Heysham M6 Link Study:
an Overview of the Modelling and Appraisal

Contents

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Summary

Background to the scheme

The Lancashire County Council (LCC) proposal for the Heysham M6 Link was called in by the Secretary of State for Communities and Local Government (CLG) and went through a Planning Inquiry in 2007. It is now awaiting a decision from the Department for Transport (DfT) as to whether it can be entered into the capital programme for the North West region.

The Planning Inquiry Inspector focussed on the matters raised by the CLG Secretary of State and was clear that not all DfT transport appraisal guidance applied to the Planning Inquiry, although it was relevant.

The original total scheme cost was £113m in 2002 prices, according to the LCC Transport User Benefit Appraisal (TUBA). The original cost will go up to £142m in 2008 prices (assuming 6% p.a. construction cost inflation). The delay of 3 years in construction would thus make the £113m go up to £135m (2002 prices). A figure of £105m has also been mentioned in the press. There needs to be a clear statement of what the current costs really are and this almost certainly needs a new estimate to be prepared.

In addition to this, transport appraisal guidance is in the middle of a well publicised review and several factors have changed the context for appraisal even since 2007. The Climate Change Bill and Office for Climate Change (OCC) are now beginning to influence decision making.

There are thus two areas of analysis which are the focus of this report. The first is a review of the Heysham Link appraisal in the light of current DfT guidance. The second deals with how the transport appraisal context is changing and has changed even since the Inquiry.

Summary of findings

Transport appraisal guidance

The Planning Inquiry deliberately did not take full account of webtag guidance, whereas the DfT should do so for Programme Entry.

The model uses methods of assignment which do not take full account of congestion in a complex road network.

Junctions in urban areas are not modelled separately and this, combined with the assignment method, will produce misleading forecasts and thus misleading economic assessments.

The model covers only road traffic and cannot set out the impacts on public transport, walking and cycling which should be included in the appraisal.

The preparation of a proper alternative, as recommended in webtag and based on the Treasury Green Book, was not undertaken.

Such an alternative was considered outside the scope of the Planning Inquiry but is clearly essential to the DfT's Business Case appraisal.

In particular, the impact of smarter choices was not considered, despite their prominence in Government policies to address climate change.

Specifically no account was taken of the increased cost of smarter choices and measures to improve public transport arising from the majority of road user benefits falling to local traffic.

No figures for carbon costs were included in the economic appraisal, though these are significant and should be included for transport schemes according to webtag guidance.

Employment

The proposer's figure of 6,000 new jobs was not supported by the Inspector who mentions, but does not confirm, the figure of 600.

If these figures were used, the cost per job would be £233,000, well in excess of the ODPM benchmark of £27,000.

There is no description of how Heysham expansion fits within national ports policy and rail policy and how it interacts with development at other ports.

Climate change

No account was taken of the impending targets in the Climate Change Bill and their legally binding nature.

Recommendations

A multi-modal model should be used for the DfT appraisal which is capable of reflecting congested junctions in an urban network.

A proper alternative package should be prepared to compare with the proposed scheme including smarter choices in the economic appraisal.

An assessment of how the driver benefits would undermine the use of sustainable modes and smarter choices must be included.

Expansion of Heysham, and its relationship with other ports, needs to be undertaken as part of national policy and the need for ports to be rail linked.

A full assessment of the impact on carbon emissions in 2020 and their costs, and how the scheme will help or hinder in achieving the reduction target, must be prepared and included in the appraisal.

1 Introduction

Before considering the details of the Lancashire County Council (LCC) proposal for the Heysham M6 Link relevant to this study, there are some general observations to be made about the assessment and appraisal process.

The scheme was called in by the Secretary of State for Communities and Local Government (CLG) and went through a Planning Inquiry in 2007. The Inspector submitted his report and the Secretary of State granted planning permission. It is now awaiting a decision from the Department for Transport (DfT) as to whether it can be entered into the capital programme for the North West region.

The Planning Inquiry Inspector focussed on the matters raised by the CLG Secretary of State and was clear that not all DfT transport appraisal guidance applied to the Planning Inquiry, although it was relevant. The entry into the programme is thus a separate matter and even this is not a guarantee the road will be built. This is because, like all regions, the North West has limited funds available for transport capital projects and is already overspending.

In fact, the cost of the scheme has been the subject of some confusion. The original total cost was £113m in 2002 prices, according to the LCC Transport User Benefit Appraisal (TUBA[i]). The construction cost was £115m in cash prices (2008-2011), again from TUBA. The original cost will go up to £142m in 2008 prices (assuming 6% p.a. construction cost inflation). The delay of 3 years in construction would thus make the £113m go up to £135m (2002 prices). A figure of £105m has also been mentioned in the press. There needs to be a clear statement of what the current costs really are and this almost certainly needs a new estimate to be prepared.

Transport appraisal guidance is set out in webtag[ii], which the Inquiry Inspector stated is relevant by way of the Business Case to the SoS for Transport. However, the Inspector also says of the Business Case that it *"…. is not a primary issue in the context of the current application"*[iii].

In addition to this, transport appraisal guidance is in the middle of a well publicised review and several factors have changed the context for appraisal even since 2007. The Climate Change Bill and Office for Climate Change (OCC) are now beginning to influence decision making.

There are thus two areas of analysis which are the focus of this report. The first is a review of the Heysham Link appraisal in the light of current DfT guidance. The second deals with how the transport appraisal context is changing and has changed even since the Inquiry.

These and other matters are dealt with in the sections which follow.

2 Modelling and Appraisal of the Heysham M6 Link for DfT Programme Entry

Programme entry needs a transport focussed appraisal

In the light of the introductory section, it is clear that the Planning Inquiry and Secretary of State for Communities had a different focus from detailed transport appraisal. The latter now becomes the overriding framework, given that it is the Secretary of State for Transport who must now consider the scheme for Programme Entry Approval. In this context the transport implications will need to be studied in more detail. Some of the key issues are set out below.

Webtag Guidance and the Business Case Appraisal

Webtag was considered by the Inspector to be relevant for the DfT Business Case, but less so for the Planning Inquiry. There are two main issues: the consideration of alternatives and the treatment of policies which change travel behaviour, often called "Smarter Choices"[iv].

Non-road based alternatives

Both webtag and the underlying Treasury Guidance[v] are clear about the need for the preparation of proper alternatives if value for money is to be assessed. The inspector considered this guidance of secondary importance for the Planning Inquiry, but did comment on the lack of a fully developed alternative ***by the objectors***. He reviews the objectors' case that a non-road building alternative should be considered and says

"*such a claim does not fall within the plain wording of the SoS's matter set out above. The SoS seeks information relating to the choice of route for a new road."*[vi] (The SoS here is for Communities & Local Government)

However, once the scheme has to meet webtag criteria, the lack of a proper alternative becomes a failing in the appraisal process. This is quite clear in the overall description of webtag principles on the website[vii]. It is worth quoting paragraph 1.1.3 in full:

"*In all cases, however, the process of identifying solutions should be broadly similar and:*

- *be easily comprehensible, to those commissioning, steering and undertaking the work; and where possible to a wider public;*
- *avoid leading to a particular outcome simply by virtue of the method or process adopted;*
- *enable a wide range of solutions and the synergy between combinations of components to be investigated in a cost-effective manner;*

- *enable a preferred solution to be developed which addresses the objectives and problems at which it is aimed; and*
- *provide a means by which the acceptability of the solution to the public can be tested and taken into account."*

Bullets two and three are clearly designed to encourage the inclusion of a wide range of solutions, these include demand management and mode transfer. What is more, the form of any modelling should not pre-judge the outcome. In relation to one particular approach, Smarter Choices, there are also some important impacts which were not considered at the Inquiry, but need to be raised in relation to the Business Case and any further appraisal.

"Smarter Choices" and the Heysham M6 Link

The choice of how people travel is strongly affected by the relative cost of alternatives such as public transport, or the attractiveness of substituting an activity which does not require any motorised travel for one that does. Working from home is a well known example of the latter.

Relative price is key to all economic and transport modelling. In the case of the Heysham M6 Link, it is possible to assess where the cost reductions to drivers are predicted to occur. This assists in the question of achieving scheme objectives and any balancing decrease in the likelihood of achieving other objectives. In the case of the M6 Link, it is clear that the cost reductions are very focussed on local travel related to the District of Lancaster, much of it to the city itself.

Table 1
Sector savings to drivers (passenger & freight)

	£ million	% of total
All sectors (including elsewhere in UK)	853	100%
To, from, within District of Lancaster	884	103.6%
Entirely within the District of Lancaster	436	51.1%
Morecambe to central City of Lancaster	114	13.4%
Heysham area to outside District	115	13.5%
All HGVs	44	5.2%

Source: Atkins MSB Review, Appendix A; TUBA outputs

There are several major conclusions to be drawn from the above for a transport appraisal.

The first is that benefits are strongly focussed on local traffic. There are some small disbenefits to long distance traffic, which is why locally related traffic actually receives more than 100% of the predicted net benefits.

The second point is that the benefits are focussed on some corridors where public transport could offer an attractive alternative. Morecambe to Lancaster is the obvious example. These benefits mean that public transport will become relatively less attractive by a very significant amount. This will make demand less than otherwise and mean that major public transport improvements will not be financially viable. The problem with benefiting car travel to such an extent is that attracting people onto sustainable modes will cost a lot more. This cost is related to the motoring benefits and in some cases may actually be higher because people prefer to use their cars when the travel costs of public transport and cars are the same. Modellers call this the “mode preference constant”.

The third point is that benefits from the potential HGV traffic from Heysham Port are very small. HGV traffic throughout the whole of Lancaster District only receives 5.2% of the benefits. For all the longer distance traffic (including cars) to and from the whole Heysham area, not just the port, the benefits are 13.5%.

It is quite clear that any policies to attract people out of their cars will have to compensate for the significant improvement in the cost advantages of driving in the District of Lancaster. This is entirely contrary to Government policy and is well illustrated in the recent Public Service Agreement for the DfT[viii]. This was published in October 2007 and is part of the rapidly changing context for transport appraisal which is considered in Section 3.

Best performing alternative

Overall it does not appear that the full range of policies has been considered as an alternative to the proposed scheme. For example, if HGVs are causing air pollution or noise it is possible to mitigate this by only allowing the most modern, and thus the quietest and least polluting, vehicles into the area. Greater London has just introduced such a scheme as part of its Low Emission Zone. Aspirations for rapid transit schemes were voiced at the Inquiry, and these should have been considered, particularly if journey times by car increase. The distribution of benefits to road users will push any such aspirations into the far distant future. The use of rail for freight seems to have been dismissed without any detailed study, as was its expansion for passengers. Parking controls can be sophisticated in their application, not just in terms of setting limits but varied by fuel efficiency. It is clear that safety improvements to Junction 34 could be beneficial and may affect the assignment overall.

A vision for the future is currently under preparation locally[ix] and this would seek to take advantage of any road space freed by the new Link. Such proposals are relevant to assessing the road scheme and should have been presented together with it as part of the MSBC. Considering that the benefits

are so strongly focussed on car drivers this vision will struggle to attract people to sustainable modes.

Structure of the model

Before considering the changing appraisal context, the final issue for DfT must be the structure of model which was used (based on the TRIPS32 suite). First, it is entirely road based, thus it is impossible to assess the impact on other modes now, and most importantly in the future. Considering the proximity of the urban areas, and the potential for public transport, walking and cycling, this is a major omission.

Secondly, much of the model area is urban and congested. The current model structure is not well suited to such an area. The network does not use detailed junction models and this will underestimate the impact of congestion. This is also reflected in the way in which the model switches traffic from one route to another. This process is critical to any model and has a major impact on benefits.

To illustrate this, a typical area with a complex road network will have many different alternative routes for traffic to use between the start and end point of a journey. The choice in the Heysham Link model is determined by an "all or nothing" transfer of traffic from a slow route to a fast route (subject only to a capacity limit)[x]. This is not normal practice for an urban area, where "equilibrium" models are more commonly used.

In this type of assignment, the traffic is assumed to take the faster route in the first instance, but if there is a lot of extra traffic, the route will become congested and may cease to be the fastest. In most urban models, the share of traffic between all alternative routes is adjusted so that all the routes take the same time (strictly speaking time+cost). This is called an equilibrium assignment and is far more likely to produce realistic flows. Even the present day flows are not well represented by the current model. As congestion increases, the all or nothing method will cause increasingly serious errors.

Most models do not apply this level of detail to the whole country. They use a hierarchy, with far distant areas modelled simply and the area most relevant to any scheme in great detail. The interface between the two is usually modelled at an interim level of complexity and is often called the "buffer" zone. Essentially, the current model uses a buffer methodology for its road network and assignment.

Examples of the impact of all or nothing assignment can be seen in the low cost road improvement results[xi], where road capacity increases lead to longer journey times on the routes displayed than in the Do Minimum (up to 25%). In an equilibrium assignment, traffic should have been deterred from these routes and a new and more realistic forecast produced.

In its assessment of the Business Case, the DfT should ask for a model which is capable of dealing fully with congested and urban conditions.

3 The appraisal context is changing

There is a continuing development in terms of Government transport policy and appraisal which has already changed the context in which the scheme was originally developed and justified. At the present time these are focussed on climate change and the move to sustainable modes of travel. In addition work is continuing on the issue of how to measure wider economic benefits (WEBS). This is a difficult area and was discussed at the Inquiry. The latest guidance, expected in September, will identify effects such as agglomeration and deglomeration and how impacts can be positive or negative. Much of this depends on business proximity and access to city areas with higher than average productivity. In view of this it seems unlikely that a new economic appraisal would find significant benefits from this scheme. Regeneration and employment are discussed further at the end of this section.

Climate Change Bill, targets and carbon costs

Perhaps most significant is the progress of the Climate Change Bill, which will provide a legally binding commitment to quinquennial reduction targets and is going through Parliamentary procedures at present (May 2008)[xii]. This is associated with the setting up of a Climate Change Committee and an Office of Climate Change (OCC)[xiii].

The OCC is currently working on advice on carbon costs and it is clear that there are two important, but different, values. The first is the cost of achieving the reductions, in other words the cost of the actions needed to achieve the targets. Once targets have been achieved, there is still a marginal value in achieving further reductions, this is a better definition of the current DEFRA figure. This assumes a "stabilisation trajectory"[xiv] is already in place through the mandatory targets in the Climate Change Bill.

Once the Bill comes into force, appraisal will be focussed on how reductions are to be achieved at the sector level (in this case transport). Schemes which do not contribute to the reduction will have to have corresponding reductions elsewhere, either in transport or other sectors such as domestic energy supply. Other people's carbon reductions may also be purchased but would have to be surplus to their targets. The indications are that each sector in the UK will find it hard enough to meet the overall target, and the idea of having reductions to spare seems somewhat far-fetched.

The DfT is currently conducting a wide ranging review of appraisal, including this particular issue[xv].

There is no doubt about the significant increase in carbon dioxide emissions arising from this scheme and this is clearly stated by the Inquiry Inspector[xvi]. On its own, this represents an increase of 5.8% in CO2 from transport in the whole District of Lancaster. This figure could not be calculated at the time of the Inquiry and relies on the latest Lancashire data[xvii]. Emissions depend on several factors, but it is still the case that emissions overall will have to decrease by 26-32% by 2020 and by 60% by 2050 to meet Government

targets. Thus the emissions from the proposal will require additional effort and cost to remove them over and above policies to achieve the basic reductions. The way in which this could be achieved and the cost cannot be calculated without a multimodal approach and clear understanding of where the balancing reductions will be.

The need for further action has also been reflected in a new consultation document on national transport policy: Towards a Sustainable Transport System (TSTS)[xviii]. This confirms the importance of objectives generally, emphasising health and giving new prominence to greenhouse gas reductions. The Inspector recognised that CO2 emissions increase as a result of the scheme but this does not seem to have been reflected in the economic appraisal or the Assessment Summary Table. This said the impact was "neutral". The cost of carbon is currently mentioned in the Major Business Case (see later in this Section) but the issue here is that the reduction is legally binding and the challenge is how to achieve it at least cost.

This principle of cost effectiveness is included in the latest guidance for different Government Departments, PSA 27. This is important in this case because it restates the need for sustainable travel in general and smarter choices in particular

"*The DfT will work to improve the environmental performance of transport, addressing the provision of 'smarter choices', including promotion of travel planning, sustainable travel towns, cycling and walking*."[xix].

The aim should be to achieve carbon reductions at a cost lower than the shadow price (PSA Indicator 6). The achievement price in Lancaster will be significantly raised by the proposed scheme. This is another new factor which should be addressed in the assessment for Programme Entry.

Implications for Heysham appraisal

Achieving carbon reductions is a Government priority, soon to be legally binding. The DfT is part of the wider agreement to do this at the least cost. These new factors need to be taken into account for the Programme Entry appraisal. No carbon costs were included in the original assessment, as pointed out in the review document[xx]. Using the new Shadow Price Costs from DEFRA[xxi] these would amount to £75.4million over the 60 years from 2010 (assumed opening year for the scheme). This is for CO2 only (not other pollutants), but is before discounting, and thus not a net present value.

It should be noted that these carbon calculations are assumed to be applied to schemes in a context where it is known how the underlying targets for reduction will be achieved. If, for example, the costs of carbon over and above the target, and not the Do Minimum, were to be valued, the cost of the carbon would be significantly higher, by a factor of six by 2020.

This assumes that improvements to vehicle efficiency keep pace with traffic growth, as they have done in recent years at least for cars. Given that many

of today's cars will still be in use in 2020 and trends in manufacturing are fairly clear this seems reasonable. On the other hand calculating the outturn fuel efficiency for 2050 is far more speculative. The point is that in the medium term the scheme does nothing to achieve a reduction target and this creates a huge deficit cost. In addition, it benefits behaviour which will lock in emissions for several generations. This in turn raises the cost, and thus reduces the cost effectiveness of transport measures to reduce emissions.

Both of these are highly relevant to the DfT and should be included in the economic appraisal.

4 Value for money, employment, economic benefits and disbenefits

It is important in any discussion of employment or the economy to distinguish between economic activity which is entirely new and would not occur without a specific transport scheme, and activity which is simply transferred from elsewhere. Thus a move of employment from one port to another cannot be included in a normal cost benefit analysis. This is why such effects were originally excluded from transport appraisals.

A difficulty has been caused by the use of the term regeneration as distinct from overall gains in employment or GDP. It may be policy to move existing jobs, or jobs that are expected to be created in the future, from one place to another. In this case it is worth assessing how a transport scheme enables or restricts such a policy. It is, however, not correct to count this as an absolute cost benefit, it is a policy benefit.

Moving jobs into regeneration areas may also lower productivity and is likely to have an economic cost while it may achieve a social benefit. On the other hand, if a transport scheme creates or fosters economic activity which would not otherwise occur, national GDP will be higher than forecast and this may be counted. These are among the difficult areas being explored by the DfT appraisal team in relation to WEBS.

In this context it is worth mentioning the Inspector's view, which does not support any monetary value or specific figure, and specifically limits his analysis of benefits to regeneration, not completely new benefits[xxii]. He states that,

"I have found somewhat more difficulty in reaching a conclusion about the regenerative effects" (para 8.4.7)

In the same paragraph he uses 600 jobs not 6,000, for his analysis. He concludes, largely on the basis of what appears to be the views of the business community that,

"it is likely that the road would bring regenerative benefits to the area."

It would thus be fair to say that no specific money values were supported for the change in employment patterns which may be caused by the scheme. LCC have used the DfT Guidance on Value for Money [xxiii] on jobs, the benchmark cost per job is £27,000, beyond which schemes would be challenged on cost grounds. The Guidance states,

"Regeneration

> *There is no generally accepted way of trying to value regeneration benefits from Government policy/expenditure. However, in appraising regeneration schemes the ODPM consider how the "cost per job" of a scheme compares to their average benchmark cost of £27,000 (NPV). Schemes may not be funded if they exceed that benchmark, and questions will*

certainly be asked about value for money. Applying this benchmark value to the increase in the number of jobs in a regeneration area, as a result of a transport scheme, can give some idea of the significance of regeneration benefits being generated relative to cost."

The equivalent figure here for the 600 jobs is £233,000. The conclusion must be that if the primary reason for this expenditure is regeneration, the value for money is poor.

Of course, there are other cost and benefit elements in the transport appraisal, but the achievement of regeneration objectives is very weak. The current LCC figures for employment benefits should not be included in any appraisal for DfT funding purposes. They are not in the current BCR although they are featured strongly in the Business Case.

On the issue of relocating jobs and Heysham port, it is clear that the growth at Heysham must be seen in the context of national ports policy and whether encouraging growth at Heysham would in fact reduce future employment at other ports competing for the same trade. The availability of rail links to such ports is already a significant consideration and will become more so in future, especially in view of the Climate Change Bill. The DfT should consider these factors in its appraisal.

These employment and regeneration issues are important because the Major Scheme Business Case (MSBC)[xxiv] relies significantly on the regeneration benefits, and in particular that they exceed the cost of carbon emissions. This is clear in the Executive summary which states,

"The route has a Benefit to Cost ratio of 7.4 with additional regeneration benefits of £162m. However, due to the successful regeneration aspects of the scheme, there are disbenefits of £0.4m for the opening year for CO2 emissions, £0.14m for Nox and £0.48m for PM_{10}. Overall, the BCR remains very high."

Examining these statements in turn, the 7.4 BCR figure does not include the pollution costs, it is the same one criticised for this in the Atkins review.

The £162m is based on over 6,000 new jobs and is not supported by the Inspector in his report. The only figure he mentions (600) would produce £16.2m. Nor is this a conventional "benefit". It is a benchmark which gives an indication of what the benefit could be in an average situation and if exceeded would not be value for money. On this basis the scheme performs badly, costing over £200,000 per job created.

The climate change costs are for the opening year only in 2002 prices. They should be calculated for the 60 year life of the scheme and over this period they would be very significant. This is misleading and does not allow assessment of the climate change costs.

Section C.1.3.3 of the MSBC admits that this is the case, stating that,

"Over the whole appraisal period (60 years) the total value of such increased emissions will be significant in relation to scheme cost but in no way as significant as the regeneration benefits acting in the reverse direction."

The value appears to have been calculated but is not shown and given the lack of support for the 6,000 jobs at the Inquiry the statement is no longer correct.

Realism of traffic forecasts

As with many schemes, the key to their value for money is the prediction of traffic growth in the future, leading to huge congestion. The scheme is designed to provide temporary relief, while not improving on today's conditions on a permanent basis. This is frequently criticised as being an unrealistic assessment, but the Inspector seems to have put this to one side because he could not see any "alternatives". The need for properly prepared alternatives was considered in Section 2 of this report.

There are two further important points to be made. The first is that the rise in the price of oil, even if it stabilises over the next few years, will have a major impact on traffic growth in the short and long term. The use of ports by HGVs, especially rail linked ports, is highly sensitive to fuel price[xxv & xxvi]. In view of the emphasis on Heysham port, this must be included as a new element in any appraisal.

The second is that the Climate Change Bill will necessitate a far more robust attitude to demand management. The current downplaying of greenhouse gas emissions runs counter to the legal obligations which are in the Bill.

The DfT will need to take all these factors fully into account in assessing the Business Case.

Conclusions and Recommendations

Conclusions

The Planning Inquiry deliberately did not take full account of webtag guidance, whereas the DfT should do so for Programme Entry.

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A full assessment of the impact on carbon emissions in 2020 and their costs, and how the scheme will help or hinder in achieving the reduction target, must be prepared and included in the appraisal.

References

[i] See TUBA website, Mott Macdonald for DfT, on http://www.tuba.org.uk/

[ii] See www.webtag.org.uk

[iii] *Proposed Heysham to M6 Link Road, Town and Country Planning Act Inspector's Report,* November 2007, para 7.2.2

[iv] *Smarter choices - Changing the way we travel*, DfT 2005, on http://www.dft.gov.uk/pgr/sustainable/smarterchoices/ctwwt/

[v] *Treasury Green Book,* HM Treasury 2003

[vi] *Proposed Heysham to M6 Link Road, Town and Country Planning Act* Inspector's report, para 8.3.12

[vii] See www.webtag.org.uk Unit 1.1 and Figure 1

[viii] *PSA Delivery Agreement 27*, HM Treasury, October 2007

[ix] This will take the form of a report by Faber Maunsell for the Vision Board

[x] LCC Proof of Evidence on Traffic, paragraphs 2.3 and 2.4

[xi] LCC Inquiry Document 37, Annex C, Forecasting Report, Section 10

[xii] Progress published on: http://services.parliament.uk/bills/2007-08/climatechangehl.html

[xiii] See statement on http://www.occ.gov.uk/

[xiv] For example see Guidance on using the shadow cost of carbon on: http://www.defra.gov.uk/environment/climatechange/research/carboncost/pdf/HowtouseSPC.pdf

[xv] Department for Transport, October 2007, *The NATA Refresh, Reviewing the New Approach to Appraisal*, HMSO
For further discussion of the issues see: *Decision making for sustainable transport,* MTRU, February 2008

[xvi] *Proposed Heysham to M6 Link Road, Town and Country Planning Act Inspector's Report,* November 2007, para 8.3.37

[xvii] *Carbon dioxide emissions in Lancashire 2005*, Lancashire County Council. January 2008, on:
http://www.lancashire.gov.uk/office_of_the_chief_executive/lancashireprofile/monitors/co2emission.asp

[xviii] Department for Transport, October 2007,*Towards a Sustainable Transport System*, HMSO

[xix] *PSA Delivery Agreement 27*, HM Treasury, October 2007, para 3.27

[xx] *Independent Review of the Major Business Case, Final Review*, Atkins for DfT, February 2007, Sections 4 and 5.

[xxi] Carbon costs: valuing emissions, on http://www.defra.gov.uk/environment/climatechange/research/carboncost/index.htm

[xxii] *Proposed Heysham to M6 Link Road, Town and Country Planning Act* Inspector's report, para 8.4.7

[xxiii] See the DfT Value for Money Guidance on: http://www.dft.gov.uk/about/howthedftworks/vfm/guidanceonvalueformoney?page=1

[xxiv] Heysham M6 Link, Major Scheme Business Case at Programme Entry, Executive Summary and Section C1, LCC on http://www.lancashire.gov.uk/environment/env_highways/roads/heysham/Main%20Document.pdf

[xxv] [xxv] For example see the predicted reductions in: Foresight - Intelligent Transport Systems – Port Traffic Modelling, MDS Transmodal, DfT, 2005 http://www.foresight.gov.uk/Previous_Projects/Intelligent_Infrastructure_Systems/Reports_and_Publications/Intelligent_Infrastructure_Futures/Ports_traffic_modelling.pdf

[xxvi] See *Heavier lorries and their impacts on the economy and the environment,* MTRU, Freight on Rail, October 2007