Charge Levels

5.16 In considering policy options, the Department for Transport looked at an option of raising the road user charges at the Crossing to a level estimated to maximise the level of net benefits. This welfare maximisation approach is a technique in welfare economics to determine the set of conditions that lead to a benefit to society being maximised from a change in circumstances.

5.17 For transport projects, this principle can be applied to recommend proposals where gains are sufficient to compensate losses, and forms the basis of cost benefit analysis. A development of this principle is to undertake cost benefit analysis to search for economic efficiency, or welfare maximisation, and this is typically undertaken by conducting a series of tests.

5.18 In relation to the Dartford Crossing, the Department has considered the level of road user charge that would derive the greatest social benefit. The chart below illustrates a range of potential charge levels and their respective benefits, for a number of economic growth scenarios.

Net Present Values at varying crossing charge levels:



5.19 For the core growth scenario, potential user benefits plateau between a charge level of 2 and 4 times greater than the existing road user charge. The Department has considered that the “optimum” socially maximised charge level to be around three times the level of the existing road user charge, and would relate to the following cash charge level per user class:

Welfare maximised road user charge levels by user class

	Current Day charge (6am-10pm)	Optimum charge levels (6am-10pm)
Motorbikes	Free	Free
Cash charge		
Cars	£1.50	£4.50
2 Axle Goods	£2.00	£6.00
Multi Axle Goods	£3.70	£11.10

- 5.20 Adoption of the welfare maximising charge levels at the Crossing would provide the most optimised charging levels in terms of the greatest welfare benefit. However, the Department for Transport recognises the introduction of such levels of road user charge would be a very substantial increase to the existing charge levels in use at the Crossing, and that given the current economic climate for businesses and households, it would be inappropriate to increase the charges by this amount.
- 5.21 The Department has concluded that proposals for a welfare maximising charging regime at the Dartford Crossing would be unacceptable, and are not proposing such an option in relation to revisions to the current charging regime. This option has therefore not been further considered in this impact assessment.

6. Monetised and non-monetised costs and benefits of each option (including administrative burden)

- 6.1 Traffic modelling commissioned by the Department for Transport for this impact assessment shows that an increase in the charge paid at the Dartford Crossing would reduce congestion by discouraging some road users from using the Crossing. In turn, this would lead to reduced journey times and hence benefits, including reduction in journey times, for transport users who continue to use the Crossing. Almost all road users put a monetary value on saving travel time, with the value generally being highest for those who are travelling on business, compared with trips made for other purposes.
- 6.2 Individual transport users' response to changes in charges is influenced by whether the value that they place on the travel time savings from the reduction in congestion at the Crossing is higher or lower than the increase in the Crossing charge.
- 6.3 This impact assessment identifies the costs and benefits for all groups that will be directly affected by a change in the level of charges at the Dartford Crossing. A change in charges will generate direct costs and benefits to central government and to transport users.
- 6.4 Several of the costs and benefits of changes to charges at the Dartford Crossing are generated because of the effect that a change in charges has on the journeys that individuals choose to undertake in the course of work, commuting, and non-work activities. The effect that a change in the charges has on the journeys that are undertaken has been estimated using transport modelling techniques that are recommended by guidance published by the Department for Transport, and contained in the Department's Transport Analysis Guidance (WebTAG)¹⁸. WebTAG identifies a wide range of possible impacts that transport schemes can have and prescribes detailed methodologies for quantifying these impacts and monetising them wherever possible.
- 6.5 Costs and benefits to transport users are identified to arise from changes in travel times, vehicle operating costs, and user charges (crossing charges). Further background information on valuation of travel time and vehicle operating costs are provided in Annex 1. Costs and benefits for transport users are disaggregated by trip purpose. These trip purposes are identified in three separate categories, which are
- Business - this category includes trips made for business purposes and also includes transport operators
 - Commuting - this category includes trips made for commuting to and from a place of work
 - Other - this category includes other non-business trips that are not included in commuting trips, such as trips made for leisure purposes.
- 6.6 The Department for Transport commissioned a transport modelling study for this impact assessment to provide the analysis required for estimating costs and benefits to transport users from changes in charges at the Crossing. The results from this analysis confirm that individual transport users' response to a change in charges is influenced by whether the value that they place on the travel time savings from the reduction in congestion at the Crossing is higher or lower than the increase in the Crossing charge.

¹⁸ <http://www.dft.gov.uk/webtag/>

- 6.7 Individual transport users who value the reduction in journey times higher than the cost of the increased charges will benefit from the increase in charges. Road users who place a lower value on the journey time savings, and are discouraged from using the Crossing by the increased charges, may choose a different route for their journey, travel to different destinations or travel by a different mode (e.g. public transport rather than car). The change in charges may lead to some changes to the journeys that workers choose to take in the course of business activities and the journeys that individuals choose to undertake for non-work activities. In turn, the changes in decisions that individuals make regarding their journey alters the volume of traffic using the Crossing and the surrounding roads. This affects the level of congestion on the Crossing, which leads to changes in journey times.
- 6.8 Costs and benefits to central government are identified to be generated by changes in investment costs associated with capital investment at the Crossing, operating costs associated with operating the charging system, changes in revenues from crossing charges, and changes in indirect tax revenues.
- 6.9 Revenues are related to the user charges, since user charges represent money transfers from users to operators which become revenues from the operator's point of view. However, this does not mean that the effect of changes in user charges is the same to transport users and to the operator. In fact, for transport users, the economic effect of a change in charges is the resultant change in their consumer surplus. For those who do not change their behaviour, the change in consumer surplus is the same as the change in money paid, but for those who do change their behaviour, this is not the case. For operators, however, the economic benefit of a change in charges is simply the change in net revenue received. Therefore, the values for User Charges and for Revenues in the cost and benefit analysis for each policy option are not equal in size.
- 6.10 There are also expected to be impacts from changes in vehicle emissions of carbon dioxide. These are valued using the latest values for non-traded carbon published by the Department for Energy and Climate Change¹⁹. Other environmental impacts, such as exposure of households to changes in noise and air quality, are expected to be minimal and are therefore not included in the calculation of costs and benefits.
- 6.11 The estimated costs and benefits of each option contain estimates derived from the Department for Transport's modelling and appraisal work for this impact assessment. The estimates of other costs of the policy options, particularly the operational implementation costs, such as the costs of changes to the charge collection process (software changes, pre-payment account management), publicity and information provision and changes to road signage, have been provided to the Department by current the Crossing operator (Connect Plus) on a commercial basis, based on proposed business case implementation costs, drawn from their contractual experience of the management of the charging regime and the costs of previous changes to the charging regime, most notably the changes made in November 2008.
- 6.12 For Policy Option 3, the removal of the road user charging regime in October 2012, the costs associated with the cessation of the charge collection process (staff costs, pension costs, removal of charging infrastructure and changes to the road alignment) have been provided to the Department by the Highways Agency and the current Crossing operator, based on their knowledge of both the current contractual requirements in the M25 DBFO contract, which includes the operation, maintenance and management of the charge collection process at the Crossing, as well as their knowledge of the relevant costs of changes to the existing road layout.
- 6.13 Costs and benefits of each option were assessed and calculated over a 5 year appraisal period (2011 to 2015). The timing of further proposed changes to the charges at the Dartford Crossing is uncertain. However, an appraisal period of 5 years was considered a reasonable time period over which these charging proposals would apply. The Department would expect to review the level of charges after a reasonable period of time following the planned implementation of free-flow charging at the Crossing, and in light of progress made on the development of options for new additional crossing capacity in the Lower Thames.
- 6.14 As set out in paragraph 6.1, the Department's analysis shows that increases in the road user charge reduces congestion as some users are dissuaded from using the Crossing, and that this leads to reduced journey times and time saving benefits for those users who choose to continue to use the Crossing. The Department's analysis for this impact assessment has included

¹⁹ Further background information on the methods used for estimation of changes in carbon emissions and the values applied to estimated changes in carbon emissions is provided at <http://www.dft.gov.uk/webtag/documents/expert/pdf/unit3.3.5.pdf>

comparison of the changes in the volume of traffic flows using the Crossing for each of the policy options during the appraisal period, and are set out below:

Comparative changes in traffic volumes (Daily forecast volumes (Vehicles) – 2015)

Policy Option	Daily Flow (forecast)	% change (from Do Nothing Option)
Do Nothing	155,181	-
Policy Option 1 (annual RPI increases)	153,125	-1%
Policy Option 2 (increases in 2012 and 2014)	132,608	-15%
Policy Option 3 (removal of charges)	175,415	13%

Costs and Benefit Assessment of Policy Option 1 (annual RPI increases)

Costs

Costs of Policy Option 1

Description of Cost	Amount (£ '000) (present value over appraisal period)
Costs to Central Government	6,017
Investment cost to central government	830
Operating costs	1,251
Decrease in indirect tax revenue	3,936
Costs to Businesses	12,852
User Charges	12,852
Costs to Commuting	2,029
User Charges	2,029
Costs to Others	5,943
User Charges	5,943
TOTAL COSTS	26,841

- 6.15 The estimated investment costs to Government arising from the implementation of Policy Option 1 are valued at £0.83m over the appraisal period. These costs relate to the physical implementation of the necessary changes for the revised charging regime, in terms of amended signage for motorists on the approaches and at the Dartford Crossing, as well as amendments necessary to the software systems used to manage the pre-paid accounts of users paying in advance. Operating costs to Government will increase by around £1.25m. These are allowances made for additional staff, their recruitment and training, to cover additional DART-Tag purchases and account set-ups, and cash handling requirements resulting from charges requiring more coins in payment.
- 6.16 Indirect tax revenues are estimated to fall by £3.94m, with forecast reductions in traffic and in congestion resulting in reduced fuel consumption. Indirect tax (fuel duty) costs to transport users are reflected in vehicle operating costs. Reporting the change in indirect tax revenue reflects that this revenue can be used for other spending, and completes the treatment of indirect tax as a transfer.

- 6.17 Vehicle operating costs to businesses are estimated to fall by around £1.3m over the appraisal period. Vehicle operating costs to commuters are estimated to fall by approximately £0.7m and these costs to other transport users fall by approximately £2.4m over the appraisal period. Vehicle operating costs fall because with fewer vehicles forecast to be using the Crossing after each charge increase, less fuel will be used and there will be similar marginal decreases in non-fuel operating costs (depreciation, vehicle component wear, etc).
- 6.18 In this option, it is estimated that businesses would pay increased user charges of approximately £12.8m. User charges paid by commuters would increase by £2.0m, and charges paid by other transport users would increase by approximately £5.9m.
- 6.19 The total estimate of costs for this option is £26.8m.

Benefits

Benefits for Policy Option 1

Description of Benefit	Amount (£ '000) (present value over appraisal period)
Benefits to Businesses	15,923
Travel time savings	14,586
Decrease in vehicle operating costs	1,337
Benefits to Commuting	1,759
Travel time savings	1,026
Decrease in vehicle operating costs	733
Benefits to Others	9,228
Travel time savings	6,808
Decrease in vehicle operating costs	2,420
Carbon emissions	409
Revenues from Crossing charges	18,854
TOTAL BENEFITS	46,173

- 6.20 Policy Option 1 provides benefits to businesses, commuters and other transport users in terms of improvements in travel time. Businesses are estimated to benefit by around £14.6m from reduced travel time. Commuters are estimated to benefit by around £1.0m and other transport users are estimated to benefit by approximately £6.8m.
- 6.21 Vehicle operating costs are estimated to decline. Vehicle operating costs to businesses are estimated to fall by £1.3m, with these costs to commuters falling by £0.7m, and these costs to other transport users falling by £6.8m over the appraisal period. Vehicle operating costs to businesses are. Vehicle operating costs fall because fewer forecast to be using the Crossing after each charge increase, less fuel will be used and there will be similar marginal decreases in non-fuel operating costs (depreciation, vehicle component wear etc.).
- 6.22 There are some additional benefits from a reduction in greenhouse gas associated with a small decrease in fuel consumption by road vehicles. The reduction in carbon emissions (2,528 tonnes) is valued at approximately £0.4m. There are increased revenues received from the payment of increased Crossing charges estimated at approximately £18.9m.
- 6.23 The overall level of benefits for this option is estimated at £46.2m.

Costs and Benefit Assessment of Policy Option 2 (50 pence increases in October 2012 and October 2014 followed by RPI increases)

Costs

Costs of Policy Option 2

Description of Cost	Amount (£ '000) (present value over appraisal period)
Total Costs to Central Government	47,168
Investment cost to central government	642
Operating costs	1,397
Decrease in indirect tax revenue	45,129
Total Costs to Businesses	98,661
User Charges	98,661
Total Costs to Commuting	14,645
User Charges	14,645
Total Costs to Others	41,822
User Charges	41,822
TOTAL COSTS	202,296

- 6.24 The estimated investment costs to Government from the implementation of Policy Option 2 are valued at £0.6m over the appraisal period. These relate to the physical implementation of the necessary changes for the revised charging regime, in terms of amended signage for motorists on the approaches and at the Dartford Crossing, changes to the marketing and publicity material for the charging scheme, as well as amendments necessary to the software systems used to manage the pre-paid accounts of users paying in advance. Operating costs to Government will increase by around £1.40m. These are allowances made for additional staff, their recruitment and training, to cover additional DART-Tag purchases and account set-ups, and cash handling requirements resulting from charges requiring more coins in payment.
- 6.25 Indirect tax revenues decline because of reductions in traffic, and the implications in terms of reduced fuel duty revenues, is estimated at £45.1m. There is an increase in revenues received from the payment of increased crossing charges. In this policy option, the increased revenues in the appraisal period are estimated at £124m. There are increases user charges for businesses of £98.6m, for commuters of £14.6m, increases for other transport users of £41.8m.
- 6.26 The total estimated costs for this option are £202.3m.

Benefits

Benefits of Policy Option 2

Description of Benefit	Amount (£ '000) (present value over appraisal period)
Benefits to Businesses	113,461
Travel time savings	103,981
Decrease in vehicle operating costs	9,480
Benefits to Commuting	16,380
Travel time savings	9,614
Decrease in vehicle operating costs	6,766

Benefits to Others	55,065
Travel time savings	34,461
Decrease in vehicle operating costs	20,604
Carbon emissions	5,267
Revenues from Crossing charges	123,870
TOTAL BENEFITS	314,043

- 6.27 Policy Option 2 provides benefits to businesses, commuter, and other transport users journeys in terms of improvements in travel time. Businesses are estimated to benefit by around £104.0m, commuters are estimated to benefit by around £9.6m, and other transport users are expected to benefit by around £34.4m.
- 6.28 Vehicle operating costs are estimated to decline. Vehicle operating costs to businesses are estimated to fall by £9.5m, with these costs to commuters falling by £6.8m These costs to other transport users are estimated to fall by £20.6m over the appraisal period. As with Policy Option 1, vehicle operating costs fall because fewer forecast to be using the Crossing after each charge increase, less fuel will be used and there will be similar marginal decreases in non-fuel operating costs (depreciation, vehicle component wear etc.).
- 6.29 There is an increase in revenues received from the payment of increased crossing charges during the appraisal period estimated at approximately £123.9m, and in addition there is a slight decrease in greenhouse gas emissions resulting from a small decrease in fuel consumption. The value of the decrease in carbon emissions (28,463 tonnes) is valued at approximately £5.3m.
- 6.30 The total estimated benefits from this policy option are £314.0m

Costs and Benefit Assessment of Policy Option 3 (Removal of road user charges)

Costs

Costs of Policy Option 3

Description of Cost	Amount (£ '000) (present value over appraisal period)
Total Costs to central government	440,117
Investment cost to central government	18,089
Decreased revenues from Crossing charges	422,028
Total Costs to Businesses	15,179
Vehicle Operating Costs	15,179
Total Costs to Commuting	13,248
Vehicle Operating Costs	13,248
Total Costs to Others	42,149
Vehicle Operating Costs	42,149
Carbon emissions	9,020
TOTAL COSTS	519,713

- 6.31 The estimated investment costs to Government arising from the implementation of Policy Option 3 are valued at approximately £18.1m over the appraisal period. These relate to the physical implementation costs of removing the charging infrastructure and there are also costs from foregone revenue from Crossing charges estimated at £422.0m

- 6.32 Vehicle operating costs increase for all three groups of road users. These costs to businesses are estimated to increase by approximately £15.2m, with these costs to commuters increasing by approximately £13.2m, and costs to other transport users increasing by approximately £42.1m. These reflect an increase in number of trips and also changes to the efficiency of traffic flows.
- 6.33 There is a slight increase in greenhouse gas emissions resulting from the increase in fuel consumption. The negative impact of the increase in carbon emissions (48,353 tonnes) is valued at approximately £9.0m.

Benefits

Benefits of Policy Option 3

Description of Benefit	Amount (£ '000) (present value over appraisal period)
Reduction of operating costs to Government	15,183
Benefits to Businesses	379,583
Travel time savings	132,421
User Charges	247,162
Benefits to Commuting	65,083
Travel time savings	20,943
User Charges	44,140
Benefits to Other	192,252
Travel time savings	64,493
User Charges	127,759
Indirect tax revenue	103,873
TOTAL BENEFITS	755,974

- 6.34 Policy Option 3 provides some savings in operational costs during the appraisal period estimated at around £15 million net. These arise from no longer needing to employ charge collection and back-office staff. Offset against these are some smaller costs arising from staff termination payments, ongoing but reducing pension contributions and the cost of a one-off public information campaign immediately prior to charge removal.
- 6.35 Policy Option 3 provides benefits to businesses, commuters, and other transport users in terms of improvements in travel time and decreases in user charges. Businesses are estimated to benefit by around £132.4m. Commuters are estimated to benefit by approximately £20.9m, and other transport users are expected to benefit by around £64.5m. User charges decrease by £247.2m for businesses, by £44.1m for commuters, and by £127.8m for other transport users. There is an increase in indirect tax revenues of approximately £103.9m, as with the forecast increase in road traffic, purchases of fuel subject to fuel duty increase.
- 6.36 The travel time savings associated with Policy Option 3 are generated by the removal of charging at booths at the Crossing, which removes the time associated with this activity for individual vehicles. This is a different effect to Policy Option 2, which results in time savings by reducing the traffic flow using the Crossing.

7. Rationale and evidence that justify the level of analysis used in the IA (proportionality approach)

- 7.1 The Department commissioned specific transport modelling and appraisal for the three policy options in this impact assessment. This has been undertaken in accordance with the Department's latest version of its transport appraisal guidance (referred to as "WebTAG")²⁰. The analysis incorporates the latest economic growth projections published by the Office of Budget Responsibility in 2011²¹ which has been incorporated into revised traffic growth factors (NTEM 6.2) issued in 2011²². Benefits and costs have been appraised using the latest version of the Department for Transport's appraisal software (TUBA 1.8) which was released in 2011²³. Further details of the transport modelling methodology can be found at Annex 1.
- 7.2 In addition, the Department has considered existing evidence of impacts from previous changes to the charging regime at the Crossing, and existing information on the current and historic traffic data, and detailed information on the operation of the Crossing. The Department has also considered details of evidence provided to it in response to its public consultation on the proposed changes to the details of the charging regime at the Crossing.

8. Risks and assumptions

Risks

- 8.1 Risks of the actual outcome for key variables (e.g. economic growth, traffic growth and the response of users of the Crossing to increased charges) differing from the projections used in this impact assessment have been minimised by using the latest published economic forecasts and data and applying transport modelling methods and appraisal methodologies that are in line with Department for Transport guidance. The assessment of impacts have been developed from the Department for Transport's latest published forecasts of future traffic growth NTEM 6.2²⁴, which are based on the most up to date forecasts of economic growth published by the Office of Budget Responsibility²⁵. In addition, the length of the appraisal period and the use of a 2009 base year for traffic data, further minimise the scale of the risks identified.

Assumptions

- 8.2 In order to ensure that the policy options are appraised on a consistent, comparable basis the following assumptions were made:
- The respective crossing charge rates are assumed to apply from October in each year – thus the first nine months will be at a lower charge rate than the final three months. For Policy Option 3, the removal of the road user charging regime would occur in October 2012.
 - A constant annual average increase of 2.63% was applied to the assumed charge for the Crossing throughout the appraisal period for Policy Option 1 and for the last 3 years of Policy Option 2, as the RPI rate assumed in the original model. This rate was applied because it was assumed in the model used, based on historic inflation rates over the recent time period considered by the analysis, and was close to the recent RPI increase forecasts.

²⁰ Further information regarding definition of costs and benefits applied in this impact assessment, in the context of transport policy, is provided on pages 3 and 4 of "Transport Appraisal and the Green Book" (Department for Transport, 2010) at <http://www.dft.gov.uk/webtag/documents/project-manager/pdf/unit2.7.1d.pdf>

²¹ Office for Budget Responsibility, Economic and fiscal outlook
http://cdn.budgetresponsibility.independent.gov.uk/Autumn2011EFO_web_version138469072346.pdf

²² <http://www.dft.gov.uk/temp/ro/>

²³ <http://www.dft.gov.uk/publications/tuba-downloads-and-user-manuals/>

²⁴ <http://www.dft.gov.uk/temp/ro/>

²⁵ Office for Budget Responsibility, Economic and fiscal outlook
http://cdn.budgetresponsibility.independent.gov.uk/Autumn2011EFO_web_version138469072346.pdf

- Policy option 2 involves two step changes in the crossing charges. All monetised costs and benefits derived from the transport model were calculated by modelling a charge of £2.00 from 2012 to 2014 and a charge of £2.50 in 2014, with subsequent increases in line with RPI.
- The rate of change based on the Retail Price Index (RPI) was assumed at a constant annual average rate of 3.11%. This was derived on the basis of historic RPI inflation from 2004 (the M25 model base year – RPI: 186.7) to 2011 (RPI 232.9), with an estimate for 2012 (RPI: 238.5).
- The charge increases were modelled on the basis that they apply for a complete calendar year, with appropriate adjustment of the user benefit values to account for the planned situations in which the increases apply from October of the relevant years. In these years, benefits have been accrued at the lower charge rate for the first nine months of the year, and at the increased charge for the final three months.
- The number of users of the DART-Tag discount scheme are based on current figures and have been assumed to remain constant over the appraisal period.
- The economic forecasts are derived from the Department for Transport, transport appraisal programme (referred to as TUBA version 1.8) without alteration to any of the economic parameters. This was in accordance with the Department for Transport’s modelling and appraisal guidance (referred to as WebTAG).
- The traffic growth forecasts are based on a Department for Transport programme that is widely used by the Department for estimating traffic growth. This programme is referred to as NTEM version 6.2 was used, which is the latest published version advised for use by Department for Transport modelling and appraisal guidance.
- The percentages of the total number of user journeys at the Crossing for business purposes and those for other trips (consumers) were assumed to change over the appraisal period in line with the forecasts from the Traffic Demand Model used.

9. Direct costs and benefits to business calculations (following OIOO methodology)

One in One Out Methodology

- 9.1 The One-in, One-out (OIOO) rule means that no new primary or secondary UK legislation that imposes costs on business can be brought “In” without the identification of existing regulations with an equivalent value that can be removed, or taken “Out”. The guidance published on the OIOO methodology²⁶ contains details of which measure are out of scope of OIOO which includes *fees and charges – except where they result from an expansion or reduction in the level of regulatory activity*.
- 9.2 The proposed changes to the road user charging regime do not create further levels of regulatory activity as the road user charging regime to manage congestion already exists. These proposals have therefore been assessed as out of scope of the OIOO rule.

10. Other and Wider impacts

Other Impacts

- 10.1 In response to views and evidence provided in response to the Department’s consultation on its proposals for revisions to the road user charging regime about potential other impacts from the proposals, the Department has developed analysis on the scale of such impacts in relation to the geographical location of expected transport benefits, the diversionary impacts on traffic and the potential impacts on other Thames river crossings. The Department’s assessment of these impacts for the preferred option (Policy Option 2) is set out in the following section.

²⁶ One-In, One-Out (OIOO) Methodology (HM Government – July 2011)

Geographical Impacts

- 10.2 Transport modelling techniques allow the Department for Transport to assess the potential geographical location of expected benefits from policy interventions. In terms of the proposals for changes the road user charging regime, the Department is able to illustrate the scale and location of the transport benefits that are expected to result from amendments to the road user charging regime.
- 10.3 For the preferred option (Policy Option 2) the Department has developed analysis on the potential scale and location of expected transport benefits. The ‘top-ten’ areas to benefit from the increase in the charge level at the existing crossing are shown in the following tables, for freight and non-freight users. Expected transport dis-benefits do not occur in any area in this analysis.

Potential Non-Freight User Benefits - Policy Option 2:

Area	Total Benefit	Population	Benefit per person
Thurrock	£9.40m	99,533	£94.47
Bexley & Dartford	£7.66m	210,733	£36.37
Havering & Brentwood	£4.47m	203,532	£21.95
Kent	£18.74m	950,203	£19.72
Bromley & Sevenoaks	£4.94m	281,212	£17.58
Reigate and Banstead	£1.16m	88,190	£13.21
Essex	£9.42m	834,259	£11.30
Epping Forest & Harlow	£0.96m	139,460	£6.91
Barking and Dagenham & Redbridge	£1.89m	274,210	£6.89
West Sussex	£3.36m	512,877	£6.55

Potential Freight User Benefits - Policy Option 2:

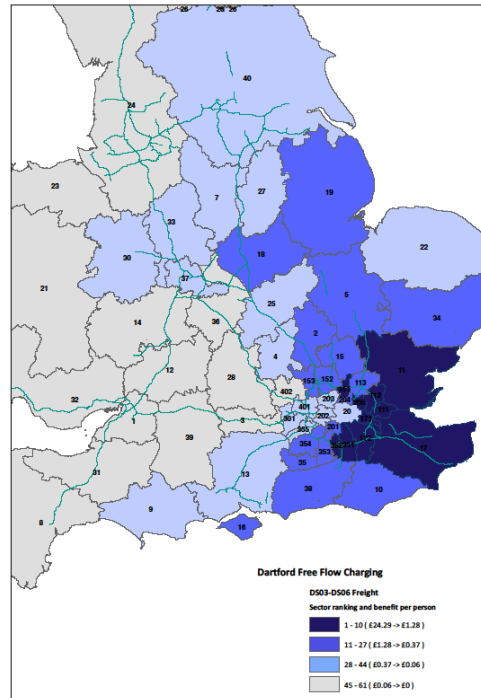
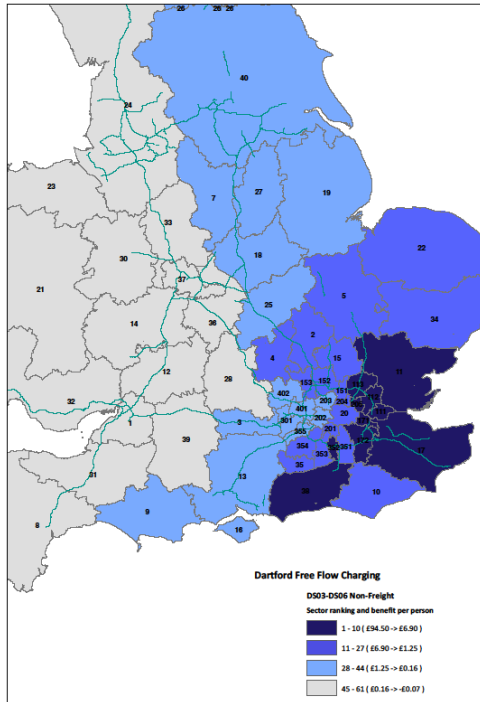
Area	Total Benefit	Population	Benefit per person
Thurrock	£2.42m	99,533	£24.29
Bexley & Dartford	£1.97m	210,733	£9.36
Kent	£5.38m	950,203	£5.66
Havering & Brentwood	£0.78m	203,532	£3.83
Bromley & Sevenoaks	£0.83m	281,212	£2.95
Essex	£2.03m	834,259	£2.43
Barking and Dagenham & Redbridge	£0.58m	274,210	£2.13
Reigate and Banstead	£0.17m	88,190	£1.88
Croydon & Tandridge	£0.43m	284,046	£1.52
Enfield & Broxbourne	£0.33m	252,105	£1.31

- 10.4 The analysis shows that:
- the top two areas benefiting most for both non-freight and freight users are Thurrock and Bexley & Dartford.
 - the top five areas benefiting most are the same for both freight and non-freight users i.e. Thurrock, Bexley and Dartford, Havering & Brentford, Kent and Bromley & Sevenoaks.
 - The area with the largest scale of expected benefits per person for both user types is Thurrock (£94.97m for non-freight and £22.29m for freight)
 - The areas with the largest scale of total expected benefits for both user types combined is Kent, Thurrock and Essex (£24.12m, £11.82m and £11.45m respectively).
- 10.5 The analysis demonstrates that the areas to benefit most in terms of expected transport benefits are those located nearest to the Crossing, and reflect the location of the origins or destinations of the traffic using the Crossing. The patterns of use of the Crossing differ between car and light van traffic and that for HGV traffic, and the scale of the expected transport benefit also reflect the relative volumes of traffic for those vehicle classes.

Expected transport benefits by user class and model sectors (Policy Option 2)

Potential Non-Freight User Benefits - Policy Option 2:

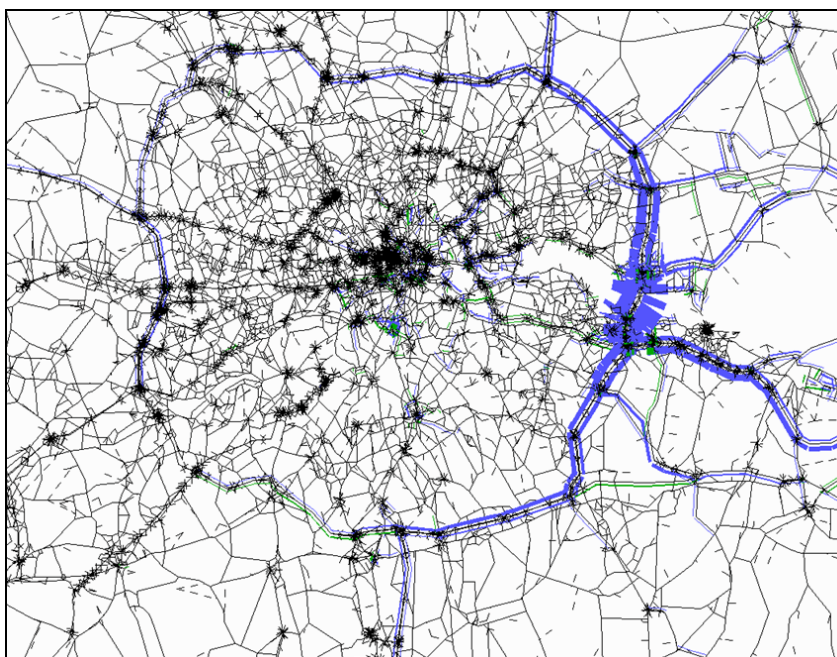
Potential Freight User Benefits - Policy Option 2:

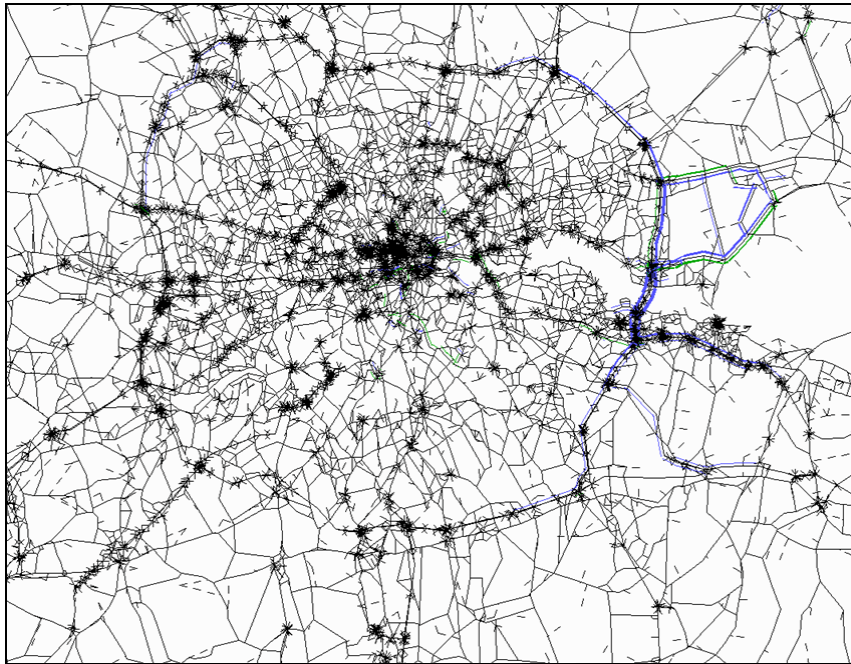


Diversionsary Impacts

- 10.6 In a similar fashion, transport modelling allows the Department to illustrate the potential diversionsary impacts on traffic from the implementation of different charging levels at the Crossing.
- 10.7 The figures below for cars, light vans and HGV's, compare the 2015 morning peak flows for the existing crossing with the morning peak flows for the charge levels in the Department's preferred option (Policy Option 2). The changes in flow are represented by bandwidth, with the width of the band being proportional to the flow represented. Green indicates an increase in flow with an increased charge and blue indicates a decrease in flow with an increased charge. The scale of the bandwidths is the same in all figures.

Traffic volume changes between Do Nothing Option and Option 2 (2015 AM Peak: (Cars and Light vans))





10.8 The figures show that the primary effects will be:

- an overall reduction in traffic (shown by the predominance of the blue bandwidths). This impact is greatest at the Dartford Crossing, with differences reducing as distances from the Crossing increases.
- In terms of scale, the impact on light vehicles at the Crossing is quite significant with around 900 fewer in each direction between 8am and 9am in the morning peak. For heavy goods vehicles there is a reduction of 50 in each direction.
- There is minimal re-routing (shown by green bands) to other parts of the road network, principally as other routes do not offer realistic alternatives to crossing the Thames at Dartford.

10.9 In terms of specific network locations the reductions on the M25 north of Junction 30 are forecast to be about 350 vehicles northbound and 250 southbound and south of Junction 2 (where the A2 is crossed) traffic is forecast to fall by similar volumes. In terms of other locations on the network, the changes on the A13 are a reduction of about 100 vehicles (both directions summed) and on the A2, the main change is to the east of the M25 with a reduction of 150-200 vehicles in each direction.

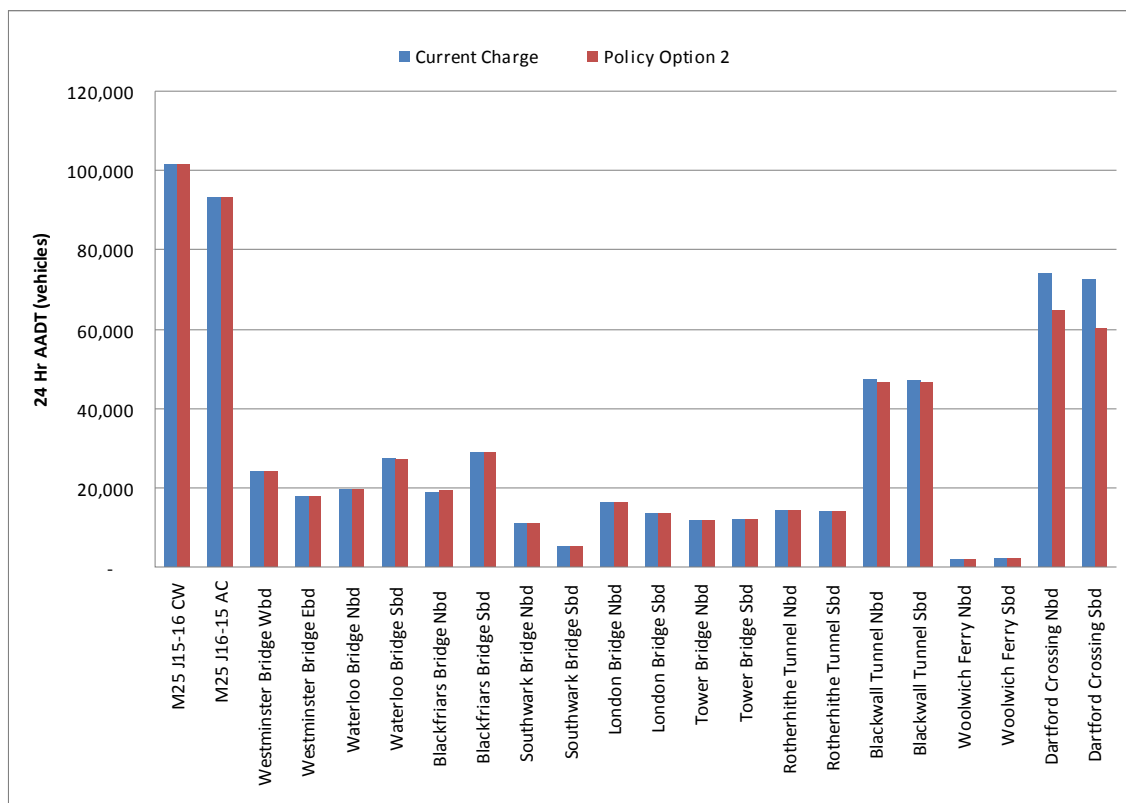
10.10 The principal re-routing effect is forecast to be traffic travelling east on the M20 choosing to switch to the M26 and the southern arc of the M25. In total this change is likely to be made by fewer than 30 vehicles per hour.

10.11 The Department recognises that increases charges at the Dartford Crossing will result in changes to traffic volumes, both at the Crossing and on the surrounding network. However, the scale of these impacts is minimal in comparison with current traffic flows, as the modelling reflects the sensitivity of individual's responses to network cost changes (including charges) in terms of the suppression, redistribution and reassignment of trips.

Impacts on Thames River Crossings

10.12 Changes to the road user charge levels at the Dartford Crossing has the potential to impact other Thames crossings, given the response from users of the Crossing in reaction to increased charges. Using its transport modelling, the Department has analysed changes in forecast traffic at each Thames River crossing in relation to the impacts for the preferred option (Policy Option 2). The forecasts set out in the chart below indicate the expected scale of the changes for Annual Average Daily Traffic (AADT) in 2015.

Changes to forecast traffic flow for Thames River Crossings (2015 AADT)



- 10.13 The impacts upon the majority of Thames crossings are expected to be minimal. The greatest expected impacts on traffic flow are for those at the Dartford Crossing. The second greatest change on another crossing is that for the M25 where it crosses the Thames at Staines. This can be attributed to some vehicles choosing to route the other way around the M25 instead of using the Dartford Crossing. There is little change in forecast traffic at the Blackwall Tunnel (less than a 1 per cent change), principally because it is currently operating at its capacity, most notably in the northbound direction in the morning peak, and is some re-routing of traffic from the Blackwall Tunnel to the Dartford Crossing, due to reductions in traffic and delay at the Crossing.

Wider Impacts

- 10.14 Consideration has been given to the list of potential wider impacts set out on pages 16-18 and the Impact Assessment Toolkit. The following paragraphs focus on the assessment of impacts in relation to those items where the impact is considered to be non-neutral. Some of the wider impacts are captured in the Department's appraisal process (WebTAG) and, if non-neutral, the assessed impact is set out in the relevant sections of the impact assessment, particularly the monetised and non-monetised costs and benefits section.

Economic and Financial

- 10.15 The Department's economic assessment set out in the monetised and non-monetised cost and benefit analysis section has captured the main economic and financial impacts, in line with the Department's approach to the appraisal of transport interventions. The analysis demonstrates that there is an overall benefit to businesses from the proposals, through improvements in journey times for all business users who make use of the Crossing.
- 10.16 Views expressed in response to the Department's consultation process included representations from small business organisations, who held the view that the proposed increases in charges could result in extra costs being absorbed by business, and in the case of small business this may mean business closures. Some representatives believed any additional costs would be passed on the customers. In terms of large businesses, similar views were expressed in terms of passing on any additional costs to customers, while others felt that no specific assessment had been undertaken on the cost implications to business.

- 10.17 Some representative organisations, such as the Essex Chambers of Commerce did not believe there had been full consideration to the costs to business from delay and congestion to businesses moving goods and services across the Dartford Crossing, while the Federation of Small Businesses felt that the risks in terms of the impacts from increased charges would be reduced business profits or increased prices of goods.
- 10.18 The Department are unable to develop a more detailed assessment of the impacts on businesses without a much more specific and detailed assessment process, which could only be undertaken at disproportionate cost. The Department's economic analysis has captured both the costs and benefits to business, as far as it is possible to do so within its methodology.
- 10.19 The proposed policy option does not propose new regulatory burdens on small firms as the Crossing charges are already in existence. The proposed charges are applied to the category of the vehicle that is making use of the Crossing, and although the Department's analysis has identified in detail the costs and benefits of its proposals, it is not possible for the Department to determine the type and scale of the specific business users making use of the Crossing, or the specific sectors of business they are involved in.
- 10.20 The economic assessment of options does identify that the micro-businesses would be in scope of the proposed policy intervention, as they are in scope of the current charge. It is not proposed to offer exemptions for such businesses. The Department's assessment of the economic and financial impacts however, does show that the proposals result in a net benefit to all business users making use of the Crossing, whether they are a micro-business, small business or large business.

Social

- 10.21 In relation to air quality, some views were expressed in the consultation exercise that the Department had not properly assessed the impacts in terms of impacts on air quality. Air Quality Management areas do exist in the location of the Crossing and the responsibilities for the monitoring and management of air quality rests with the relevant local authorities. A methodology for assessing the potential impacts on air quality levels is not available to the Department and a specific assessment has therefore not been undertaken. However, generally, proposals which decrease the levels of traffic and improve the flow of traffic are generally considered to provide a positive impact on air quality.
- 10.22 In terms of potential impacts on statutorily protected groups, the Department's assessment is that there are no specific impacts from its proposals, and it has made clear that it intends to maintain the current exemptions from the crossing charge, including the exemption for users of the Crossing who are eligible to be exempt from Road Fund Tax due to a qualifying disability.

Environmental

- 10.23 The preferred policy option would lead to a change in the emission of greenhouse gases and the scale of these impacts are set out in the monetised and non-monetised cost and benefit section. The impact is assessed for the preferred policy option (Policy Option 2) as a decrease in emissions of 28,643 tonnes within the appraisal period.
- 10.24 Detailed assessments of the impacts in relation to air quality and the affect on the number of people exposed to noise levels has not been specifically conducted in the appraisal of the policy options. However, the Department do consider that with the predicted reductions of traffic expected from implementation of the preferred policy option, there will be improvements to the impacts on air quality and noise levels, although quantification of the scale of such impacts are difficult to substantiate due to the complexities of making such an assessment, and could only be determined through further specific assessments at disproportionate cost.

11. Summary and preferred option with description of implementation plan.

Summary Assessment

- 11.1 The economic analysis of each of the three policy options shows they all provide positive net benefits (Present Value (PV)), with Policy Option 1 providing the lowest level of net benefits (£19.4m) while Policy Option 3 providing the greatest level of net benefits (£236.3m). Policy Option 2 provides net benefits of £111.7m.
- 11.2 All policy options provide benefits in terms of improved travel time to all the user groups analysed in the Department's modelling methodology i.e. businesses, commuters and other transport users. For Policy Options 1 and 2, these benefits are reduced to those groups by the need to pay increased levels of user charges. However, the increased user charges also represent increased revenue to Government.
- 11.3 For Policy Option 3, again all user groups benefit through improved travel times, as well as from the removal of the crossing charge. However, for Policy Option 3, there is also a loss of future revenue to Government from the removal of the crossing charge.
- 11.4 In terms of overall costs to Government, Policy Option 1 has the lowest cost overall cost to Government (£6.0m) compared to £47.2m for Policy Option 2. Policy Option 3 has the greatest overall cost to Government of £440.1m.
- 11.5 Both Policy Option 1 and Policy Option 2 provide positive monetised environmental impacts in terms of reductions in carbon emissions (decreases of 2,528 tonnes and 28,463 tonnes respectively), while Policy Options 3 results in a negative monetised environmental impact through an increase in carbon emissions of 48,353 tonnes.
- 11.6 In addition to the monetised costs and benefits in terms of improved journey times, the policy options result in changes to the forecast traffic flows at the Crossing. Policy Option 1 is expected to result in a decrease of 1% in forecast daily traffic flows by 2015, compared to a decrease of 15% for Policy Option 2. In comparison, the removal of the road user charging regime (Policy Option 3) is forecast to increase the levels of daily traffic flows by 13% within the appraisal period.

Preferred Option

- 11.7 The Department for Transport's preferred option is Policy Option 2. This option performs best against the Government's policy aims and objectives, in balancing the need to manage demand at the Crossing in the short term, and allowing Government to maintain its prioritisation of other interventions in the medium and long term.
- 11.8 In economic terms, the resulting net benefits, including improved travel time and reductions in vehicle operating costs are greater than those secured by Policy Option 1: £111.7m compared to £19.4m. The impacts on future traffic flows at the Crossing also differ with expected reductions of 15% from the Department's preferred option compared to a 1% decrease from Policy Option 1. The increased net revenues secured as a result of Policy Option 2 (£123.9m) is also greater than that for Policy Option 1 (£18.9m). In addition, Policy Option 2 is shown to result in a slightly greater reduction in carbon emissions than Policy Option 1.
- 11.9 In comparison, Policy Option 3 in economic terms provides greater overall net benefits and net benefits to consumers, business and other non-business transport users through improved journey times and reductions in user charges payable than that from Policy Option 2 (£236.3m compared to £111.7m). In terms of traffic flow, Policy Option 3 would result in increases of traffic levels at the Crossing of 13%, compared to the reduction in traffic volumes from the preferred option. Implementation of Policy Option 3 also results in a considerable loss to central Government in terms of future crossing revenues beyond those already factored into its spending review settlement. Policy Option 3 also results in an increase in carbon emissions compared to a decrease in Policy Option 2.

- 11.10 The Department for Transport's selection of its preferred option has been made through an assessment of the balance necessary between the performance of the policy options against its policy aims and objectives for the Dartford Crossing.
- 11.11 Tackling congestion is a key aim for the Department and although removal of the charges at the Crossing provides benefits in terms of improved journey times, such an approach would result in increases in traffic flows rather than a reduction of traffic through what is already a physically constrained part of the strategic road network.
- 11.12 The Department considers that the most appropriate way of securing travel time savings at the Crossing is through the provision of a more effective payment mechanism for the road user charge, and is currently prioritising the implementation of free flow charging at the Crossing which would generate these benefits without the resulting loss of Government revenue.
- 11.13 The Department has also been clear that the provision of enhanced physical crossing capacity is the right solution in the longer term, and has been clear that the net revenues Government receives from the road user charges will allow the Department to prioritise expenditure on the development of such crossing options.
- 11.14 The Department therefore considers that Policy Option 1 (increasing the charges by levels determined through the use of the Retail Price Index) makes insufficient impact on effectively managing the demand for use of the Crossing in the short term, and provides insufficiently enhanced levels of net revenues to be able maintain the prioritisation of the implementation of the necessary future improvements at the Crossing.
- 11.15 Similarly, the Department does not consider the implementation of Policy Option 3 (removal of the user charging regime) is the way forward, as it would result in an increase in demand for the use of the Crossing in the short term. The Department considers improvements in travel times at the Crossing are best secured by maintaining the road user charging regime and implementing newer charging technology. Doing so would provide sufficiently enhanced levels of additional net revenues to Government to be able to progress the provision of additional crossing capacity.
- 11.16 Government revenues from the road user charging regime at the Crossing form a key part of the Department's committed future funding allocations and reflect the relative priorities it determined during the spending review process, in which it made difficult decisions across a range of competing demands for future transport investment.
- 11.17 The Department for Transport consider that the right way forward to meet its policy aims and objectives for improving the performance of the Crossing, is to implement its preferred policy option of maintaining the charging regime, which would manage demand for its use in the short term and enable progression of the improvements necessary in the medium to long term.

Implementation Plan

- 11.18 Changes to the details of the charging regime at the Crossing are made through a legislative process, using secondary legislation (a statutory instrument) as required by the Transport Act 2000²⁷. Subject to the outcomes of the Government's processes for the development and implementation of secondary legislation, the Department for Transport will finalise the revised Charging Order and complete the necessary Parliamentary processes for the Order to come into effect.
- 11.19 In addition, a detailed implementation plan has been developed with the Highways Agency and the current operator of the Dartford-Thurrock River Crossing, to make the necessary operational changes to the charge collection process, including the installation of new signage, information provision for users (publicity, leaflets etc.) about the revised charging regime, and making the necessary software changes for the management of users pre-payments accounts, for the DART-Tag system.
- 11.20 The Department would expect to review its policy in terms of the charging rates at the Crossing by 2015, to consider and reflect on the impacts of the planned newer charging technology at the Crossing, and the progress it has made in the development of longer-term plans for additional capacity in the Lower Thames.

²⁷ Sections 167, 168, 171 and 172(2) of the Transport Act 2000(a)

ANNEX 1: Further Explanation of Appraisal Methodologies Applied

Background

The monetised and non-monetised costs and benefits of the options considered in this impact assessment have been estimated using the Department for Transport's (DfT) WebTAG (Web-based Transport Analysis Guidance)²⁸ which is based upon HM Treasury Green Book principles. WebTAG identifies a wide range of possible impacts that transport schemes can have and prescribes detailed methodologies for quantifying these impacts and monetising them wherever possible. The range of impacts which must be considered come under the three main headings of Economy, Environment and Society which are then subdivided into sub-impacts such as journey times, reliability, noise, air quality, landscape, greenhouse gas emissions and accidents etc. Scheme promoters are required to assess all these impacts using the prescribed methodologies. The options considered in this impact assessment have been subject to these processes.

Because WebTAG relates to transport schemes generally, there is a second tier of more detailed appraisal guidance which relates specifically to trunk road schemes and which is contained within the DfT/HA's Design Manual for Roads and Bridges (DMRB)²⁹. In particular, Volumes 11 to 14 of the DMRB contain supplementary appraisal guidance on a number of issues including traffic model building. This guidance has been complied with in estimation of the costs and benefits of the options considered in this impact assessment.

It is important to appreciate that the cornerstone of the appraisal process for road schemes is a traffic model. The model is a computer based representation of the physical characteristics of the road network, the behaviour of different types of traffic using the network and the origins and destinations of that traffic. The model is built and calibrated to represent the road network (the "supply") and the traffic "demand" upon it at the current time "the base year". A set of independent traffic count and journey time data not used in the calibration process is then used to "validate" the base year predictions of the model.

Using the behavioural relationships between supply and demand contained within the model, it is possible to alter the network to represent a new road scheme, or a change in travel costs such as that resulting from a change in road charges, and identify how traffic flows, route choices, and speeds change as a result. This provides the information necessary to identify changes in journey times, journey time reliability, vehicle operating costs, tax revenues and other impacts across the network in any modelled future year. The information is also used to assess the environmental impact of a scheme including changes in greenhouse gas emissions.

The reference case demand and travel cost is then entered into the demand model to determine the projected responses. The principal response is a change in the destinations and route that road users choose. These changes are calculated using a model that includes information on how road users in the study area respond to changes in travel cost. This information is collected via studies that examine actual road users' behaviour, including via surveys and roadside interviews. Journey times between specific road users trip origins and destinations are calculated using a highway network model. The calculations that are undertaken produce an estimate of the traffic flows on the highway network that are expected to result following a change in travel costs.

Naturally there is some uncertainty in relation to forecasts of future traffic levels when modelling future years. These forecasts are made at a national level through the DfT's National Transport Model³⁰ and are based upon certain assumptions regarding household growth, income growth, changes in fuel price and how these affect the level of car ownership and usage. Changing these core assumptions can affect the level of future year benefits and it is now a requirement of the Department for Transport's WebTAG guidance that different scenarios of future traffic growth are modelled, in addition to the most likely or "Core Scenario". However, definitive WebTAG guidance on the treatment of uncertainty in forecasting was not available at the time the modelling work for this impact assessment was undertaken. As a result, it was only possible to produce a most likely or Core Scenario forecast which has then been used to produce a "Best Estimate" of the benefits.

²⁸ <http://www.dft.gov.uk/webtag/>

²⁹ <http://www.dft.gov.uk/ha/standards/dmrb/>

³⁰ <http://www2.dft.gov.uk/pgr/economics/ntm/>

Definitions

The definitions of costs and benefits in this impact assessment are consistent with the Department for Transport's transport appraisal guidance, referred to as WebTAG. This guidance is consistent with the HM Treasury's guidance on appraisal and evaluation in central government (referred to as "The Greenbook")³¹.

Approach

Costs and benefits of each option were assessed in comparison with the Do Nothing option, and calculated over a 5 year appraisal period (from 2011 to 2015). The number of years until further changes are made to charges at the Dartford Crossing is not known. However, an appraisal period of 5 years was considered a reasonable time period over which these charging proposals could apply. It should be noted that, while altering the length of the appraisal period would alter the present value costs and benefits, and present value net benefits, of the options considered, it would not alter the relative rankings of the options in terms of these estimates.

A constant annual average increase of 2.63% was applied to the assumed charge for the Crossing throughout the appraisal period for Policy Option 1 and for the last 3 years of Policy Option 2, as the RPI rate assumed in the original model. This rate was applied because it was assumed in the model used, based on historic inflation rates over the recent time period considered by the analysis, and was close to the recent RPI increase forecasts. Policy option 2 involves two step changes in the Crossing charges. All monetised costs and benefits derived from the transport model were calculated by modelling a charge of £2.00 from 2012 to 2014 and a charge of £2.50 in 2014, with subsequent increases in line with RPI.

The costs for the operation and maintenance of the current charging regime have been assumed to remain constant in real terms for each of the policy options assessed. Only additional operation and maintenance costs and benefits associated with each option have been analysed in calculating the costs and benefits of those options. Similarly with implementation costs, it is only those costs which are additional that are identified in the successive policy options. The additional costs comprise costs of increased staffing, signage and advertising.

Values and calculations applied

Costs and benefits to transport users of a change in charges at the Dartford Crossing include changes in travel time for journeys using the Dartford Crossing and in the surrounding area, and change in vehicle operating costs for these journeys. Detailed explanation of the values and formulas applied to derive these benefits is provided in the Department for Transport's WebTAG guidance³², with which the model and software used for this impact assessment complies.

Travel time savings:

As the WebTAG guidance indicates, the Department for Transport has undertaken a long term programme of research to identify the appropriate values to apply in calculating travel time savings. Time spent travelling during the working day is a cost to the employer's business. It is assumed that savings in travel time convert non-productive time to productive use and that, in a free labour market, the value of an individual's working time to the economy is reflected in the wage rate paid. This benefit is assumed to be passed into the wider economy and to accrue in some proportion to the producer, the consumer and the employee, depending on market conditions. The majority of journeys do not take place during working hours, but in the traveller's own time. However, people implicitly put a value on their own time, in that they will trade a cheaper, slower journey against a faster, more expensive one. It is therefore appropriate to take account of this value in assessing the impact of different transport policies.

³¹ http://www.hm-treasury.gov.uk/data_greenbook_index.htm

³² Further background information on the methodology used for estimating and valuing changes in vehicle operating costs and changes in travel time are provided at <http://www.dft.gov.uk/webtag/documents/expert/pdf/unit3.5.6.pdf>

In the WebTAG guidance, values are presented in 2002 prices. These have been updated to 2010 prices for use in this Impact Assessment. Adjusted to 2010 prices, the WebTAG guidance reports that the average value for travel time savings in business time is estimated to be £32.89 per hour. The average value for travel time savings in non-working time is estimated to be £6.20 for commuting journeys and £5.49 for other journeys in non-working time. These values are in market prices, at 2010 prices and values.

Vehicle Operating Costs

Driving vehicles on the road system gives rise to operating costs for the user. The Department for Transport has developed formulas to estimate the impact of transport policies on these costs. For example, they include the cost of fuel, oil and tyres, and an element of vehicle maintenance. The formulas for car and goods vehicle operating costs also include allowances for the purchase of new vehicles. The distance-related costs to private households and business of purchasing a car are included by making an allowance for mileage related depreciation. In addition, an allowance is also made in relation to business cars, for the decline in vehicle capital value (other than that accounted for by mileage related depreciation). The costs to freight carriers of goods vehicle purchases are taken into account under goods vehicle non-fuel operating costs. As with private cars, it is assumed that the decision to purchase goods vehicles is independent of the transport policy option pursued. However, changes in congestion on the road system will influence the productivity of any given fleet of goods vehicles, and this element is taken into account in calculating goods vehicle operating costs.

The formulas used by the Department for Transport for calculating changes in vehicle operating costs are also used in transport modelling to estimate changes in fuel consumption and the associated change in fuel duty revenue from changes in transport policies. These formulas also underpin the calculation of the impact of charge increases on fuel duty revenue in this impact assessment.

Price Elasticities:

The traffic model represents six different user classes and complies with WebTAG guidance relating to low, medium and high income users. Each of these classes has a different value of time, and therefore exhibits a different behavioural response to changes to the charge. The overall traffic volumes resulting from these modelled responses to the proposed £1.00 increase under the preferred have been used to calculate an out-turn model price elasticity. The model responses change over time as the deterrence effect of the increase are eroded over time as values of time are forecast to increase at a greater rate than RPI. The out-turn elasticities are presented below:

Modelled Year	Elasticity
2015	-0.22
2025	-0.11

These elasticities are derived from the response to an increase in charge of around 66% under the preferred Policy Option and a change in overall traffic volumes of -14% in 2015 and -7% in 2025. The responses are consistent with the observed responses to the increase of 50 pence in 2008 that is documented in the main body of text.