

decision-making for sustainable transport

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By Keith Buchan

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executive summary

The New Approach to Transport Appraisal (NATA) was introduced in 1998 as part of the government's integrated transport policy. In May 2007, The Department for Transport (DfT) announced that it was to 'refresh' NATA and has published a detailed consultation document.

Transport appraisal methods in the UK have evolved over several decades. The DfT refresh process provides an opportunity to consider both the effectiveness of the overall NATA approach and to fully include the government's new transport objectives, recently set out in the October 2007 document, *Towards a Sustainable Transport System*, which will lead to a white paper at the end of 2008.

This report contributes to the refresh by asking two fundamental questions. The first is whether NATA delivers an appraisal process that accurately represents the true costs and benefits of transport schemes and fully reflects the government's objectives in general and, in particular, its climate change targets. The second issue is whether NATA's basic principles have been followed in practice.

The purpose of appraisal is to provide the most accurate picture of how much it costs to achieve a certain level of progress towards government objectives for transport. It would therefore be expected that schemes which strongly support government policies should perform well, and those that do not should perform less well.

But, as this report shows, the cumulative effect of a series of individual adjustments, often made for good reason, has been that many schemes which seem to be in line with government ambitions for transport do not fare well in the assessment process. In contrast, many schemes which contradict policy, such as those which increase, or at least fail to reduce, greenhouse gas emissions, score very well. Individual examples of this have been examined before but, rather than seeing them as anomalies, this report seeks to explain how a consistent bias has occurred, and how it might be remedied.

When reviewing NATA it is essential to understand the attractiveness of producing a single figure that tells the decision maker, across all transport modes and in all circumstances, which transport schemes are the best value for money. This is still the dream of many theoretical economists. But seeking to achieve this results in large scale, often hidden, mathematical simplifications, and it requires an attempt to put a monetary value on all costs and benefits irrespective of their nature. There have been so many compromises in NATA that the accurate description of the real costs and benefits of a given transport scheme has been seriously compromised and this has had a major impact on which transport schemes have been implemented.

Findings

The findings of this report can be summarised as follows:

1 In NATA, schemes that go against government objectives often score best

The introduction of changes in the way that NATA accounts for tax revenues (especially fuel duty) has had two major effects. The first is that increased fuel use, with its associated CO₂ emissions, is counted as a massive benefit, as it increases government revenue. The second is that people spending money on public transport (where fares are VAT free) and not on fuel for their cars is seen as a significant disbenefit, due to the tax revenue lost. This runs completely contrary to government policy and is described as the 'cost benefit paradox'.

Tax revenues from increasing fuel use are also set against a scheme's capital costs, allowing the cost of a scheme that raises tax revenue to seem cheaper to implement, which further magnifies the detrimental impact of the way that tax is accounted for on key parts of the cost benefit analysis. There are several options proposed for avoiding these effects. The important point is that they are so serious they must be addressed as a matter of urgency.

2 Environmental valuations to date are hugely uncertain – they are not comparable to each other or to other valuations and should not be relied upon

The desire to value every non-user cost, including landscape, natural habitats, heritage buildings, street traffic noise, community severance and the cost of a transport related death, has led to a series of survey based studies based on what people might be;

- willing to pay for improvement or
- willing to be paid to put up with unsatisfactory or worsening conditions

The latter tends to give consistently higher values. This report explores the basis for this whole approach and how this rather singular interpretation of work by economists in the 1930s and 40s has such a grip on UK transport policy.

The huge uncertainties involved in creating valuations from surveys are shown in many international studies that compare results. The individual surveys are usually extremely prone to survey bias and have to be subjected to considerable statistical modelling to avoid this and to achieve sensible numbers. On the assumption that people and vehicle flows can be predicted accurately, it is possible to make a reasonable estimate of changes in real operating costs and fares based on actual figures. The other valuations are simply not comparable in nature or in their levels of certainty. The bringing together of such values into a single balance sheet hides the real impacts of a proposal behind invented monetary values and creates a false sense of certainty in terms of the appraisal.

3 NATA still does not adequately value the meeting of government objectives

The parts of NATA based on earlier road appraisal systems have continued to attract resources and have been expanded. However, the move towards an appraisal system that sees the achievement of government objectives as a benefit has been poorly executed.

This is particularly relevant to the Assessment Summary Table (AST), which government guidance requires for each scheme or package. The AST is intended to be the centrepiece in appraising the impact of different decisions in relation to their cost. In reality, a brief survey for this report showed wide variations and inconsistencies both within and between ASTs. There seems to be little monitoring of them or their content. Improvements in this area are vital, as ASTs will become more important if the reforms suggested in this report are implemented, and in relation to the new government objectives for transport.

4 NATA does not adequately assess switching between transport modes

While an attempt has been made to change road based assessment methods to cover different forms, or modes, of transport this is extremely weak in relation to walking and cycling.

A simplification was introduced which views transfers between modes, e.g. from driving to using the bus, as if they were newly generated journeys in each individual mode. This created two important problems.

The first is that the value of transferred trips is downgraded (as newly created journeys are valued less than existing ones) and interacts with the way that fuel tax revenue is accounted for. This creates even more bias against non-car modes.

The second is that the people who change mode are not tracked. So the same person who used to drive by car and whose time was assigned a high value due to their assumed contribution to the economy sees the value assigned to their time significantly reduced if they start travelling by bus, cycle or car share. This approach may have had minimal impact when transport modes were considered separately but it is not suitable for a genuinely multi-modal approach that seeks to compare different forms of transport.

5 Alternative transport schemes are poorly developed

Despite clear guidance on this subject, the exploration of alternatives to a preferred scheme, especially those involving demand management such as 'smarter choices'¹ and other travel planning initiatives is very weak. Alternatives are not given the same attention as road schemes and are hardly ever modelled, and many alternatives that would involve different land use policies to encourage walking and cycling are actually beyond the scope of conventional modelling. Current practice is not even in line with the Treasury Green Book² and this needs reform and rigorous external monitoring.

6 Time-savings are uncertain and in many cases over valued in NATA appraisals

Time-savings in NATA are averages, taking no account of the size or length of the journey. But both of these factors are important and the survey on which UK travel time values are based showed this quite clearly, as have other studies. According to the best data available (produced for DfT) the value to a driver of saving a few minutes or less on their journey is close to zero.³ So a more significant time-saving, even if it is on a lower number of journeys, should be valued more than an almost worthless saving of two minutes on a high number of journeys.

NATA currently aggregates time-savings. This means that, regardless of their value to individuals, negligible time-savings for a large number of people can have a major impact on whether a scheme scores well in appraisal.

One way to deal with this would be to describe the time-savings in terms of size and volume, and put this in the AST instead of a single money value.

Average time-savings are also used without any indication of reliability. This results in some schemes, which predict a large number of small time-savings in non-congested conditions, scoring very well, while other schemes that achieve larger time-savings in congested conditions score less well. It is also likely that time-savings are overvalued relative to accident savings.

7 The NATA refresh process is a positive step and should be continued

Some of the serious problems that have arisen might have been avoided by making the process of changing and amending NATA more transparent. There will always be complex technical issues, but this should not deter DfT from engaging with external stakeholders. The commitment to doing this during the refresh of NATA is very constructive and should be continued after it is complete.

Recommendations for improvement

These recommendations are based on the discussion in this report and the author's response to the specific consultation questions issued by DfT for their refresh process. The latter are attached as Annex C.

1. The new objectives for sustainable transport need to be reflected in NATA. The effectiveness with which a scheme meets a particular objective can be compared to its cost, creating a measure of effectiveness per pound of cost. Complex schemes will need the decision maker to consider strengths and weaknesses against cost.
2. The need to achieve climate change targets requires significant changes to NATA. It could simply apply a pass/fail criterion if schemes do not achieve the target reduction or integrate the costs of carbon more fully into NATA's assessment.

3. Appraisal methods mean that NATA often promotes schemes that run counter to government policy. DfT should set up a multi-modal, multi-interest monitoring and advisory group to ensure the widest possible consideration and acceptance of amendments to NATA by professionals and the public. This will help to avoid unintended consequences.
4. The NATA appraisal internet site, webtag, should be continued as a source of guidance but extended significantly to include more good practice, for example to support the next four recommendations.
5. The AST is at the heart of the appraisal system and needs to be completed in a way that is internally consistent and consistent with other appraisals. This needs a new and more comprehensive approach involving training, better guidance, and monitoring. This should include a specifically trained practitioner having overall responsibility for producing the AST.
6. The development of alternatives to proposed schemes needs to be taken seriously. This needs even greater emphasis in guidance, but also improved monitoring. Schemes should be judged against the best performing alternative, not against an often unrealistic 'do minimum'. Any serious alternative should have its own AST with a comparable level of detail to the main proposal.
7. The impacts of schemes should be described properly in the AST. For example, it should set out how large individual time-savings are or what the noise context is relative to standards for sleep or conversation. These aspects should not just be averaged and have a monetary value put on them.
8. Because of conceptual and practical problems, there should not be a trading off between very different costs and benefits to produce a single monetary value. These include complex areas like: personal injuries and death; climate change; time-savings; value of a landscape; damage to historic buildings; street conversation; a night's sleep; air pollution nuisance; air pollution damage to health; health benefits of exercise and social inclusion. The preferred option is to describe the scheme or policy impacts more accurately, without valuation, in the AST.
9. Forecasting and modelling resources should be prioritised. The best possible data (on travel as well as impacts) should be ensured and there should be more broad brush testing of properly modelled alternatives. This can be done using the improved travel and other data and much simpler models. Only if absolutely necessary should highly elaborate network based models be developed.
10. Every appraisal relies on forecasts, at present supplied by the DfT through their TEMPRO programme.⁴ At present this does not produce a demand management forecast without road pricing. This should be altered to do so and could use benchmark values from existing DfT studies such as *Smarter Choices: changing the way we travel*.⁵

11. Walking and cycling need to be properly represented in the appraisal process and appropriate methods of modelling them need to be developed that allow for useful comparison of their benefits with other transport modes.
12. When polluting behaviour such as driving is reduced and tax is lost as a result it should not be seen as a cost that reduces a scheme's benefits. In reverse, gains in tax through increases in polluting behaviour should not be viewed as a benefit and be allowed to reduce scheme costs. A separate statement on changes in tax revenue should be made. This must distinguish between charges for polluting behaviour and general taxes.
 - Fuel duty should be seen as an environmental tax which needs to be minimised by encouraging people to shift to less fuel intensive forms of transport, whereas NATA currently sees it as a source of government income to be maximised
 - People shifting to public transport where fares are not subject to VAT and where fuel duty income falls should not be seen as disbenefits of a scheme
13. Numbers of travellers changing mode should be identified in the appraisal, rather than treated as generated traffic (and thus have their value reduced). Nor should they have their working time values altered when they switch, as at present.
14. The problem of using different average values (including national equity rates) continues to produce counter intuitive results and undermines the basis of a cost benefit analysis of the traditional type. The issue of the compatibility of national and scheme specific forecasts and valuations is complex and needs its own research and consultation project. A move away from derived valuations, rather than extending their use, will be of some help.

1 introduction

The NATA⁶ was introduced in 1998 as part of the government's integrated transport policy. It was designed to assess all transport proposals in light of the government's objectives for transport without bias towards any one mode of transport. These objectives included integration, safety, economy, environmental impact and accessibility.⁷

The appraisal process puts a monetary value on most costs and benefits of a particular transport scheme, from the carbon emissions caused, to the human cost of a fatal accident, to time-savings gained. The gathering of all these values and assessments into a simple one-page assessment summary table (the AST) was designed to make the process more transparent. The AST is designed to provide most of what a decision maker needs to consider before deciding whether to go ahead with the scheme.

The principles behind NATA and its detailed application are set out in the form of online guidance on webtag⁸ – the government's appraisal website. This has been of great use to those involved in undertaking appraisal, as well as to a wider audience. Further details on the structure of NATA are given in Annex A.

During almost ten years of operation, there have been subtle changes both to the principles and the detailed practice of NATA transport appraisals. This report reviews the economic principles that underlie the technical changes to NATA. These have followed an independent path from meeting the government's objectives and pursue a particular form of social cost benefit analysis.

In particular, we consider whether NATA is capable of dealing with the new challenge represented by climate change and the mandatory targets for reducing greenhouse gas emissions (GHGE) proposed in the Climate Change Bill.⁹ These include a reduction of GHGE of between 26 per cent and 32 per cent in 2020, compared to 1990 levels. Transport emissions today are about 12 per cent higher than in 1990 but, rather than being a useful tool for reducing them, our analysis shows that NATA can create obstacles to transport schemes that help to reduce emissions.

Refresh and review

DfT announced that it was to 'refresh' NATA in May 2007 and has published a detailed consultation document in October 2007.¹⁰ This was published alongside a new DfT strategy document, *Towards a Sustainable Transport System*,¹¹ which includes new objectives for transport and therefore has implications for the whole refresh process.

The consultation questions reflect the department's own view of how NATA should be refreshed. However, they do not fully reflect the widespread concern over the extent to which NATA guidance is followed, and over technical changes that have had major impacts on the appraisal process and subsequent scheme approvals. This report therefore starts from first principles and looks at the problems with the current NATA appraisal process, before considering the consultation questions, or indeed the wider issues which they do not address.

The author's initial responses to the specific consultation questions are included in Annex C.

Key issues for this report

In refreshing NATA there are two key questions to be answered:

- The first is how well the detailed processes and guidelines in the NATA system deliver an appraisal process which accurately represents the true costs and benefits of transport schemes and fully reflects the government's objectives in general and, in particular, its climate change targets.
- The second issue is whether NATA's basic principles, which have enjoyed widespread support, have been followed in practice, in particular when preparing ASTs. This is the subject of the final section of this report.

Chapter two looks at the proposed new objectives for transport, as published in *Towards a Sustainable Transport System* and assesses their implications for NATA appraisals.

Chapter three considers the issue of whether it is possible to value social and environmental factors in the assessment process. One important point here is that NATA does not recognise that values are changed by context. In other words, people will value the environment differently if they know it is to be traded off against items such as time-savings. Alongside the economist's familiar 'willingness to pay' there needs to be a further precondition – 'willingness to trade'.

Significant problems in relation to climate change arise from the way that NATA accounts for tax revenues (especially fuel duty). The first is that increased fuel use, with its associated CO₂ emissions, is counted as a massive benefit, as it increases government revenue. The second is that people spending money on public transport (where fares are VAT free) and not on fuel for their cars is seen as a significant disbenefit due to the tax revenue lost. This runs completely contrary to government policy. Tax revenues from increasing fuel use are also set against capital costs which magnifies their detrimental impact on key parts of the cost benefit analysis. This is described as the 'cost benefit paradox' and is considered in chapter four.

Chapter five looks at the treatment of different transport modes and in particular how the more sustainable modes have suffered from the simplifications introduced to the NATA methods. There is also the issue of how alternative solutions to transport problems are so frequently underdeveloped, despite the clear recommendations of the Treasury Green Book ¹² and advice in webtag.

Chapter six considers how the practical implementation of NATA has not been as consistent or transparent as intended. More detailed information on this can be found in Annex B, which discusses the relationship between Public Inquiries and the NATA process.

Chapter seven discusses conclusions and recommendations for change to NATA.

2 new government objectives for transport

At the same time as releasing the full NATA consultation document, the government published *Towards a sustainable transport system*.¹³ This proposes the extension and revision of the existing NATA objectives to incorporate new transport objectives. In view of this, this chapter looks at the current objectives, the proposed new objectives, and their implications for transport appraisals.

NATA assessment is currently based on a set of objectives that were set in 1998 based on the government's integrated transport policy. They are as follows:¹⁴

- **Environmental impact:** reducing the direct and indirect impacts of transport facilities on the environment of both users and non-users. There are ten sub-objectives including noise, atmospheric pollution of differing kinds, impacts on countryside, wildlife, ancient monuments and historic buildings.
- **Safety:** reducing the loss of life, injuries and damage to property resulting from transport incidents and crime. There are two sub-objectives: to reduce accidents and improve security.
- **Economy:** improving the economic efficiency of transport. The five sub-objectives are to improve economic efficiency for consumers and for business users and providers of transport, to improve reliability and the wider economic impacts, and to get good value for money in relation to impacts on public accounts.
- **Accessibility:** the ability with which people can reach different locations and facilities by different modes.
- **Integration:** aims to ensure that all decisions are taken in the context of the government's integrated transport policy.

Towards a Sustainable Transport System proposes a revised set of objectives for NATA to replace the original objectives. These are:

- **Competitiveness:** maximising the overall competitiveness and productivity of the national economy, so as to achieve a sustained high level of GDP growth.
- **Climate change:** reducing transport's emissions of carbon dioxide (CO₂) and other greenhouse gases, with the desired outcome of avoiding dangerous climate change.
- **Health:** contributing to better health and longer life expectancy through reducing the risk of death, injury or illness arising from transport, and promoting travel modes that are beneficial to health.
- **Quality of life:** improving quality of life for transport users and non-transport users, including through a healthy natural environment, with the desired outcome of improved well-being for all.
- **Equality:** promoting greater equality of transport opportunity for all citizens, with the desired outcome of achieving a fairer society.

There are a number of crucial differences between the existing and proposed set of objectives. Firstly, climate change gets more emphasis and is addressed in an objective

of its own right. However, other environmental impacts are downgraded and become part of a broader brush 'quality of life' objective which includes the 'range of goods on supermarket shelves', 'enjoyment of the countryside' and 'seeing the world'.

Economic objectives are made consistent with the Eddington report,¹⁵ thus broadening them to include reliability, agglomeration (particularly within conurbations) and labour market flexibility, while retaining time-savings. Safety is now included in a broader health objective, which promotes healthy modes of travel. Accessibility is moved into an 'equality of opportunity' objective, which includes vulnerable groups of people and regional differences.

Implications of the proposed objectives for transport appraisals

Although *Towards a sustainable transport system* is still subject to consultation, an analysis of the effect of the proposed new objectives is set out below:

- The additional emphasis on climate change is consistent with government policy and makes the reforms suggested in this report even more urgent.
- The inclusion of health should mean that encouraging motorised short distance travel is seen as counter productive. This will make some of the report's comments about the distorting way that time-savings are viewed by NATA even more relevant. The valuation of health in relation to years of life lost is problematic and raises ethical questions but it can begin to be assessed and included in a revised AST. The appraisal system must also be able to fully identify the benefits of walking and cycling.
- The economic objective moves away from a simple approach to time-savings and operating costs into areas which are even more uncertain. There is a further potential paradox between the desire to reduce the need to travel (which improves efficiency as well as the environment) and the desire to facilitate it (in particular to make it cheaper). This will need to be resolved in the appraisal.
- The issue of the relocation effects on people or business (cheaper transport leads to greater centralisation) needs to be included. Cashing in time-savings in this way is extremely difficult to value. In addition, it can add to regional imbalances rather than reduce them. It will be difficult to come to terms with these effects in the present system, but possible within a reformed AST.
- How to balance increased choice with demand management, and how far increased choice relates to income, are both difficult issues that need to be included in the appraisal. In broad terms, travel rises rapidly with income, and modes may not be available through ability or income (such as driving a car) or through accessibility (walking, cycling and public transport). These issues can be addressed through the AST, but it is important to note that there will have to be a more package-based approach to transport. For example, a scheme which facilitates road or bus use on its own will fail to deliver many of the objectives and should therefore be seen as poor value for money. In a different context such a scheme may contribute to an overall beneficial impact. However, the conflict between scheme elements, for example encouraging motorised travel and reducing CO₂ emissions, needs to be addressed.

These are preliminary reactions to the proposed new objectives as they relate to this report. The exact nature of the new objectives, and any sub-objectives, standards or targets, will not be settled until later in 2008. In the mean time, this report points to the issues that will need to be addressed. Its recommended emphasis on improving the AST is entirely supportive of the direction taken in the latest government proposals.

3 the NATA version of social cost benefit analysis

Before assessing the strengths and weaknesses of the current system, it is important to understand how and why it has evolved. NATA is essentially a form of social cost benefit analysis (CBA). DfT themselves quote two main sources for the economic principles behind this; the Kaldor-Hicks criterion, and the Sugden report. This chapter considers how these principles have influenced the development of NATA. It goes on to consider the significant implications of adopting these particular principles for transport appraisal.

The origins of NATA's social cost benefit analysis

Kaldor and Hicks were two British economists who published their work in the late 1930s, and created a new approach to assessing public policy, often called New Welfare Economics. In the context of the political and economic turmoil of the 1930s the urgency of developing more objective methods of assessment leading to social progress is very understandable. To do so, economists revived and then developed a turn of the century concept entitled the Pareto optimum. Very briefly, it says that, for a given group of people, their most economically efficient state of being has not been achieved if it is possible to benefit some people without disbenefiting others. Once the Pareto optimum is achieved, any change might create benefits, but would cause someone disbenefit.

It may seem rather self-evident that policies which produce some gainers but no losers represent an ideal, although such a position is rarely experienced in the real world. However, it was used by Nicholas Kaldor and John Hicks to develop a new idea, and this is still at the heart of the current NATA system. Instead of avoiding any disbenefit, it explored whether the gainers would be willing to compensate for the disbenefit caused to others by paying the losers an amount which they would be willing to accept. If they still had money left over, there would be a net gain and society could move closer to a Pareto style utopia.

These two concepts, 'willingness to pay' (WTP) and 'willingness to accept' (WTA) are inherent to the valuations currently undertaken for many items in the NATA checklist, and some of these are considered in more detail later in this report.

Before considering the inner workings of NATA, and the way that these ideas influence the relative 'value' of schemes, there are a few immediate observations to be made in relation to the social welfare approach.

The economic optimum may not be ethical

There is no ethical context to this approach and the Pareto optimum could be a society that most people would find morally repugnant. This has been widely commented upon and leads to the criticism that any CBA is at best informative and should never be normative (i.e. the ethical or political context should not be removed from decisions). Some economists have argued that CBA is simply not a suitable tool for public decision making.

The gainers don't actually compensate the losers

Although the operation of the CBA system seems to imply that the gainers actually negotiate with and then compensate the losers this does not occur. If they did this would unambiguously establish whether there can be any overall gain. Without this direct but difficult form of engagement, it is necessary to create an artificial system for estimating what the financial transactions would be. In other words, it requires the estimation of WTP and WTA values for any item under consideration. In transport, non-work travel time is an example of an item with a WTP value and accident costs an example of combining WTP and WTA (although in a highly individualistic manner). Specific items such as these are the subject of more detailed analysis later in this report.

After this, the gainers could be taxed and the losers could be paid without direct negotiation. In practice this rarely happens because the mechanisms do not exist and they could be complex and imperfect. One notable exception which illustrates the point is the London Congestion Charge. In broad policy terms this prices some motorists out of private cars and on to public transport, walking or cycling. The remaining cars are willing to pay to move around faster, and the income from the tax they pay is used to support the alternative modes of transport, which benefits those who were priced off the road and had to start using them. While the payment is rather rough and ready, it is a rare example of an actual Kaldor-Hicks compensation, even if it is one step removed.

For most publicly funded transport schemes there is no gainer to loser exchange other than the purchase of property. Whether motoring taxation is in some sense a charge on the gainers is a separate argument which is fortunately not central to this initial analysis. The issue here is the dissociation of payments by gainers to losers and whether the artificial creation of WTP and WTA values is accurate or appropriate.

Is 'consent to trade' a necessary condition for maximising social welfare?

Next there is the issue of who is in the group of social welfare traders (in the case of UK transport, everyone affected by a scheme) and who consents to have an item which they value put into the cost benefit pot. This could be a large group of people, or even an individual. There are real world examples of the latter, for example in a situation where compulsory purchase is not used and one person refuses to sell a piece of land in order to speed up other people's travel. In this case the scheme does not progress. In a Kaldor-Hicks calculation this is a bit like one person having an infinite value for their willingness to accept a disbenefit. Thus there is never enough time-saving to compensate the loser.

The issue of people coming in and out of the relevant group of traders has also been recognised by economists. This is one factor behind the criticism made by many economists starting in the 1940s, that in the 'after' situation, when gainers have paid off the losers, the new set of people who have lost may have a higher value of WTP than the gainers and thus to reverse the situation (the Scitovsky paradox). This understandably caused a few decades of discussion, and Scitovsky (a contemporary of Kaldor and Hicks at the LSE in the 1940s) went on to champion the idea that different costs and benefits had different qualities and could not be put into a simple CBA.

More tangible than these intense academic arguments, in relation to some items included in a cost benefit analysis, such as landscape and valuable natural habitats, non-consenters turn up in front of bulldozers. Opinion varies greatly among economists

about whether a WTP or WTA value can be assigned to 'items' like environmental or human rights. NATA's approach assumes that a trading value can be placed on them, although this contentious decision seems to have been made without a full public discussion.

Can unique items like a specific landscape or habitat be traded with non-unique items like time-savings?

Consent to trade is related to another issue – the uniqueness of what is being lost in order to achieve a gain. In fact, unique objects need not be environmental. A person's life is uniquely theirs, and this is why people find it incredibly difficult to put a value on reducing the risk of a fatal accident. In NATA the accident values are derived using an indirect approach starting with avoiding injuries and then comparing injuries with fatalities. Asking people what they would pay to avoid the certainty of being killed would understandably produce extremely high values, exceeding the values that would be achieved by extrapolating from what people will pay to reduce risk. The techniques are designed to avoid asking an unacceptable question about how much a life is worth which, quite logically, could not be answered objectively.

There is also a dissociation between an item such as a habitat and any group or individual's willingness to pay to have it damaged, or pay to avoid it being damaged. This leads into the issue of whether the natural world has a right to exist – an ethical issue conveniently ignored in CBA. Fortunately this philosophical question does not have to be resolved for CBA purposes as long as someone values a habitat as irreplaceable. This can be considered as placing an infinite value on the loss, or people withdrawing their consent to trade. It should be noted that most economists recognise that places can be valued just for existing (thus giving people the option of visiting them). In other words people don't have to visit a unique place to want it to be there.

Valuations change as a result of scheme implementation

The next problem is the stability of the price of the items being costed. Time spent travelling has a pretty stable price, although it varies quite a bit, especially between rich and poor people. But what if the item being traded is not so plentiful, and if its price goes up the more of it is removed. A person's sleep is a good example. Losing one night a week may be something that people would be willing to accept for a certain payment. Losing a week during a controlled experiment to establish the cost of noise might also produce a value. But the cost of hardly being able to sleep, or never being able to conduct a conversation in the street will, for most people, have a completely different value. In fact, they may consider that normally having a night's sleep (rather than valuing missing one or more nights) is a basic right, rather than something that can be included in a market style trade off.

Standards and rights

A well-known method of avoiding the social and ethical difficulties of derived values and theoretical trading in environmental factors is to establish basic standards. This could include such diverse items as:

- the designation of Sites of Special Scientific Interest (SSSIs), and Areas of Outstanding Natural Beauty (AONBs)
- setting limits on street noise to preserve people's ability to undertake daytime conversation and night time rest

- achieving levels of pollution which fall below harmful levels
- avoiding climate change

There is a presumption against building on SSSIs or in AONBs, although sites of European significance in the UK are much better protected.¹⁶ Unfortunately this means they are available for transport infrastructure without having to move people from their homes. NATA sees them as undeveloped and thus of low market value with few residents to move if they were to implement a scheme. Measurements of environmental nuisance based on numbers of residents (such as noise) will show low impact for the same reason. Their protected status perversely makes them attractive to infrastructure builders.

The other problem with designation is that it can devalue other areas. These may not be specially protected, but would not normally be permitted to be developed, for example open space of all types and farmland. Even this limited protection makes them vulnerable.

This contradictory state of affairs has been identified previously and has the unintended consequence of working against government policy. The issue is exactly how useful designated area protection should be and this has not been resolved. Should it be absolute? Most development would not be contemplated in such areas, and can be sited elsewhere, but transport schemes seem to be treated more leniently.

It may be true that nothing can be absolute, but in this case the issue is whether there is a transport policy reason for overriding area designation. In fact, this assessment is rarely done; instead the derived values (for example for time-savings) are used as justification.

This also relates to the question of whether people have a right not to suffer a particular level of pollution. Cost benefit analysis is still relevant, numbers of people, proximity to the basic standard, and level of improvement can all be measured and compared to cost. However, there is no trading at this point. It may be that marginal improvements to an environment that meets the basic standard could be brought into some Kaldor-Hicks theoretical trade off. If the standard is ignored, social inclusion objectives will not be met. The less well off will not be able to buy their way out of pollution.

The valuation of time-savings

In any discussion of valuations, it would be wrong to omit the dominant element in the appraisal: time-savings. There are two key issues; how the valuations are derived and applied, and how they take account of differences in types of journey and size of time-saving.

Calculation of time-savings

The time-savings for different users and journey types are currently calculated using a variety of methods which are briefly described below.

Starting with road users, the time of professional drivers (for example buses and goods vehicles) is costed using industry averages. The values for other users are split between work time and non-work time.

For work time the values are derived from the average earnings of user type from the National Travel Survey (car driver, cyclist, bus passenger, etc.) plus an employer overhead of 21.2 per cent. Thus taxi passengers have the highest value, followed by rail users. Car drivers are about the average for all users, with cyclists and bus passengers significantly lower.

Time-savings for different users

Due to the different valuations of their time, car drivers switching to the bus will have their time devalued during working time, but if they switch to rail it will be uprated. While a car user switching to cycling for a work journey will have their time devalued, if they switch to cycling for commuting to work their time value will stay the same. The same is true for a car sharer.

NATA guidance justifies this by saying that there is a mix of different values around the average. But this is actually an anomaly – the average value of bus passenger time value should rise if a high time-valuer gets on board. The change would be incredibly small and it would almost certainly be simpler (and more logical) to use the higher working time value of the car driver. There are also issues about representing quality factors – if bus use is less pleasant than car, it might be worth more to people to minimise journey time – in other words, time-savings on a bus journey should have a higher value.

In fact this principle is used in NATA to adjust the value of waiting and walk times for non-work journeys. Waiting for public transport the values are raised by 2.5, for walking or cycling for interchange purposes the values are doubled. All modes have the same non-work time values, but commuting is valued slightly higher than other types of non-work journey.

The values are derived from different sources and they are hugely averaged but this is not done in a totally consistent manner. In particular, the non-work time values are derived from surveying people. This stated preference technique is similar to that used for environmental valuation. Thus perceived costs from surveys are mixed with costs for work travel based on actual wage costs and actual average earnings.

Do small time-savings have any value at all?

The major piece of research work on which much of the valuation of time is based was published in 1999, although it actually uses 1994 data.¹⁷ It was peer reviewed at the European level.

The results showed that people valued their time-savings more highly the more they earned. This was totally expected. There was also a rise in value for savings on longer journeys, particularly for business users. The finding which caused most discussion and a subsequent reinterpretation study of the results, was that small time-savings were far less valued than large ones. For business users a five minute saving is worth a fifth in terms of pence per minute than a 20 minute saving. For non-work time the report says that “a time-saving of five minutes has negligible value.”¹⁸

The report also found that in the short-term, time-savings were valued less than time lost (for example through congestion). This may have been related to the short-term impact – people could adapt less quickly to delays in their journeys.

The finding that short-time savings have almost no value has been rejected by DfT (for more information see box below), while the authors of the original 1999 report continue to assert a negligible time value for small savings.¹⁹

DfT rejected conclusions on time-savings

Without reviewing the study in detail, it is worth noting that the conclusion on small time-savings being close to valueless was rejected by the DfT, having taken advice from a second group of consultants.²⁰ They did not undertake new research, but re-examined the original study data.

Their conclusion was based on a working paper²¹ which contains the following conclusions:

“With regard to the “size” effect, there is no doubt that the data strongly indicates that a lower unit utility attaches to small time changes (whether positive or negative). There is nothing apparently illogical in the data or the design which could have contributed spuriously to such an outcome, nor is it an artefact of the model specification. Our preferred model indicates that time changes of 10 minutes or less are increasingly “discounted”.”

“Nonetheless, we are not inclined to take these results at face value. The results are inconsistent with the theoretical expectations on the shape of the indifference curve, at least when allowance is made for adjustments beyond the immediate short term.”²²

In fact, the results from the original study form the basis for the current values for perceived time costs, although the source is usually given as the reworking conducted in 2001. Reasons for ignoring one of the most striking findings of the research are difficult to fathom, especially since a change in value according to size of effect is entirely logical. And, the impact on scheme appraisal is immense, as the authors of the reinterpretation report admit,

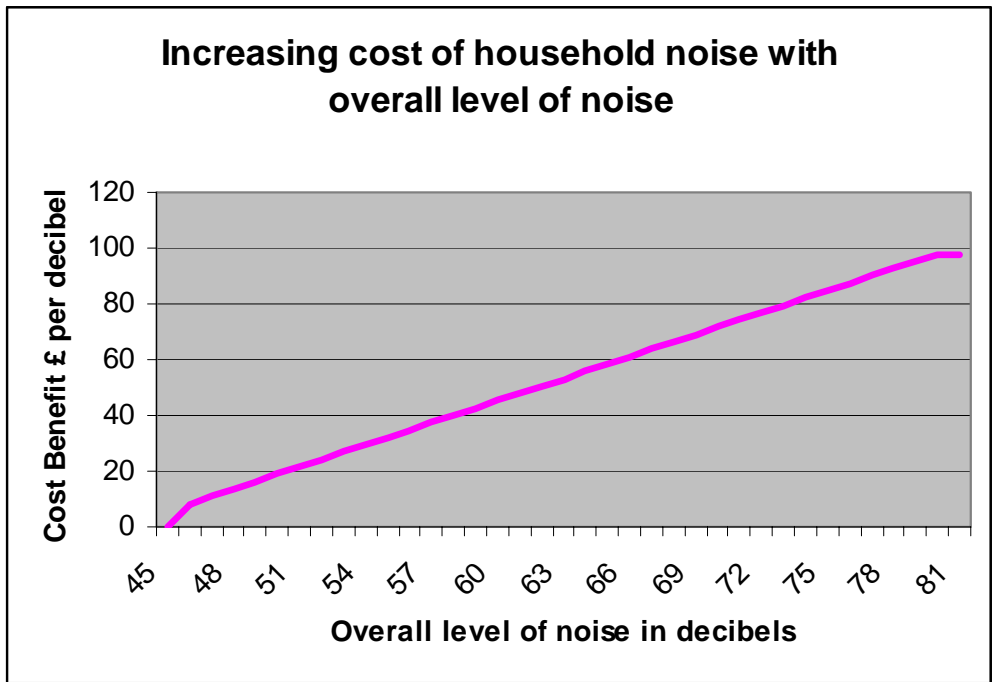
“We are aware that this can be seen as somewhat perverse, given the fact that most projects rely for their benefits on ‘small’ time-savings – precisely the ones whose SP valuation we are ignoring!”

In this context, the use of precise valuations of time-savings below five minutes cannot be considered at all reliable and the best estimate remains that they have little value. It would be better not to apply a benefit measured in pounds to them, but to list them separately in the AST in the form of how much is saved in time bands of one minute. There is also serious doubt over the use of average values in the range five to 10 minutes.

Noise valuations

There are different ways of measuring noise to produce an average figure. This report does go into the strengths and weaknesses of different approaches but sets out the current valuations published by the DfT.

Recent studies²³ have attempted to put values on changes in the noise environment and these have now been published in webtag.²⁴ It should be noted that this only applies to noise experienced by people in their homes. The most important feature is that the value of a change in noise has a cut off (45 decibels) below which values are zero. The price of a decibel change in noise grows as the general noise level rises. This is shown in Figure 1 below.²⁵



Webtag also clearly states that “monetary valuation is intended to complement the existing noise assessment.”²⁶

What is interesting about this approach is that the concept of a varying value with a cut off seems to have been readily accepted for noise while it was rejected for the value of time. Such inconsistencies also illustrate the dangers of mixing together values with such diverse origins into one final sum expressed in pounds.

Conclusions and way forward

There are arguments of principle against the dominance of the Kaldor-Hicks approach in transport, particularly in relation to environmental valuation. Even if these were overcome, the valuations themselves are currently limited in scope, derived using different methods, have large margins of error and depend on a wide range of differing assumptions including averaging some costs and not others. There are significant variations in approach across Europe for appraisal,²⁷ not always consistent with, for example, road charging studies.²⁸

The pursuit of monetary values in this context is not only a diversion of resources away from establishing better data on the impacts, it obscures those impacts in the appraisal.

In order to address this, it is proposed that the AST should be revised. The impacts should be described more accurately and in context. For example, time-savings should be listed by overall quantity but also by size. Noise should be contextualised in terms of overall levels and what is being affected. Impact on SSSIs should follow the European site approach of testing that there is no alternative.

Alternatives should also be properly developed and assessed; a requirement which is in line with current DfT and Treasury guidance. To ensure that this is followed through, an AST should be prepared both for scheme being appraised and the best performing alternative. There needs to be some independent vetting procedure to ensure this is done.

The effect of this would be to show where the impact of any scheme is strongest, to summarise the nature of the impact, and to estimate how much it costs relative to alternatives. The production of a benefit to cost ratio in pounds is counter productive, even if the reforms in the following section were put in place.

4 climate change and the tax and cost benefit policy paradox

Appraisal and the support of government objectives

Appraisal of any publicly funded scheme should reflect how far it meets government objectives. In the case of climate change, a scheme should demonstrate that it contributes to achieving reductions in greenhouse gas emissions within fixed timescales, as set out in policy, which are considered necessary in order to avoid a catastrophic series of events for humankind.

It should be noted that the current target does not restore 'safe' levels of greenhouse gas in the atmosphere, only levels at which damage is acceptable. In this case, there is still a benefit in over-achieving, which also needs to be represented in the appraisal.

Failure in this policy area has a qualitatively different impact to, for example, improving travel speeds or reliability. In this context, it might therefore be expected that particular attention would be paid to climate change targets when assessing the costs and benefits of transport spending. The fact that transport schemes are now assessed over a 60 year time period, well beyond the 2050 climate change target date, seems to support this. Many of those currently undergoing appraisal will not open until 2015, close to the 2020 target date.

But as the following points make clear, anomalies in NATA can counteract schemes that are positive from a climate change point of view.

The tax revenue anomaly

The inclusion of tax revenues in transport cost benefit analysis can lead to situations where the appraisal suggests that the government achieves best value for money when it acts against its own climate change objectives. This major anomaly can occur in the following manner:

Most governments tend to impose taxes on goods or activities that cause nuisance or harm to individuals or to society as a whole. Examples are duties on fuel (at least some of which taxes the air pollution and greenhouse gas emissions caused by cars), and cigarettes (which tax the damage to health). Conversely, some activities are exempt from sales tax (food, housing rental, public transport) and may even have a rebate (fuel duty is rebated for local bus services). This is because they are seen as being basic to social well-being, or supporting government objectives.

But including tax revenues in the balance sheet of a transport scheme's costs and benefits means that reducing an activity, which is taxed because it may undermine policy and whose reduction should be welcomed, will be reflected as a disbenefit in a scheme's assessment because it causes losses in tax revenue. This then undermines the case for reducing that activity. This has become a major issue in transport and is only just beginning to be understood.

If we now consider two schemes in relation to the objective of combating climate change we can see the paradox at work.

Examples of how the tax revenue paradox operates

1. Public transport scheme

First, take the example of a public transport scheme, let us assume that a proposed bus priority scheme would have the effect of attracting car users out of their cars and on to the bus. In the current NATA system time-savings from bus passengers would be counted as a benefit, plus half the time-savings from the former car users. In this simplified case, we assume no change in car travel times – i.e. the reduction in traffic is balanced by the roadspace used for the bus priority.

The capital cost of the scheme would be set against the benefits. However, the capital cost of the scheme will be increased by the tax loss from fuel duty and VAT. This will make the bus scheme look like poor value for money, because there is no VAT on fares, and fuel duty for buses is rebated.

The price assigned to the damage caused by carbon emissions is so low that it does not counteract this effect. At the moment it is costed at about 5-6p per litre, compared to duty and VAT on fuel of about 55-60p per litre.

2. Road scheme

If we now look at a road scheme, the effect works in the opposite direction. New roads frequently trade off time-savings against increases in fuel used. The extra cost of the fuel is usually far exceeded by the time-savings. In this case, the more a road scheme increases fuel use, the greater the tax revenue. Again, the price put on the carbon emissions caused by increased fuel use is too low to counteract this effect. The net benefit to the road scheme is about 55p per extra litre used. This is then used to reduce the capital cost of the scheme which has a disproportionate effect on the ratio of the benefits to costs, as is shown below.

The position of tax in the balance sheet increases its impact

Despite an objectives led approach, the benefit to cost ratio (BCR) is the dominant benchmark for scheme approval. For all BCRs over one, changing the cost base rather than the benefits has a disproportionate effect.

The inclusion of tax in the cost benefit table as if it were a change in the capital cost of a scheme has a 'one way' bias against schemes which save fuel (or any scheme with a tax element).

To take a detailed example, if the BCR of the scheme that reduces fuel use costs £50 million and has benefits of £100 million is calculated with the tax ignored (i.e. fuel is in at resource cost - no duty, no VAT), it will have a benefit to cost ratio of two. If the tax is added in on both sides, say £10 million saved by users and the same 'lost' by government, the new ratio is 110/60 not 100/50. This reduces the BCR to 1.83.

If another scheme used more fuel, using only the resource costs it might also have costs of £50 million and benefits of £100 million. In this case, adding in the tax could reduce the benefits by £10 million but would also reduce the costs by £10 million, as the revenue from fuel is deducted from the scheme's capital costs. The new ratio is then 90/40 with a BCR of 2.25.

A recent example of this happening is a bypass scheme currently at inquiry, where a model adjustment to the road scheme produced a modest increase in fuel used and thus carbon emissions, but reduced scheme costs (through tax gains) by £9.4 million. Although there were other contributory factors, the BCR overall moved from 2.25 to 2.8 – a major financial improvement but associated with a small increase in fuel used (less than 0.1 per cent). The balancing effect from the total damage cost of carbon was only £0.8 million, in the context, for example, of total time-saving benefits of £220.4 million.

Inconsistencies in tax revenue accounting in ASTs

In order to explore the extent of this problem, the ASTs from a number of schemes of different types were extracted from the available database to examine the effect of tax revenue on the BCRs. They were surprisingly inconsistent in many places, even in their economic benefit summary. The rows were almost certainly filled in by different people with different levels of understanding of the NATA process. In many cases the tax effects were simply not mentioned at all, while some had them clearly set out. In some cases the BCR was listed, for some it was missing. In several cases the inspector's report was used to extract data, but in some cases this did not have the information either. In many cases the detailed material on the economic appraisal is not available once the public inquiry is over.

Despite this, it has been possible to estimate the impact of the tax revenues on the BCR for each. It must be remembered that the BCR is still a major factor in decision making. However, in some cases it was not in the AST. One possible reason for this is that the tax effect is so extreme it can produce embarrassingly large and favourable BCRs, in particular for schemes which increase greenhouse gas emissions significantly.

Table 1: Impact of tax revenues on Benefit to Cost Ratios (BCRs)

Transport scheme	BCR presented in AST	BCR with tax effect removed	Notes
Motorway widening M25 J16-23	5.22 Quoted in AST	2.33	Tax effect was not shown but a major increase in CO ₂ was costed. This was used to re-estimate BCR
Motorway widening M25 J27-30	2.04 Quoted in AST	1.82	Tax was explicit in the AST, when removed the scheme drops from high benefit category to medium
Motorway extension M6 Guards Mill	51.54 Not in AST, in Inspector's Report	2.03	Tax effect was not shown in the AST, Inspector's Report figures were used
HA Bypass A30 Bodmin	2.4 Not in AST, in Inspector's Report	Cannot be calculated from AST - unclear	Tax effect was not shown, but the CO ₂ increase was significant (but not costed) thus the tax income looked high
Trunk road upgrade A1 Dishforth	12.46 Not in AST, calculated from AST figures	2.06	Tax effect was explicit in the AST, thus the recalculation was straightforward
Trunk road upgrade A14 Ellington	9.53 Not in AST, calculated from AST figures	2.94	Tax effect was not shown, but the CO ₂ increase was significant (although not costed in the AST). Average tax calculated as below
Local Authority road package Weymouth	2.72 – 5.10 Not in AST, calculated from AST figures	3.25 – 6.01	Tax effect was not shown. The small CO ₂ decrease was not costed in AST. Average tax calculated as below
Local Authority tram scheme	4.1 In AST (& full report), DfT appraisal slightly lower	4.87	Tax effect was not set out in the AST. Full Economic Appraisal has figures consistent with the AST showing tax effect

Assumptions used for the table

- Tax revenue per tonne of carbon from road fuel = £625 (estimated average based on previous fuel duty at time of AST). Total tax income then discounted over 60 years @ 3.5%.
- Total per year for carbon not usually given (although standard output), figure for design year (15 after opening) used as average where available.
- Safety, environmental and carbon costs or benefits not included in any BCRs, to be consistent with ASTs.

Possible solutions

For the above reasons, the hypothesis that including tax revenues in the cost benefit analysis reduces the perceived value for money of sustainable transport schemes, and increases it for less sustainable schemes, can be illustrated in theory and in practice.

The question then arises as to how this anomaly can be addressed, and several options are discussed below.

1. Remove tax changes from the economic efficiency table

This is probably the simplest approach and means that changes in government revenue and private spending would be in resource costs (i.e. excluding tax). This used to be the case in appraisal and is a familiar concept in economics. It would reduce the impact of operating costs in the appraisal, but increase the impact of carbon price (even at its current low levels). For example, if tax were left out of the HA bypass example in the table above, a one per cent increase in fuel use would have produced a fall in the BCR of about 10 per cent. A one per cent decrease in fuel use would cause the BCR to rise by around the same amount. This scale of change would give preference to the more sustainable scheme and be consistent with government policies.

2. Pass/fail criterion

A different approach would be to introduce a simple pass/fail criterion in any cost benefit analysis. In other words, any scheme that does not include a reduction in greenhouse gas emissions in line with government targets would not proceed. This would have the effect of ensuring that local transport schemes were not considered in isolation from one another. They would have to be considered with the proper preparation of demand management alternatives (the failure to do this is a major omission in NATA implementation on the ground).

Integration is, of course, one of the key government objectives for transport and is included in NATA advice, as is the proper exploration of alternatives. In relation to road schemes, where the established way of working was not to consider alternatives, the change in approach desired by government is still lacking in many cases.

3. Excess carbon charged at current rate

Rather than an absolute pass/fail, another option would be to apply the cost of carbon (preferably a Stern based value) to all emissions in excess of the level needed to achieve the target. This would again reflect the necessity of taking action on GHGE targets. For example, a road scheme would assume a realistic improvement in fuel efficiency, balance this against traffic growth and check the total emissions against the level required to achieve the Climate Change Bill targets. Any emissions in excess would be costed at the carbon damage cost. This concept of charging the excess would fit well with the achievement of targets – once achieved, the value of extra carbon reductions falls to zero.

However, in this case the target is not to avoid any risk of climate change but to keep the damage to an acceptable level (less than two degrees, about 450-550 parts

per million of atmospheric CO₂). Thus there is a value in further reductions, down to the level at which CO₂ will fall to the historically stable level.

In fact, the current DEFRA price of carbon, which is well below Stern's estimate, is the value of carbon *beyond* the target (i.e. it assumes that the reduction target is achieved). At the moment appraisals do not come to grips with this issue at all.

The current approach only values small marginal changes in emissions without reference to any policy context. This is simply a misconception of value in the context of what should be called a 'necessary target'. It leads to the situation where the failure to achieve the target is given a zero cost in the evaluation. Failure to achieve the target should at the very least have the price of carbon applied to all emissions in excess of it.

This would have a dynamic effect on scheme design for all modes, focussing them strongly on the government objective, rather than achieving theoretical BCRs based on time-savings and tax revenues. For example, the excess carbon charge could be avoided by devising an integrated package, which achieved the reductions, even though some individual elements may see an increase in emissions.

While an economic appraisal model was not available for this study, it is possible to approximate how this would work using the webtag spreadsheet. It is clear that for the highway scheme example used earlier, which did nothing to reduce emissions, the cost of the excess carbon over target would exceed the time-saving benefits by a significant amount. On the other hand, a scheme which achieved time-savings at the same time as reducing emissions would achieve a positive BCR. This result would again be in line with the achievement of government objectives.

4. A policy value for carbon damage cost

A second pricing approach would be to set a policy achievement damage value for carbon equivalent to the tax revenue and add it to the existing carbon cost. This would have to be around 55p per litre in 2002 prices. In effect, this is the equivalent of the government's willingness to pay to reduce carbon. VAT is not counted for business users (who can claim it back) and so the fuel duty equivalent could be assumed as the carbon cost. This would make it 46p per litre (2002 prices).

This is probably over complex, but would allow for tax benefits to be included, although these must not be counted against the construction costs (see below).

5. Tax revenue treated as a benefit

If there are residual changes to tax revenue in the analysis, in combination with one or more other amendments, the BCR tax sensitivity problem, set out earlier in this study, still needs to be addressed. This could be done by simply entering the changes in tax revenue in the economic efficiency table – i.e. putting it in with other revenue costs and benefits. It would then not appear in the same table as the scheme's capital costs.

Conclusions

The pass/fail criterion and the removal of tax altogether are the simplest and easiest to implement. However, the excess carbon charge also has considerable attractions. It would be useful to analyse a real life example with the DfT and to fully test the impact of all the different solutions as part of the NATA refresh. What is already clear is that the current system is incapable of properly reflecting new government policy on climate change in the economic appraisal.

5 NATA and sustainable transport

The Sugden multi-modal amendment

The other source quoted by the DfT for some of NATA's inner workings is the Sugden report of 1999. Professor Robert Sugden was asked by the department to look at various inconsistencies in appraisal, for example relating to tax treatment, resource costs and market values. Among several recommendations, one was adopted in relation to multi-modal appraisal.

This essentially provides a short cut to assessing the impact of people changing modes. However, it produces a twofold bias which appears to have gone unnoticed. The first is against modes which do not increase tax revenues, the second is that it avoids any audit trail of who changes mode.

The approach, adopted in 2001, simplifies matters by assessing each mode as if new travel, or lost travel, occurs independently from all the other modes. This is then subject to the 'rule of half' which simplifies the benefit of generated travel to half of the benefit to existing travel. This is fine if there is only one relevant mode, such as road, and the appraisal needs to take account of generated traffic. To apply it in a multi-modal context, however, is a high risk strategy and the results can be seen below:

Distributional effects are lost

One immediate problem is that the tracking of who switches mode ceases to be relevant and thus issues of who gains and who loses can be obscured. In these circumstances a real situation, such a person changing mode, will result in a change in their value of time, since they will become, for example, a bus passenger as opposed to a car driver. This is quite simply unrealistic. It compounds the problems caused by the use of different time values for different modes.

It is worth contrasting this with the use of national time values instead of local time values. One reason for this is political – high time values are found in high-income areas and thus most infrastructure would be built in the richest parts of the country and very little in development areas if local instead of national time values were used. It is worth recalling this in the context of whether cost benefit analysis in NATA is quite as pure as it is sometimes claimed to be.

Mode transfer, including walking and cycling, appears poor value

There are further problems caused by the rule of half in transfer between different transport modes and interactions with real costs and tax revenues. One of the reasons for this is that public transport fares are not subject to VAT and that local bus services are given a fuel duty rebate. Thus any switch creates significant losses of government revenue – usually approximated as 20.9 per cent (VAT plus other general tax). Fuel duty is of course, significantly higher.

It has proved difficult to find worked up scheme examples of these processes, partly because the use of high mode transfer penalties in traffic models has effectively prevented transfers to bus under many circumstances. Transfers to walking and cycling are usually ignored completely in infrastructure appraisal.

These rather convoluted, interacting effects are illustrated in the box below.

Examples of how NATA treats mode transfer poorly

Let's consider a 'do minimum' road network with 100 non-work car trips on it, each of which cost £1 (total cost £100). A new bus scheme is to be introduced which reduces car trips by 10 per cent, down to 90. Congestion is reduced, and the cost of each car trip falls by 10p, of which 5p is fuel. Total fuel costs were originally 25p, falling to 20p. 70 per cent of fuel costs are duty and tax (please note these resemble real figures but would be different for each scheme).

Using the DfT assumption for changes to trips, the rule of half, (see webtag 3.5.3, para 2.1.6) the savings due on the road side are:

$$\frac{1}{2} \text{ of new trips plus old trips } \times \text{ cost saving} = (100+90) \times (100-90) / 2 = \text{£9.50.}$$

However there is a loss of government revenue, amounting to all the duty on the 10 trips removed, plus the duty on the lower amount of fuel used for the remaining trips. This makes the formula:

$$10 \text{ trips } \times 70\% \text{ of } 25\text{p} = \text{£1.75 plus } 90 \text{ trips } \times 70\% \text{ of } 5\text{p} = \text{£3.15}$$
$$\text{Total cost} = \text{£4.90}$$

This would then be put into the appraisal as a scheme cost, to be set against the savings (£9.50), effectively reducing them by over 50 per cent, to a total saving of £4.60.

This example could be changed to a scheme that improves walking and cycling, reduces car trips by the same amount but produces no time savings (they are used up by new crossings or cycle priority).

In this case there is no benefit to car users to compensate for the loss of government revenue from fuel duty. The small improvement for walkers and cyclists would be reduced by the rule of half.

Smarter travel, walking and cycling are not usually tested

In the appraisal of alternatives, the issue of smarter travel initiatives, emphasised in NATA guidance as being a first resort in dealing with transport problems, has not been properly reflected. There are two inherent problems. The first is how to represent such initiatives in a transport model. The second is how to deal with the changes in travel in the economic appraisal.

Modelling smarter travel

While the scale of impact from smarter travel initiatives is well documented, the application of a single percentage reduction in traffic is not ideal. However, the data needed to apply different levels of change for different journey purposes is not usually

available. For smarter travel the following categories for journey purposes would be useful:

- commute
- travel in course of work
- shopping
- leisure
- education
- education escort
- other escort
- personal business
- health

Such categories are available in surveys such as the National Travel Survey, but in most appraisals three user groups are identified:

- commute
- travel in course of work
- other

This is less satisfactory and has sometimes been used to argue against the inclusion of smarter travel in the development of solutions that are to be modelled for appraisal. In one of the cases studied for this report, the option of using low growth regional forecasts for traffic generation (TEMPRO)²⁹ to simulate smarter travel was proposed. This is far removed from taking such measures seriously. It also leads to a further problem in relation to road schemes and alternatives. Most NATA appraisals are undertaken for road schemes where low growth TEMPRO forecasts are often presented as a pessimistic scenario. Road or public transport schemes are then tested in conditions of low or high traffic growth.

The problem here is a complete misunderstanding of the nature of alternative solutions. Justifying one scheme in terms of making one mode more attractive, usually through time-savings, while pursuing a policy to encourage a competing mode at the same time, is bound to lead to poor value for money.

For example, if a road scheme saves motorists time, persuading them to use an alternative becomes more difficult. All those drivers who might be persuaded to use more sustainable modes of travel would require additional financial compensation at least equivalent to the value of the time-savings offered by the road scheme.

In fact, because the car is so attractive, most models would predict that compensation over and above the simple savings value would be needed.

Smarter travel in appraisal

While the public transport example given in the earlier mode transfer section illustrated the problem of interacting tax revenues and the rule of half, smarter travel poses new questions.

For example, smarter travel can include walking and cycling, as well as car sharing, home working and public transport. The first two modes offer health benefits as well as

low environmental cost but they also lose tax revenue for the government and require conditions such as safe routes to avoid increasing accident costs. These are usually left out of appraisal, although Transport for London, for example, has done some innovative work in this field.

Since the appraisal of smarter travel as an alternative to infrastructure is rare, these problems do not frequently surface in relation to specific schemes. However, they have been identified, for example in relation to home working. Here the issue is one of how commuting time is used. In many cases, people perceive their work time as starting when they leave home, not when they get to the workplace. This results in people using some of the time saved by not commuting for work purposes. This should result in a very significant increase in the value of the time saved. The people working from home also tended to have higher incomes, again not reflected in appraisal.

Overall there is a clear need to better reflect government objectives on social inclusion and health as well as carbon reduction so that achieving these does not look like a disbenefit.

Walking and cycling and trip length

There is a final issue to be raised about the inclusion of walking and, to a lesser extent, cycling in NATA. In the modelling process it is often said that walking trips cannot replace car trips over a mile or so, and cycling cannot replace them over three to five miles. This is based on existing mode share and trip data.

However, the reality is that if people choose to walk to the shops rather than drive, they will tend to use different shops and change their shopping patterns. This is well known to modellers – it is called mode transfer and redistribution. However, most models treat the two processes in almost complete isolation from each other. This is another example of model structure determining the outcome of appraisal.

Conclusions on sustainable modes and way forward

It is clear that a multi-mode approach has not been implemented in NATA, and that there are several major technical obstacles. The recurring themes of removing tax revenues to a separate accounting exercise and of moving closer to the objectives led approach which NATA was designed to achieve are both reflected in the treatment of sustainable modes.

To address this, travellers who switch mode should not be counted as generated or suppressed, nor should they have their value of work time altered as they switch mode. This makes it easier from the modelling point of view but creates bias and loses track of distributional effects.

Smarter travel initiatives, walking and cycling and not properly represented and should be included as fully worked alternatives, as is already recommended in NATA guidance. Potential benefits from sustainable modes, especially health and access for people without cars, need to be included in the AST.

6 NATA implementation in practice

The NATA new principles of appraisal

There were two fundamentally new principles to appraisal which NATA introduced in 1998. The first is a move towards a more objectives led approach. Thus transport schemes are both developed and assessed using specific criteria within a family of clearly stated goals. This is sometimes referred to as multi-criteria analysis (MCA) and may involve targets or constraints. Overall, the costs of any scheme, package or policy are compared to the achievement of a range of transparent and clearly defined goals.

The second principle relates to transport in particular and is that problems should be defined, and solutions then developed, without any bias towards one or more modes. The guidance, introduced to accompany NATA stated that decisions should be “based on a full range of options and a comprehensive analysis of the impacts using a consistent approach.”³⁰ This fitted with the government objective of an integrated approach to transport.

A further question for this report is therefore whether the NATA goals for scheme appraisal have been followed in practice, and whether there are any technical methods embedded within NATA that actively prevent their achievement.

In trying to answer this question it has become clear that central monitoring of scheme appraisals against NATA guidance, or of predicted outcomes against actual outcomes, has been weak. For this report the ASTs for a series of individual schemes were examined, particularly the summary of scheme performance against the criteria. The Highways Agency and DfT are just beginning to publish these, in particular in response to the Campaign for Better Transport lobbying.

NATA principles in practice

The webtag process is clear and expresses its wish to provide a system which creates solutions to transport problems, without modal bias, in a way which is as transparent as possible. Unfortunately the reality of scheme promotion can bear little resemblance to the webtag guidelines.

Without spending too much time on examples of bad (as opposed to good) practice, there are several persistent problems with scheme development. Webtag sets out 3 key criteria (see Annex A) for developing solutions: transparency, avoidance of bias, and public acceptability. How far these have been adopted is discussed below.

Transparency

The production of ASTs has been a significant move forward, but much of the underlying analysis is obscure and often incomplete. Summary statistics from models which cover large areas conceal where costs and benefits occur and who is gaining and losing. Webtag specifically recommends that such factors are made clear in any appraisal.

Modelling is poorly explained, partly because all models need assumptions, compromises and adjustments to make them work, and the adversarial nature of public

inquiries mean that it is never in the interests of the modellers to reveal them. It is not unknown for opposing consultants to meet each other after an inquiry and discuss who spotted which major flaw and which ones they got away with. The whole relationship between NATA and the public inquiry system is also important and is explored further in Annex B.

Avoidance of bias and preparation of alternative solutions

Pre-judging the outcome of an appraisal is also an issue. In some cases this has gone as far as adding the construction of a specific scheme to a list of objectives. This is a complete misinterpretation of what an objective really is – a scheme can only be a means of achieving an objective.

Less conspicuous, but equally deterministic, is the half hearted preparation of alternatives and the use of models and techniques which are better suited to one mode rather than another. Although webtag distinguishes between them, the pre-judging problem is closely related to how far scheme proposers develop realistic alternatives and test them properly. This again is a major point of contention at public inquiries. The NATA process should have minimised such problems.

Public acceptability

It is not to be expected that everyone will agree with every scheme. However, within this constraint, it is possible to maximise acceptance, by ensuring that people feel their views have been heard, respected and taken into consideration. Rejecting a person or organisation's views is seen as more or less acceptable according to two key factors. The first is how far they feel they have had a fair hearing. Few ordinary people feel this after a public inquiry, during which they are often subjected to a very intense and aggressive level of legal cross-examination well beyond their normal experience and where there is a huge gulf in technical support between ordinary objectors and promoters.

The second acceptability factor is how far people were listened to during the process of defining the transport problem. This is quite clearly shown in Figure 1 of the webtag guidance (reproduced in Annex A). The common practice of not consulting until there has effectively been a decision on what type of infrastructure is required and then offering several alternatives, which are in fact all of the same type, creates public cynicism and is against the guidance. The fact that alternatives are often set out in the format of modest version, extreme version and the one in between (usually the preferred option) is another ploy that is so obvious that it will only alienate those whose acceptance is being sought.

It is worth repeating that acceptance of a decision is not the same as supporting or welcoming it. The issue is respect, both for those who have an interest in that decision, and for the guidance that is designed to protect them

How widespread are the implementation problems?

While schemes that came forward in the early years following NATA's introduction may have had some excuse for still displaying a lack of alternatives or assessment against objectives, by now it should be expected that all schemes follow the basic approach. However, this is not the case and is widely believed to be a major failing, both by transport academics and professionals.

One problem is that there is little central monitoring, so a comprehensive overview is not available. The UK approach to infrastructure appraisal is heavily focussed on modelling and forecasting and very weak on monitoring the actual outcomes. At a recent expert seminar held by UK Energy Research Centre,³¹ these twin problems of failing to follow the guidelines and inadequate post-scheme monitoring were frequently raised.

Examples of implementation problems

Road

At a recent highway inquiry, demand management alternatives were not worked up at all, despite a majority of the scheme's traffic having origins or destinations in urban areas. Potential objectors to the scheme had raised the issue of alternatives well in advance of the inquiry (and met the promoters and their consultants), yet nothing was ready when the inquiry opened. The road traffic model used had a rail add-on, but no bus use, walking or cycling was included, despite the scheme being a local bypass.

Thus when the inquiry opened, the only scheme with any detailed assessment was the road, despite a package of specific measures being proposed by objectors (some statutory) as an alternative. Objectors went as far as obtaining ministerial assurance that the package would be tested. That they had to go to this length to get the government agency to follow the guidance is in itself a comment on the failure to implement. At the time of writing, six months after the inquiry opening, the testing of a demand management package, which has been defined in detail by objectors, has not yet been done.

Bus

Such problems are not confined to highway schemes. For example, a major bus scheme came to inquiry last year with a range of rail alternatives which were chosen by the bus promoters and developed to a lower level of detail. There were even private sector proposals, which were ruled out because they had a lower level of detail. In fact, a public inquiry was a completely unsuitable forum in which to discuss such different proposals. For example, much higher levels of optimism bias (raising the capital cost estimates) were applied to rail alternatives. This effectively ruled out some options on grounds of cost and would have been avoided if the schemes had been developed alongside the bus scheme. The model itself also used simplifications which could be argued as adequate for a road-based scheme, but not for rail. There was no real best performing alternative.

In such cases the most important feature was not just the lack of a champion for an alternative, but the fact that there was so little work done before the inquiry opened. This is far too late, as webtag recognises, and ends up wasting public money and delaying decisions.

Lack of proper alternatives is a very common criticism of infrastructure proposals. In essence, promoters have often continued with the existing practices as though NATA and the webtag guidance had never been issued. This has in turn made the aim of the final webtag key goal – public acceptability – a rare occurrence.

Overall, the webtag process is sensible enough, and perhaps one of the problems was the lack of reform of the inquiry process with which it has to interact. However, the previous sections of this report set out some serious technical issues in relation to appraisal which mean that, even if guidance were to be followed, decision makers would not have the information they need to answer the basic question: how far does this scheme meet government objectives and how much does it cost?

Conclusions on basic NATA principles and their implementation

The overall picture is one of a clear and logical structure for appraisal in theory, but weak evidence of it being reflected in actual decision-making. This in turn has undermined public confidence and thus the achievement of greater acceptance. It has been noted above that there is a difference between people welcoming a decision and accepting it. Neither does the system operate fairly, in reasonable time, or in a cost effective manner.

7 conclusions and recommendations

This report set out to contribute to the NATA refresh process by asking two fundamental questions:

- The first is whether NATA delivers an appraisal process that accurately represents the true costs and benefits of transport schemes and fully reflects the government's objectives in general, and in particular its climate change targets.
- The second is whether NATA's basic principles have been followed in practice, particularly when preparing ASTs.

The answer to both of these questions must be 'no'.

The purpose of the NATA appraisal system is to provide the most accurate picture of how much it costs to achieve a certain level of progress towards government objectives for transport. But, as this report shows, the cumulative effect of a series of individual adjustments to NATA, often made for good reason, has been that many schemes which seem to be in line with government ambitions for transport do not fare well in the assessment process. In contrast, many schemes which contradict policy, such as those which increase, or at least fail to reduce, greenhouse gas emissions, score very well.

There have been so many compromises in NATA that the accurate description of the real costs and benefits of a given transport scheme has been seriously compromised and this has had a major impact on which transport schemes have been implemented. Producing a single cost benefit analysis figure from an AST, which tells the decision maker, across all modes and in all circumstances, which transport schemes are the best value for money results in large scale, often hidden, mathematical simplifications. While an attempt to put a monetary value on all costs and benefits irrespective of their nature creates confusing and misleading results.

In implementation, it is clear that central monitoring of scheme appraisals against NATA guidance, or of predicted outcomes against actual outcomes, has been weak. The result has been that NATA's basic principle of an objectives led approach, based on a full range of options with consistent implementation has not been followed through.

In summary, the refresh process needs to ensure the following:

- The generation of properly championed and designed alternatives to compare to proposed schemes, replacing the usual unrealistic 'do minimum' baseline;
- Clear distinction between the 'real' prices of items and those which are subjectively derived and the downgrading of the latter in appraisal;
- More accurate description of the effects of transport schemes and placing them in context (i.e. how far is the current position from the desired situation);
- Assessment of packages of schemes against agreed emissions targets standards;
- Changes to methodology to address a range of serious anomalies, in particular:
 - the treatment of government tax revenues,
 - the way which mode transfers are handled in the appraisal, and

- the exclusion of the potential impact of walking, cycling and smarter choices from transport modelling.
- All this needs to be fully incorporated in a properly filled out AST, and these need to be audited and monitored.

An example of the existing, and a suggested revised AST are included on the following pages.

Existing AST

Option		Description	Problems	Present Value of Costs (PVC) to Public Accounts £m
OBJECTIVE	SUB-OBJECTIVE	QUALITATIVE IMPACTS	QUANTITATIVE ASSESSMENT	ASSESSMENT
ENVIRONMENT	Noise			Net population win / lose NPV £m
	Local Air Quality			Concs wtd for exposure
	Greenhouse Gases			PVB £m
	Landscape			Score
	Townscape			Score
	Heritage of Historic Resources			Score
	Biodiversity			Score
	Water Environment			Score
	Physical Fitness			Score
	Journey Ambience			Score
SAFETY	Accidents			PVB £m
	Security			Score
ECONOMY	Public Accounts		Central Govt PVC, Local Govt PVC	PVC £m
	Transport Economic Efficiency: Business Users & Transport Providers		Users PVB, Transport Providers PVB, Other PVB	PVB £m
	Transport Economic Efficiency: Consumers		Users PVB	PVB £m
	Reliability			Score
	Wider Economic Impacts			Score
	Option values			PVB £m
ACCESSIBILITY	Severance			Score
	Access to the Transport System			Score
	Transport Interchange			Score
INTEGRATION	Land-Use Policy			Score
	Other Government Policies			

NPV: Net Present value; PVB: Present value benefit; PVC: Present value cost

Revised AST template

Option		Description		
OBJECTIVE	SUB-OBJECTIVE	QUALITATIVE IMPACTS	QUANTITATIVE ASSESSMENT (before & after)	IMPACT ASSESSMENT (before & after)
ENVIRONMENT	Noise	Active street Home Day Home Night Open space	Population above threshold Population above threshold Population above threshold Area affected above threshold	Changes in affected populations and areas
	Local Air Quality	List all pollutants	Areas exposed above threshold	Population affected & level of achievement or failure
	Greenhouse Gas	Total transport emissions in scheme area	Total emitted over 60yrs less total if 1990 levels achieved	Amount in tonnes CO ₂ equivalent + PVB £m
	Landscape	Description of site + any special status	Sight line based area of change + effect on rights of way	Description, including direction of change *
	Townscape	Description of area	Specific effects including individual buildings + on footfall	Description, including direction of change *
	Heritage/Historic Resources	Description of area, type and scale of resource	Effect on individual resources	Description, including direction of change *
	Biodiversity	Description of area + specific resources	Effect on individual resources	Description, including direction of change **
	Water Environment	Description of context and specific resources	Effect on individual resources	Description, including direction of change **
	Physical Fitness	Degree to which scheme creates additional exercise	Person hours per individual by person type (not aggregated)	Estimation of health benefits
	Journey Ambience	Separate entries for each mode including walking & cycling	Refer to environmental and congestion entries & any other relevant factors	Description of changes
SAFETY	Accidents	Description of current pattern and problems	Estimate of changes by casualty type and location	Description of changes
	Security	Separate entries for each mode including walking & cycling	Refer to fear of accidents, isolation & intimidation, walking route audits	Description of changes
ECONOMY	Scheme cost	Description of scheme/package	Optimism bias + description of risk assessment	PVC £m
	Transport time and operating costs: business	Description of total time savings by type and size	Users PVB OPEX, Transport Providers PVB OPEX, Other PVB	PVB OPEX £m
	Transport time and operating costs: consumers	Description of total time savings by type and size	Users PVB OPEX, Transport Providers PVB OPEX, Other PVB	PVB £m
SAFETY	Accidents	Description of current pattern and problems	Estimate of changes by casualty type and location	Description of changes
	Security	Separate entries for each mode including walking & cycling	Refer to fear of accidents, isolation & intimidation, walking route audits	Description of changes

Revised AST template continued

Option		Description		
OBJECTIVE	SUB-OBJECTIVE	QUALITATIVE IMPACTS	QUANTITATIVE ASSESSMENT (before & after)	IMPACT ASSESSMENT (before & after)
ECONOMY	Scheme cost	Description of scheme/package	Optimism bias + description of risk assessment	PVC £m
	Transport time and operating costs: business	Description of total time savings by type and size	Users PVB OPEX, Transport Providers PVB OPEX, Other PVB	PVB OPEX £m
	Transport time and operating costs: consumers	Description of total time savings by type and size	Users PVB OPEX, Transport Providers PVB OPEX, Other PVB	PVB £m
	Reliability	Proportion of travel in congested conditions	Measured day to day variation in journey time	Description of changes
	Wider Economic Impacts	Description of local employment	Description of centralisation and labour catchment effects	Description of changes
ACCESSIBILITY	Option values	Description of non-scheme modes affected		
	Severance	Include all non-motorised modes	Describe impact and location	Description of changes
	Access to the Transport System	Change current formula to PT only + create equivalent walking & cycling accessibility measures	Description of changes	
INTEGRATION	Transport Interchange	This should draw on the impacts above which will include interchange and refer to them.	Description of changes	
	Land-Use Policy	This should draw on the impacts above, especially Accessibility and Wider Economic.	Description of changes	
	Other Government Policies	Description of areas and populations for the above impacts will enable an overall distributional analysis. Other policies can be included. Estimates of tax revenue changes could be included here, distinguishing between general taxation and environmental charges.		

Notes

- * Specific note of relationship with noise and air pollution entries
- ** Specific note of relationship with air pollution entries

Recommendations for improvement

These recommendations are based on the discussion in this report and the author's response to the specific consultation questions issued by DfT for their refresh process. The latter are attached as Annex C.

1. The new objectives for sustainable transport need to be reflected in NATA. The effectiveness with which a scheme meets a particular objective can be compared to its cost, creating a measure of effectiveness per pound of cost. Complex schemes will need the decision maker to consider strengths and weaknesses against cost.
2. The need to achieve climate change targets requires significant changes to NATA. It could simply apply a pass/fail criterion if schemes do not achieve the target reduction or integrate the costs of carbon more fully into NATA's assessment.
3. Appraisal methods mean that NATA often promotes schemes that run counter to government policy. DfT should set up a multi-modal, multi-interest monitoring and advisory group to ensure the widest possible consideration and acceptance of amendments to NATA by professionals and the public. This will help to avoid unintended consequences.
4. The NATA appraisal internet site, webtag, should be continued as a source of guidance but extended significantly to include more good practice, for example to support the next four recommendations.
5. The AST is at the heart of the appraisal system and needs to be completed in a way that is internally consistent and consistent with other appraisals. This needs a new and more comprehensive approach involving training, better guidance, and monitoring. This should include a specifically trained practitioner having overall responsibility for producing the AST.
6. The development of alternatives to proposed schemes needs to be taken seriously. This needs even greater emphasis in guidance, but also improved monitoring. Schemes should be judged against the best performing alternative, not against an often unrealistic 'do minimum'. Any serious alternative should have its own AST with a comparable level of detail to the main proposal.
7. The impacts of schemes should be described properly in the AST. For example, it should set out how large individual time-savings are or what the noise context is relative to standards for sleep or conversation. These aspects should not just be averaged and have a monetary value put on them.
8. Because of conceptual and practical problems, there should not be a trading off between very different costs and benefits to produce a single monetary value. These include complex areas like: personal injuries and death; climate change; time-savings; value of a landscape; damage to historic buildings; street conversation; a night's sleep; air pollution nuisance; air pollution damage to health; health benefits of exercise and social inclusion. The preferred option is to describe the scheme or policy impacts more accurately, without valuation, in the AST.
9. Forecasting and modelling resources should be prioritised. The best possible data (on travel as well as impacts) should be ensured and there should be more broad brush testing of properly modelled alternatives. This can be done using the

improved travel and other data and much simpler models. Only if absolutely necessary should highly elaborate network based models be developed.

10. Every appraisal relies on forecasts, at present supplied by the DfT through their TEMPRO programme.³² At present this does not produce a demand management forecast without road pricing. This should be altered to do so and could use benchmark values from existing DfT studies such as *Smarter Choices: changing the way we travel*.³³
11. Walking and cycling need to be properly represented in the appraisal process and appropriate methods of modelling them need to be developed that allow for useful comparison of their benefits with other transport modes.
12. When polluting behaviour such as driving is reduced and tax is lost as a result it should not be seen as a cost that reduces a scheme's benefits. In reverse, gains in tax through increases in polluting behaviour should not be viewed as a benefit and be allowed to reduce scheme costs. A separate statement on changes in tax revenue should be made. This must distinguish between charges for polluting behaviour and general taxes.
 - Fuel duty should be seen as an environmental tax which needs to be minimised by encouraging people to shift to less fuel intensive forms of transport, whereas NATA currently sees it as a source of government income to be maximised
 - People shifting to public transport where fares are not subject to VAT and where fuel duty income falls should not be seen as disbenefits of a scheme
13. Numbers of travellers changing mode should be identified in the appraisal, rather than treated as generated traffic (and thus have their value reduced). Nor should they have their working time values altered when they switch, as at present.
14. The problem of using different average values (including national equity rates) continues to produce counter intuitive results and undermines the basis of a cost benefit analysis of the traditional type. The issue of the compatibility of national and scheme specific forecasts and valuations is complex and needs its own research and consultation project. A move away from derived valuations, rather than extending their use, will be of some help.

references

- ¹ Smarter choices is often used to refer to a range of initiatives which are person based, such as commuter planning, use of new technology to reduce travel, using efficient home delivery systems and packaging leisure events with free public transport. See reference 5 below.
- ² The need for alternatives is one of the central recommendations of Treasury Guidance: see Treasury Green Book, Chapter 5
- ³ Accent Marketing & Research and Hague Consulting Group for Department for Transport, 1996, *The Value of Travel Time on UK Roads*
- ⁴ TEMPRO is on <http://www.tempro.org.uk/>
- ⁵ Department for Transport, June 2005, *Smarter choices: changing the way we travel*, HMSO footnote
- ⁶ See webtag, Unit 1.1, Section 1.3 www.webtag.org.uk/index.htm
- ⁷ See webtag Unit 2.1, para 1.2.1 www.webtag.org.uk/index.htm
- ⁸ See webtag <http://www.webtag.org.uk/index.htm>
- ⁹ Climate Change Bill, November 2007, The House of Lords
- ¹⁰ Department for Transport, October 2007, *The NATA Refresh, Reviewing the New Approach to Appraisal*, HMSO
- ¹¹ Department for Transport, October 2007, *Towards a Sustainable Transport System*, HMSO
- ¹² HM Treasury, *The Green Book* Chapter 5.
- ¹³ Department for Transport, October 2007, *Towards a Sustainable Transport System*, HMSO
- ¹⁴ See webtag, Unit 1.1, para 1.5.1 www.webtag.org.uk/index.htm
- ¹⁵ HM Treasury and Department for Transport, December 2006, *The Eddington Study: The case for action; Sir Rod Eddington's advice to government*, HMSO
- ¹⁶ The protective structure is set out in Planning Policy Statement 9, ODPM Circular 05/2005 and DEFRA Circular 01/2005
- ¹⁷ Accent Marketing & Research and Hague Consulting Group for Department for Transport, 1996, *The Value of Travel Time on UK Roads*
- ¹⁸ *Ibid*, Section 5.1
- ¹⁹ See Gunn and Sheldon, reported in the Journal of the Transport Economists Group, Spring 2001
- ²⁰ Leeds ITS for Department for Transport, January 2003, *Value of time-savings in the UK*
- ²¹ Bates & Whelan, December 2001, *ITS Working Paper 561: The Sign and Size of Time-savings*
- ²² *ibid.* (Section 6.6, page 40)
- ²³ ITS Leeds, May 2005, *Developing Guidance on the Valuation of Transport Related Noise for Inclusion in Webtag*, TSG Loughborough
- ²⁴ See webtag Unit 3.3.2, Table 2 www.webtag.org.uk/index.htm
- ²⁵ *Ibid.*
- ²⁶ See webtag Para 1.4.1, Unit 3.3.2 www.webtag.org.uk/index.htm
- ²⁷ ITS Leeds, October 2007, *Transport Appraisal in other countries: lesson for the NATA Refresh*, for Department for Transport
- ²⁸ European Environment Agency, March 2004, *Transport Price Signals, Monitoring changes in European transport prices and charging policy in the framework of TERM*
- ²⁹ TEMPRO is on <http://www.tempro.org.uk/>
- ³⁰ See webtag Unit 1.1, para 1.2.3 www.webtag.org.uk/index.htm
- ³¹ UKERC, October 2007, *The cost effectiveness of carbon abatement in the transport sector*
- ³² TEMPRO is on <http://www.tempro.org.uk/>
- ³³ Department for Transport, June 2005, *Smarter choices: changing the way we travel*, HMSO footnote

Annex A

NATA Guidance and webtag

NATA Guidance is published on the web (www.webtag.org.uk) and this gives an overview of the New Approach as follows:

‘The White paper framed the move away from ‘predict and provide’ solutions to transport problems and put at the core an integrated transport policy. Appraisal of problems is key to the efficient delivery of this policy. The decisions made as part of the delivery need to be based on a full range of options and a comprehensive analysis of the impacts using a consistent approach. To this end, the White paper introduced the New Approach To Appraisal (NATA), to appraise and inform the prioritisation of transport investment proposals.’

(Unit 1.1, para 1.2.3)

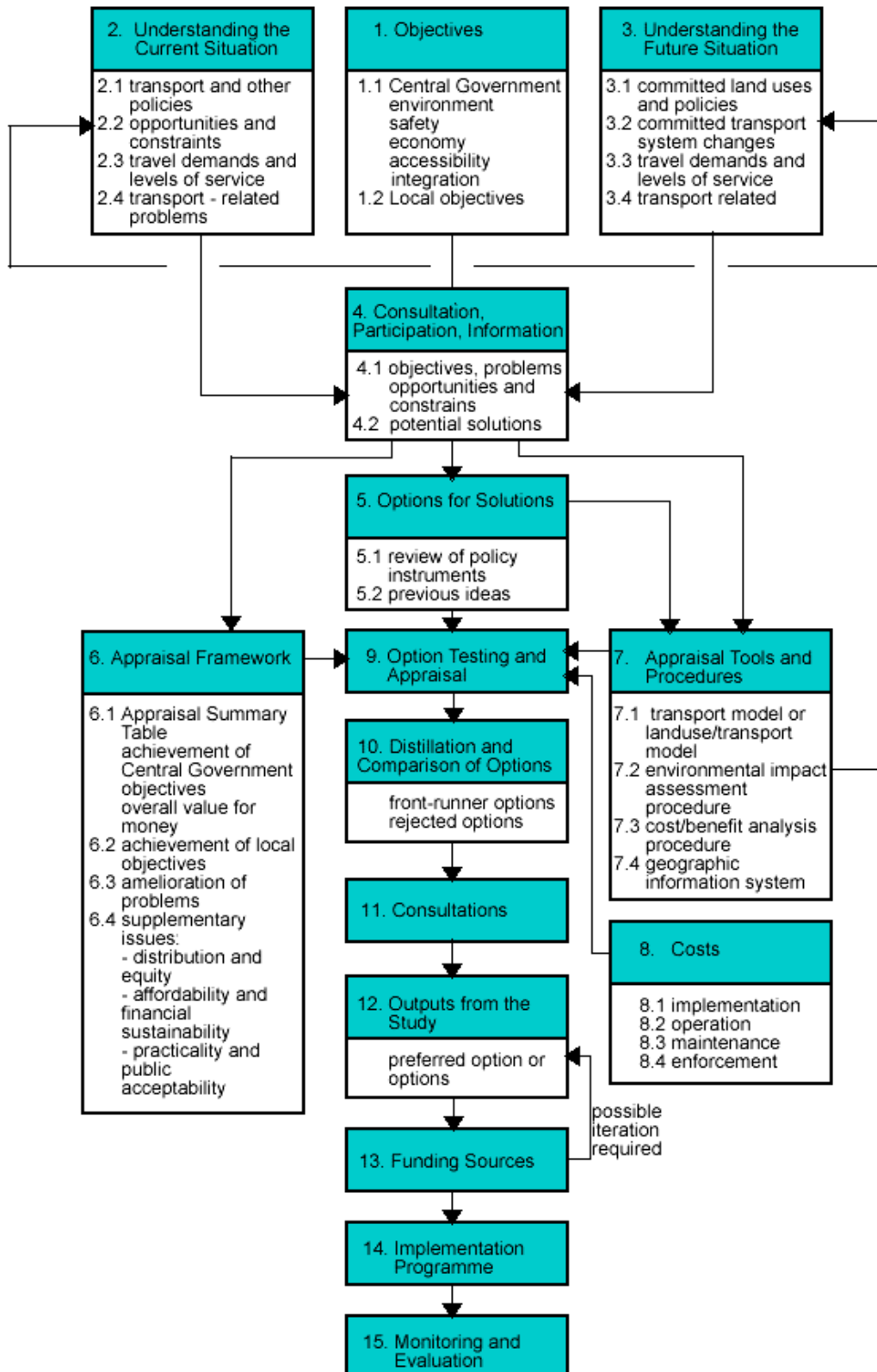
The NATA approach is described in webtag as follows:

‘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.’

(Unit 1.1, para 1.4.3)

The above process is described diagrammatically in the following figure, again from webtag Unit 1.



Annex B

The relationship between NATA and the Public Inquiry system

Overall, the webtag process is sensible enough, and perhaps one of the problems was the lack of reform of the Inquiry process with which it has to interact. For example, most inquiries are delayed by a lack of information, partial modelling, misunderstanding and inadequate preparation. Once open, everyone is under pressure to finish, and many people feel frustrated because this can be used as an excuse not to undertake work on alternatives.

It may be better to open the inquiry and receive the promoters' evidence, then adjourn. There would then be a period during which the objectors and promoters could seek to resolve all issues of information and properly test alternatives. It would be possible to use an independent adviser who would be the guardian of the webtag process and would oversee this stage. They could chair meetings and also offer independent advice to objectors – something that usually speeds up the process. This would almost certainly be faster and less costly than trying to do this during the Inquiry itself.

In fact, at one of the examples given above, pre-inquiry mediation with a professional, independent mediator was undertaken and managed to clarify key issues and identify areas of agreement. Objectors were at first wary of participation, but the atmosphere between them and the promoters improved during the process. Unfortunately, there was no proper mechanism to reflect this at the Inquiry, which was carried out in the usual adversarial manner. A lot of constructive work by all parties was wasted. Again, this does not help public acceptability.

Webtag goes on to say that,

'Typically, a study should include:

- agreement on a set of objectives which the solution should seek to satisfy;
- analysis of present and future problems on, or relating to, the transport system;
- exploration of potential solutions for solving the problems and meeting the objectives;
- appraisal of options, seeking combinations which perform better as a whole than the sum of the individual components; and
- selection and phasing of the preferred solution, taking account of the views of the public and transport providers'

Agreement on objectives, thorough analysis, exploration of different solutions, proactive appraisal which seeks out integrated packages, ending with a preferred solution engaging public and providers – the structure is clear and has a logical sequence. The problem is that the preferred option is too frequently the starting point, and this alters the whole procedure. It prevents the exploration of alternative solutions and using the appraisal process in 'seeking combinations'. It also tends to limit the range of objectives and the analysis of problems to those relevant to the preferred option.

The Government itself is aware of such problems. Indeed, it commissioned a report on transport and the UK economy which considered it essential to include a great deal of analysis of decision making – the Eddington Report.

This report also criticised the adversarial nature of Inquiries and confirms the need for general reform:

‘There are a number of causes of unnecessary cost and delay, which have developed over many decades. These include: (i) lack of clarity about national policy, so that the public inquiry needs to determine the policy context for, and assess the basic case for, the development; (ii) the adversarial nature of the inquiry process, which often involves the duplication of oral and written evidence and a lack of focus on the key issues, (iii) the existence of a second, separate phase of decision-making (the Ministerial decision stage, following an inspector’s report), often examining issues that should have been covered at inquiry; (iv) a cumbersome process with overlapping statutory and formal processes, with different legislation for different modes and often different Ministers accountable for each; and finally (v) the scope for legal challenge from beginning to end.’

(Eddington Report, Summary Advice, Para 1.176)

This is very much in tune with the discontinuity between the webtag NATA process and the Public Inquiry process identified in the earlier examples in this report. In fact, Eddington’s basic structure for decision making is very similar to webtag. The four key ‘principles’ are:

1. ‘Start with a clear articulation of the policy objectives, and the transport outcomes required to deliver these objectives, focusing where relevant on the “whole journey” rather than particular stages or modes in a journey;
2. Consider the full range of policy options for meeting the policy objectives, including different modal options, and policies for making more efficient use of existing capacity as well as small and larger scale capacity enhancements and packages of policy measures;
3. Prioritise limited public resources on those policies that most cost-effectively deliver Government’s objectives, taking account of the full social, environmental and economic costs and benefits of policy options; and
4. Ensure the evidence base can support this process, providing information on the needs of users, current anticipated use and performance of the network, supporting option generation through modelling and appraisal of options, and evaluating impacts to inform future decision making’

(Eddington Report, Volume 4, Para 1.2)

Annex C

Responses to the NATA review consultation questions

Chapter 2: Analytical framework

The NATA Refresh is an opportunity to align better the analytical information needs of decision makers and the public with the latest policy priorities for transport and the government. To inform the consultation, the Department will progress demonstration material focusing on: integrating the mode-neutral perspective to stages of analysis, recognising that better use of the existing network will be an important option and progress some specific appraisal guidance to support innovation in meeting climate change challenges.

Response: The approach of undertaking work during the consultation is strongly supported. This report contains suggestions and options which could be tested within the work proposed here and we would be happy to work with the Department to achieve this.

Questions:

1. The need to ensure proportionality of appraisal effort is noted in NATA, but users suggest that in practice the burden appears to be on the excessive side. How might we support promoters and analysts so that appraisal is proportionate?
2. If there were a light touch appraisal, how should sufficient robustness be maintained?

Response to 1 & 2: Currently there is enormous effort put into detailed modelling, but this is often with a decreasing rate of return in terms of improved accuracy for specific proposals. Indeed, some models can become less able to replicate local conditions as they cover larger geographical areas. There are also problems with large equilibrium based models because they have several different stable states, each with different costs. Large models also become time consuming to run and difficult to fully check. The model for Mottram/Tintwhistle is a current example of this.

We suggest a clear hierarchy starting with the definition of the areas and types of journeys which are of concern. This would allow accurate surveys and data collection (still often overlooked). It is worth saying that too much is spent on modelling and not enough on data. Data should be multi modal, including walking and cycling.

At the next level, the compilation of land use data and predicted changes can be added to prepare a matrix of travel movements. Schemes and policies can be tested at this level, using different mode split assumptions and simple elasticities. This process has been used for strategic broad brush assessment in the past and is informative across a broad range of schemes.

Only if it is considered absolutely necessary should complex network based modelling be undertaken. Not only is it data hungry, it requires high levels of skill and is very difficult for anyone other than the designer to audit. It is possible to calibrate models to reproduce the present day flows and speeds (though both at the same time is challenging) while they contain serious flaws in the network definitions.

3. The Department and other bodies involved in strategic planning should consider wider dissemination of strategic analysis to provide the context for later stages in decision making. How should strategic appraisal tools be developed, balancing the right options being generated without unnecessarily analysing those that are unsuitable?

Response: The responses above are highly relevant to this and the following principle should also be followed. It is far better to assess a wide range of options using simpler appraisal tools but in an even handed way, than to put most of the available resources into doing one option at a very high level of detail. Given limited resources inclusiveness should be the priority. This is actually more in accord with the Green Book guidance and webtag, for example see Unit 1.1, para 1.4.3, (See Annex A).

“avoid leading to a particular outcome simply by virtue of the method or process adopted”

4. In the future, option generation is likely to be more complex, integrating for example small-scale and better use options. The range of alternatives considered, including some possibly rejected at an earlier stage, may be informative to decision making. How might this information be presented? The analytical framework should continue to improve the linkage with the value-for-money assessment. As analysis widens its scope, the evaluation of schemes should also correspondingly broaden. Further, the framework should allow an assessment of the impacts of regulatory or other non-infrastructure options so that it is neutral over each option.

Response: For reasons given in the main body of this report, the inclusion of tax revenues and the low value of carbon creates serious bias against schemes which involve “better use” in terms of lower vehicle kilometres. This applies to both freight and passenger and is a major obstacle. Detailed reforms are essential and options are set out earlier in this report.

Value for money is of course the key, but this should be related to policy achievement per pound. Implementation costs (capital and revenue) should be calculated in as accurate a manner as possible and put in the appraisal. However, as explored in this report, over emphasis on valuations derived from surveys for various social and environmental costs and benefits distorts the decision making process by making the actual changes more opaque, and by ignoring the policy goals of achieving basic standards. No-one would dream, for example, of valuing clean drinking water and then trading it off the cost of producing it.

The mixture of scheme elements is complex. The way in which models are constructed means that some packages, which are internally inconsistent, can be modelled and even given a BCR. For example, road pricing can be combined with road and public transport schemes, although this can also produce odd results (see the Shropshire TIF). Combining smarter travel with measures to speed up private car and lorry use is illogical and is unlikely to be successful. Again this issue is explored further in the main report.

In this context it is extremely important that the AST for different schemes and alternatives is prepared fairly and properly. This requires a good practice guide and training. The latter has to be widespread, because many different people are involved in filling in the AST. There should also be a separate practitioner providing an overview. The AST is also important in addressing Question 5 below.

5. The analytical framework used to assess transport interventions should explicitly recognise wider government objectives in the evidence provided, beyond the Department's economic, environmental and social ones. How should those elements which relate to broader objectives, such as housing or regional growth or the distributional impacts on the socially excluded, be presented?

Response: Before presenting them they have to be properly assessed. A key objective which goes missing is health, and distributional effects are hard to measure thanks to the use of the Sugden approach, which should be phased out. Travel is strongly correlated with income, so making it easier tends to prioritise the better off. There should be a far greater emphasis on measuring access between people and facilities, not mobility.

Overall, many ASTs have not been well executed, but they should provide the answer. They are capable of expressing the direction and scale of change within each defined objective. The level of accuracy will depend on the amount of research undertaken in the detailed appraisals. Thus in general terms a bus improvement will have a socially progressive effect -this can be calculated using NTS or, for greater accuracy, local data. It should be noted that modes such as car and rail, which have higher income users, can be strongly influenced by policies such as fare concessions or the use of car clubs. The issue then becomes

Chapter 3: Economy, accessibility and safety

The evidence provided on how a scheme impacts on the economy should take account of the reductions in public transport crowding. The location of the health sub- objective, currently in the environment objective, should be considered. The evidence base for and application of appraising the wider economic benefits (WEBs) of transport is still relatively new. This seeks to capture agglomeration impacts and the improvements to labour markets. There is a need to advance best practice and disseminate this. One of the early deliverables from this Refresh will be the development of advice on WEBs, communicating this, recognising its novelty and that innovative interventions are likely.

Response: This area is new but one of the best ways of understanding agglomeration (familiar to geographers and planners, but not quantified) is to link it with the idea of reducing the need to travel. This is critical to transport policy but also to agglomeration benefits. For example, it is the close proximity of businesses, minimising travel, which can produce what this report identifies as three benefits: synergy, competition, and capacity. In many cases, particularly the service sector, this will be related to the density of development and the concentration of activity within walking distances. It will be important not to confuse the extension of potential commuting distances (potential employees within a certain drive time) with agglomeration. Thus land use planning, including zoning, relationship to relevant non-commuter transport networks, and density, is the key factor. Modelling the impact or valuing it would be confusing and probably counter productive.

6. Over the Refresh, the extent to which the evidence for strategic decisions can be consistent with local or scheme specific evidence should be explored. How might the provision of more detail about the strategic analyses of economic, safety and accessibility impacts of transport policies be made helpful for project appraisal?

Response: It is surprising how often regional targets are ignored in scheme appraisal. For example, if the region has a greenhouse gas emissions reduction target (soon to be backed up by mandatory national targets), transport schemes should be contributing to achieving the transport share of that target. If they do not, this is a failure to achieve. Most ASTs record a “no change” or even a small increase in GHG emissions as a neutral or negligible impact. This point was argued at the recent Thames Gateway Bridge Inquiry, where the Inspector was quite clear that failing to achieve a clear objective should be recorded as such.

Chapter 4: Environmental appraisal and assessing housing impacts

The Department uses Defra’s new guidance on the shadow price of carbon to ensure that carbon is properly accounted for in the appraisal of transport policy. In addition, the Department should progress some specific appraisal guidance to support innovation in meeting climate change challenges. This partly reflects the importance of the issue, but also about ensuring NATA effectively supports delivery partners and transport professionals as they analyse innovative interventions. The Department should consider how to consolidate the extensive advice provided through WebTAG, Design Manual for Roads and Bridges and other areas on environmental impacts. A particular aspect is to ensure that environmental information provides a consistent picture at the various stages of scheme development.

Response: Consistency is supported, but the current way that carbon values are treated is considered in detail in the main report. There is a conceptual problem in valuing carbon at marginal cost, without distinguishing between the carbon reduction that is required to get to the desired level, and carbon reductions beyond the target. One way to approach this is to value all carbon above the annual reduction required at the DEFRA level. This would have the effect of raising the value of innovative solutions which actually reduced GHG – exactly what the Government is seeking. This should be further discussed during the consultation process. The alternative is to raise the value of carbon to the fuel tax level plus the carbon cost. This would compensate for some of the current bias but also needs further discussion and for the moment appears less attractive.

7. In providing decision makers with the evidence on environmental impacts there is always going to be a balance between taking appropriate account of the environmental impacts of transport interventions and the need to summarise evidence for decision makers alongside other impacts. Is the current balance between detailed assessment and summary appraisal information appropriate?

Response: Earlier responses cover the need for a more rational and even handed approach to detailed assessment across modes. In this instance, the proper completion of the AST should provide the best summary. We have already suggested that the standard of ASTs needs to be raised and this would assist in this area too.

8. What are the priority areas for extending the use of the monetary valuation of environmental impacts?

Response: For the reasons given in this report the monetary valuation of environmental impacts is not satisfactory at present and no extension should be contemplated until the current problems are addressed. Accurate measurement is

supported, but the attached valuations are flawed conceptually (see comments on policy, rights and standards) and depend on surveys of what people might be willing to pay. Even on the value of fatal accidents, this technique is incredibly difficult. In the UK case, two values of avoiding death were ignored (total survey 167 people) because they were too high. It may well be they were the only two who understood the question. Values were split between a large number in a lower valuation group and a smaller number in a high group. The pilot survey had already exposed the difficulty people had in understanding the issue.

The overall point is that basing “hard” numbers like a BCR on a mixture of real world estimates, such as buying a bus or building a road, with derived values which are far more speculative, is not prudent.

Overall, in better identifying the impact of new housing on transport schemes, appraisal tools should recognise the transport benefits and costs attributable to the residents of the new housing. Such information at a strategic and scheme level should also feed back into strategic decisions over housing. This would help in prioritising expenditure on transport schemes that are intended to support housing growth, e.g. the Community Infrastructure Fund. Further, the appraisal needs to develop analysis of the uncertainty around such development plans.

Response: This is frequently included in scheme appraisal through land use change and predicted transport generation. Consistency, particular in mode split predictions and the impact of smarter travel, should be pursued.

Chapter 5: Assumptions and scenarios

The Department’s release and update of common assumptions should be on a pre-announced, regular cycle alongside guidance releases. For ease of use, assumptions should be stored in a single place, where possible.

Response: Supported.

Chapter 6: Evidence from appraisal

9. Given there are a range of decision makers and the mass of evidence underlying appraisal is large and increasing, does the AST remain a useful format? How should the AST be augmented to be a more effective way of conveying the information to decision makers?

Response: The AST was one the most potentially useful elements of NATA but has been poorly implemented on the ground. It needs to be altered to be consistent with the objectives in the latest Sustainable Transport document (for example including health).

10. How do we summarise the results of strategic analysis?

Response: The ASTs for the alternative approaches considered should be presented, with the addition of a set of implications for local schemes. For example, the achievement of standards for street noise, of public transport accessibility, numbers of

walk trips, and of GHG emission reductions should be cascaded down. Schemes would have to contribute or be given a negative rating in the local AST. Packages would tend to fare better than isolated schemes rather than the opposite, as present. This is another area where government policy (towards integration) would be better supported by refreshing but, more importantly, implementation.

The Department is committed to further work to provide a detailed specification of the BCR, as PSA Delivery Agreement 5 will use this ratio as an indicator of the Department's success in seeing better value for money from its investment over time. It will be important to ensure that the appraisal continues to provide the information required for the calculation of the indicator.

Response: Essentially the AST should contain a comprehensive list of costs and benefits under each objective. This creates a benefit to cost ratio, for example for increased hours of exercise per pound. Improving a local park and the walking routes to it might score better than a bus priority scheme. This should be clear in the AST. Creating money values for this and then mixing them all together to provide one BCR is unrealistic and misleading.

Chapter 7: Building analytical capability

Developments to the Department's guidance should include presentational improvements as an important and on-going part of the overall approach.

Response: As might be guessed from earlier responses, the issue is one of training people to understand objectives led, multi criteria analysis, rather than thinking up new ways of presenting it. This is important for those who prepare reports for decision makers and for decision makers themselves. Experience of actually undertaking such training in the 1990s suggests that this need not be too much of a burden, probably at the level of courses running over a couple of days.

11. *From the range of techniques available to better communicate the appraisal advice, what should the Department consider?*

The Department should consider how editorial control of the various documents and 'knowledge' can be improved. In disseminating this material, the Department should consider how the use of the internet could be more effective both with regard to facilitating engagement and in being transparent with results.

Response: Advice on appraisal, including the strong common sense element in documents such as the early Traffic Appraisal Manual (TAM), has often been provided but insufficiently read or followed. Now that the internet is available, webtag offers some improvement but the Department could consider using the web more actively, for example through debates, video, and possibly appraisal blogs reliving the vicissitudes of everyday modelling folk. While not going quite as far as Bebo there needs to be greater recognition of the problems and how people are dealing with them. There is a slight problem in relation to the adversarial nature of major scheme Inquiries, but this should also be addressed.

12. Do you have any suggestions about the consultative change process we envisage to ensure that you can participate as we develop changes to the guidance?

Response: The commitment to produce more material and hold further discussions is entirely appropriate for such a wide ranging and complex subject. It should be run in close co-operation with the debates around the Sustainable Transport process next year. It will be appropriate to tackle some specific areas and where appropriate to use Departmental tools such as TUBA and the NTM to explore the implications of changes. The adoption of changes in relation to tax revenues and the Sugden approach are examples where such exploration would have exposed problems and allowed them to be properly addressed.

13. The document identifies some issues and we would appreciate your views on the priority – a ranking if appropriate – the Department should attach in progressing these. We recognise that all the areas will need some consideration, but what are your views on their importance?

Response: Taking due account of appraisal techniques, the items are scored from one to five stars – the more stars the higher the priority.

a. The Department should consider how best to support the continued interest in the reliability and wider economic benefits of transport improvements. The nature of these issues suggests the support would be wide, looking at data, modelling issues in the context of innovative transport solutions. The need to reconcile wider economic benefits and regeneration benefits is a particular area for guidance.

1 star some of this should be incorporated through land use data. It would be time consuming to produce a standardised system of measurement. Support research.

b. The importance of journey time-savings in the overall benefits of a scheme suggest some further information about their composition would be informative. Whether this is possible should be explored.

4 stars recognising the dominance of time savings in current appraisal and the need to understand their treatment across modes and who is gaining or losing is important.

c. The Department will seek, engaging with the industry, to improve data and methods regarding freight time savings.

1 star freight is very important, but this is far from the key issue. Guidance on a reasonable road freight elasticity would help – it is assumed to be low in the UK, unlike most other EU members. Leaving freight out of variable demand modelling leads to distortions. Five stars would be given to a broader freight study. Engagement with a wider range of experts would be useful.

d. The Department should consider how accessibility measures should be used in the NATA framework. In particular, should the information on the accessibility impacts in relation to local targets be presented, or should a more national approach be used? How should the accessibility impact be presented alongside the other impacts of interventions?

4 stars mapping techniques are particularly useful here, and there needs to be expansion within this area. Walking line of sight mapping is now well developed, as

are public transport accessibility and travel time contours. These are both informative and easy to understand.

e. The Department should consider how best to determine value for money within the transport appraisal framework using cost effectiveness analysis, in order to take account of economy-wide carbon and other environmental limits .

4 stars this report concludes that moving towards a measure of effectiveness per pound for all objectives individually should be one of the outcomes of this refresh.

f. The Department should develop desk-based analysis of the spatial aspects of environmental impacts. This can be used to facilitate strategic analysis, especially using GIS evidence, and support analysis of smaller schemes

3 stars some of this is quite well done already. Consistency and good practice would be useful.

g. The Department should investigate the extent to which transport's wider economic benefits can be associated with housing growth. The considerable change in land value due to the use of land for housing may – in part – reflect some benefits of transport enabling housing growth

2 stars this is a complex area where double counting is likely to be a problem. While academic research is supported, it is a higher priority to get other elements in the appraisal right.

h. While work to join up freight, rail and aviation forecasting of trip generation is continuing, the Department should in the short-term consider how to ensure that the modal interactions are adequately represented in some specific areas. This is needed at a strategic level, to incorporate into the trip generation common assumptions, such as TEMPRO.

5 stars the availability of a “demand management/sustainable” TEMPRO forecast would be very useful, given that many practitioners use TEMPRO as providing given inputs and have the utmost reluctance to alter them, especially in relation to smarter choices and mode switch.

i. The Department should consider defining common modelling scenarios to be used by those involved in strategic modelling and scheme level appraisal. These would recognise that some scenarios are policy determined. The evidence from alternative scenarios will need parallel tools to analyse uncertainty around scheme impacts.

5 stars but relatively straightforward to implement. For example the idea of using a “Do Minimum should be dropped. This would require the preparation of some alternatives. General guidelines on these can be produced, for example a Smart Growth land use approach with Smarter Choices policies. Clearly the problems described in this report under the “Cost Benefit Policy Paradox” would have to be addressed.

j. The Department's guidance should continue to be developed on scheme costs. Such work should make decision makers aware about the risks around costs and how estimates become more firm with time. Risks may be mitigated through the financing of schemes. The overlap between cost appraisal and finance issues should be considered.

3 stars the use of optimism bias has caused some thought to be applied to this issue already and what is needed is some review of how this worked in practice, leading to further refinement of the guidance. Blanket application needs to be avoided.

k. The Department should look at the evidence emerging from Congestion TIF and other evidence on assessing packages and then consider how this approach can be widened beyond city and regional networks.

4 stars essential to look at evidence

0 star TIF bid preparations have already shown some assessment problems and should not be rolled out yet. NATA itself needs to be reformed.

l. The Department should continue to develop distributional analysis. In which types of interventions or transport problems should the priorities for this be?

4 stars distributional problems should be identified – they are currently addressed by adopting the national equity rate for time savings, but this is not extended to a national rate across modes. This needs to be resolved as part of the analysis of time savings.

m. The Department's support for determining whether a transport model is fit-for-purpose may supplement the standards by recognising the staged nature of designing solutions to complex transport problems. Should this be part of a more general look at model validation?

1 star validation is important but there is an urgent need for greater understanding of the nature and limitations of models (across all modes). In particular the current models are very poor in relation to changing behaviour, since most of them are calibrated to existing behavioural responses. This issue should be addressed as a far higher priority.

n. Developments to the Department's guidance should be issued with appropriate support. Appraisal tools assessing reliability and productivity impacts are demanding analytically and the Department should consider using workshops, training and the provision of data to enable analysis in these areas.

1 to 5 stars given the earlier responses training is strongly supported. The professional bodies and other transport organisations should be engaged in this process. However it should not be focussed on assessing reliability and productivity while practitioners are still producing such inadequate ASTs.

p. The Department is considering the scope to which a range of social research techniques may provide useful data involving the participation of the public at different stages in the appraisal process and to assess the social impacts of schemes, starting in the areas of option generation and in issues around public acceptability of proposals.

1 star this is a very difficult area, involving different people's willingness to be involved, how articulate they are, how well supported they may be and what their personal agenda may be. Guidance on producing a range of alternatives, use of mediation techniques instead of adversarial inquiries, and trying to create the working atmosphere of the best EIPs should be prioritised.

Impact Assessment

The Impact Assessment identifying a broad range of benefits and costs for the proposals and issues raised in this consultation document is published separately at <http://www.dft.gov.uk/consultations/open/>. When responding to the consultation, please comment on the analysis of costs and benefits, giving supporting evidence wherever possible. Please also suggest any alternative methods for achieving the aims of the Refresh and highlight any possible unintended consequences and practical enforcement or implementation issues.

Response: Not yet available on website.

What will happen next?

Before the end of the consultation period, there will be workshops as the Department develops its transport strategy. This will include regional events targeting local delivery bodies and your views on the refresh of NATA would be welcome. Early in 2008, some materials specifically designed to aid engagement with the Refresh will be disseminated through the web. We also intend to organise a NATA Refresh conference. A summary of responses, including the next steps will be published by 1st July 2008 on the Department's web site. Paper copies will be available on request.

Response: Strongly support engagement, but smaller workshops focussing on some of the complex issues will also be needed. Large-scale conferences do not allow for a flow of debate on these difficult areas.

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