

1 Existing Assessment in JCS

- 1 Climate change/climatic factors were very clearly not assessed in the remitted JCS SA, as under the assessment rating columns for each of the three alternatives presented are clearly labelled with “N/A” against ENV 6, meaning either “not available” or “not applicable”.
- 2 As assessment of climatic factors was not “scoped out” of the SA assessment during the scoping phase, there was clearly an expectation that significant effects on climatic factors were possible, if not likely. This created a reasonable expectation that climatic factors would be assessed in the remitted JCS SA, rather than labelled as N/A.
- 3 Contrary to the Councils argument at the hearings yesterday, no “qualitative” assessment on carbon dioxide emissions from transport traffic was presented under ENV1. Climatic factors were very clearly not assessed under SA Objective ENV1. The assessment text makes no mention of climate change, carbon dioxide emissions or climatic factors, no their direct measurement or modelling. Regardless, the assessment text for ENV1 makes very clear that ‘it is not possible to differentiate between the alternatives in terms of “significant effects”’.
- 4 This lack of climatic factors and carbon dioxide assessment represents a legal failure to comply with Article 5 and Annex I of the EU SEA Directive (2001/42/EC) as shown in **Appendix A**. It also represents a legal failure to comply with UK legislation as presented within the Environmental Assessment of Plans and Programmes Regulation 2004, Section 12 and Schedule 2, as shown in **Appendix B**.

2 NATS

- 5 Contrary to the Councils claim, NATS cannot be used as conclusive evidence that growth in either of the NE sectors (Alternatives 1 and 2) will have lesser impacts in terms of traffic effect and carbon dioxide emissions for a number of reasons. Firstly, NATS is a transport plan and not a spatial plan. NATS did not at any point attempt to develop alternative transport proposals for the Norwich area based on the alternatives presented in the remitted JCS SA, other than NEGТ. This means that as transport proposals to facilitate growth were only developed for the NEGТ alternatives. However, no transport proposals to facilitate the levels growth outlined in Alternative 3 were developed. Therefore positive benefits from NATS would only occur for NEGТ, with no benefits accruing for Alternative 3, which leads to a biased and unbalanced starting point, if NATS was actually used as evidence for the remitted JCS SA.

- 6 Secondly, in rebuttal to the Councils' claim NATS provides the necessary evidence, it is worth noting that the NATS Implementation Plan SEA (February 2010) recorded negative effects in relation to the delivery of NATS and reducing emissions, meaning the assessment concluded that emissions would increase from the implementation of NATS. Therefore, stating that NATS provides the evidence to show that carbon dioxide emissions and/or traffic effects arising in the NEGT resulting from NATS are beneficial is factually incorrect.
- 7 In reality, the NATS Implementation Plan SEA shows that "NDR Package" (NDR plus complementary sustainable transport infrastructure, such as Bus Rapid Transit) proposal was assessed as negative, meaning the NDR package, focused on facilitating growth in the NEGT, would likely lead to an increase in carbon dioxide emissions, as shown in the NATS Implementation Plan SEA (see **Appendix C**). Therefore, NATS does not provide any evidence supporting the remitted JCS SA assessment for ENV1 or ENV6, as the Councils claim, but rather shows the opposite – that the proposed transport improvements for the NEGT alternatives (the NDR Package) are likely to increase carbon dioxide emissions.
- 8 Therefore, even if carbon/climatic effect had been assessed under ENV1, as the Councils claim, the assessment is contrary to the SEA on the NATS Implementation plan, which clearly shows that the NDR Package will increase emissions from transport.

3 BRT Delivery

- 9 Additionally, it is worth noting that, under ENV1 the core conclusion that growth in the NE would have fewer effects in traffic terms than Alternative 3 is based entirely on difference in delivery of Bus Rapid Transit (BRT). However, it is worth noting that, to our knowledge, the County Council have made no commitment to implement BRT in the NEGT. Although they claim it is tied in with the NDR and part of the wider NDR package, they did not request funding for BRT or any of the complementary sustainable transport improvements from central Government through the Major Scheme process.
- 10 Therefore, the delivery of BRT and other sustainable transport improvements in the NEGT is highly uncertain, and funding has to rely on other routes such as CIL. We challenge the ability of CIL and the LIPP to deliver on infrastructure delivery, particularly public transport interventions, elsewhere.
- 11 Furthermore, Norfolk County Council has a webpage within their wider website dedicated to BRT, outlining their plans for BRT in Norwich. Norfolk was awarded funding for BRT of £2.583 million to implement some aspects of BRT in Norwich. These include BRT routes along the A11 Corridor (the corridor running through the SW sector of Alternative 3) and Dereham Road BRT – neither of which go anywhere near the NE distribution options set out in Alternative 1 and Alternative 2.

- 12 The previous (suspending) hearings highlighted that there is a likely shortfall in the funding for the NDR itself, particularly from CIL. It therefore is likely that the County Council will find it extremely difficult to find the funding necessary to implement BRT from Norwich to the NEGTT as well, as CIL is likely to be oversubscribed and public funding has faced a serious of capital and revenue funding cuts in recent years. BRT was certainly not part of the funding bid to central Government through the NDR Major Scheme Business Case.
- 13 Therefore, it is quite clear that the County Council are only committed to BRT along the A11 corridor and Dereham Road corridor with any level of certainty. If the County Council were truly committed to BRT in the NEGTT, it seems rational that they would have applied for the funding to deliver it either through the NDR Major Scheme Business Case, but they did not.

4 Capacity for robust carbon footprinting

- 14 There is a very obvious modelling method available to the County Council to provide a quantitative assessment of the traffic effects of the different growth options presented in the remitted JCS SA. The Norwich traffic model can be used to identify changes in traffic movements/patterns, as shown in the current NDR consultation documents. These traffic figures can then very simply be input into the Department for Transport's 3.3.5 greenhouse gases spreadsheet and will calculate the carbon dioxide emissions arising from each different alternative assessed through the remitted JCS SA and conclusion can then be drawn as to which alternative minimise carbon dioxide emissions the most.
- 15 The County Council and their framework partners Mott MacDonald have extensive modelling resources and capabilities through the use of the Norwich traffic model, as has been demonstrated through the very long development process for the NDR over the years. Therefore, producing a quantitative assessment of the effects of the remitted JCS alternatives should be technically feasible and relatively straightforward, particularly as the growth alternatives have already been modelled for the current NDR consultation (as a result of part of the JCS being remitted following the legal challenge), so timing really could not be much more convenient for undertaking this exercise.
- 16 It is currently unknown how many other Council have use quantitative modelling of carbon dioxide emissions to assess growth distribution options. However, it can be safely assumed that most, if not all at least provided a qualitative assessment within the SA, unlike the remitted JCS SA which provided no assessment of carbon dioxide emissions at all, instead assessing it a "N/A". Evidence is provided in Appendix D and E of the Mayor's London Plan and traffic and travel modelling carried out for its Transport Strategy, and of targets and projections for transport CO2 emissions.

5 SEA Regulations

17 Regardless of other Councils actions, Norfolk County Council has the know-how and the wherewithal to provide a quantitative assessment of carbon dioxide emission in relations to the remitted JCS growth alternatives.

18 Therefore, in accordance with Part 3, Section 12(3) of the SEA Regulations the SA report should have included all of the information referred to in Schedule 2, including climatic factors, taking account of:

- (a) **current knowledge and methods of assessment** – the Councils have the technical ability and expertise to provide a quantitative assessment of the impacts on carbon dioxide emissions from the growth options ;
- (b) **the contents and level of detail in the plan or programme** - the level of detail of the plan is very high as most of the JCS is already adopted and the alternatives proposed show clearly the potential different growth locations and number of houses possible in very specific locations;
- (c) **the stage of the plan or programme in the decision-making process** – the majority of the JCS is adopted and the remitted JCS is submitted, so the stage of the plan in the decision-making process is very advanced, as the decision making process is theoretically over, with the remitted JCS now under examination.
- (d) **the extent to which certain matters are more appropriately assessed at different levels in that process in order to avoid duplication of the assessment** – the JCS preparation is the appropriate level in the decision making process to consider carbon dioxide emissions levels in relation to different growth options, as this is the level at which decisions on where growth will be allocated is made strategically. If assessment of carbon dioxide emissions were remitted to a different level, such as Area Action Planning, this stage would be too late to reduce carbon dioxide on a strategic level, as large scale growth would already have been broadly allocated, possibly to areas where carbon dioxide emissions are not minimised. No assessment has yet been provided in terms of carbon dioxide emissions from the alternative growth locations, so no duplication is possible.

6 Summary

19 In summary, climatic factors were not assessed within the remitted JCS SA. In particular, a quantitative assessment of carbon dioxide emission arising from transport for the alternatives should be provided, as it is within the Council capability to do. We maintain that this quantitative assessment should be overseen by an independently appointed transport professional, agreed by all parties. As it stands, the remitted JCS SA is unsound as it does not meet the legal requirements

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to consider and assess climatic factors of the alternatives presented, as required by the EU SEA Directive and SEA Regulations. Without this assessment, the remitted JCS is unsound and could be subject to a legal challenge.

7 Appendix A: EU SEA Directive 2001/42/EC

Article 5

Environmental report

1. Where an environmental assessment is required under Article 3(1), an environmental report shall be prepared in which the likely significant effects on the environment of implementing the plan or programme, and reasonable alternatives taking into account the objectives and the geographical scope of the plan or programme, are identified, described and evaluated. The information to be given for this purpose is referred to in Annex I.

2. The environmental report prepared pursuant to paragraph 1 shall include the information that may reasonably be required taking into account current knowledge and methods of assessment, the contents and level of detail in the plan or programme, its stage in the decision-making process and the extent to which certain matters are more appropriately assessed at different levels in that process in order to avoid duplication of the assessment.

3. Relevant information available on environmental effects of the plans and programmes and obtained at other levels of decision-making or through other Community legislation may be used for providing the information referred to in Annex I.

4. The authorities referred to in Article 6(3) shall be consulted when deciding on the scope and level of detail of the information which must be included in the environmental report.

ANNEX I

Information referred to in Article 5(1)

The information to be provided under Article 5(1), subject to Article 5(2) and (3), is the following:

(a) an outline of the contents, main objectives of the plan or programme and relationship with other relevant plans and programmes;

(b) the relevant aspects of the current state of the environment and the likely evolution thereof without implementation of the plan or programme;

- (c) the environmental characteristics of areas likely to be significantly affected;
 - (d) any existing environmental problems which are relevant to the plan or programme including, in particular, those relating to any areas of a particular environmental importance, such as areas designated pursuant to Directives 79/409/EEC and 92/43/EEC;
 - (e) the environmental protection objectives, established at international, Community or Member State level, which are relevant to the plan or programme and the way those objectives and any environmental considerations have been taken into account during its preparation;
 - (f) the likely significant effects(1) on the environment, including on issues such as biodiversity, population, human health, fauna, flora, soil, water, air, climatic factors, material assets, cultural heritage including architectural and archaeological heritage, landscape and the interrelationship between the above factors;
 - (g) the measures envisaged to prevent, reduce and as fully as possible offset any significant adverse effects on the environment of implementing the plan or programme;
 - (h) an outline of the reasons for selecting the alternatives dealt with, and a description of how the assessment was undertaken including any difficulties (such as technical deficiencies or lack of know-how) encountered in compiling the required information;
 - (i) a description of the measures envisaged concerning monitoring in accordance with Article 10;
 - (j) a non-technical summary of the information provided under the above headings.
- (1) These effects should include secondary, cumulative, synergistic, short, medium and long-term permanent and temporary, positive and negative effects

8 Appendix B: The Environmental Assessment of Plans and Programmes Regulations 2004 (No 1633)

Preparation of environmental report 12.

—(1) Where an environmental assessment is required by any provision of Part 2 of these Regulations, the responsible authority shall prepare, or secure the preparation of, an environmental report in accordance with paragraphs (2) and (3) of this regulation.

(2) The report shall identify, describe and evaluate the likely significant effects on the environment of—

(a) implementing the plan or programme; and

(b) reasonable alternatives taking into account the objectives and the geographical scope of the plan or programme.

(3) The report shall include such of the information referred to in Schedule 2 to these Regulations as may reasonably be required, taking account of—

(a) current knowledge and methods of assessment;

(b) the contents and level of detail in the plan or programme;

(c) the stage of the plan or programme in the decision-making process; and

(d) the extent to which certain matters are more appropriately assessed at different levels in that process in order to avoid duplication of the assessment.

SCHEDULE 2 Regulation 12(3)

INFORMATION FOR ENVIRONMENTAL REPORTS

1. An outline of the contents and main objectives of the plan or programme, and of its relationship with other relevant plans and programmes.

2. The relevant aspects of the current state of the environment and the likely evolution thereof without implementation of the plan or programme.

3. The environmental characteristics of areas likely to be significantly affected.

4. Any existing environmental problems which are relevant to the plan or programme including,

in particular, those relating to any areas of a particular environmental importance, such as areas

designated pursuant to Council Directive 79/409/EEC on the conservation of wild birds(a) and the

Habitats Directive.

5. The environmental protection objectives, established at international, Community or Member

State level, which are relevant to the plan or programme and the way those objectives and any

environmental considerations have been taken into account during its preparation.

6. The likely significant effects on the environment, including short, medium and long-term effects, permanent and temporary effects, positive and negative effects, and secondary, cumulative

and synergistic effects, on issues such as—

(a) biodiversity;

(b) population;

(c) human health;

- (d) fauna;
 - (e) flora;
 - (f) soil;
 - (g) water;
 - (h) air;
 - (i) climatic factors;
 - (j) material assets;
 - (k) cultural heritage, including architectural and archaeological heritage;
 - (l) landscape; and
 - (m) the inter-relationship between the issues referred to in sub-paragraphs (a) to (l).
- (a) O.J. No. L59, 8.3.1996, p.61.

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7. The measures envisaged to prevent, reduce and as fully as possible offset any significant adverse effects on the environment of implementing the plan or programme.

8. An outline of the reasons for selecting the alternatives dealt with, and a description of how the assessment was undertaken including any difficulties (such as technical deficiencies or lack of

know-how) encountered in compiling the required information.

9. A description of the measures envisaged concerning monitoring in accordance with regulation

10. A non-technical summary of the information provided under paragraphs 1 to 9.

9 Appendix C: NATS Implementation Plans SEA Assessment of NDR Package

Figure 2: Cumulative Assessment for each Package

SEA Objective	SEA Objectives												Cumulative Assessment
	1. To reduce emissions from transport	2. To improve air quality in line with the National Air Quality Strategy (NAQS)	3. To minimise noise, vibration and visual intrusion from transport	4. To improve accessibility and reduce social exclusion	5. Implement transport solutions that protect and enhance where feasible, open space	6. Implement transport solutions that protect and enhance where feasible, biodiversity including wildlife habitats and species, and geo-diversity	7. Implement transport solutions that protect and enhance where feasible, water resources	8. To maintain and enhance the character of the landscape/townscape and cultural heritage including architectural and archaeological heritage	9. Minimise the number and severity of road traffic accidents and maximise safety and security for everyone	10. To encourage use of sustainable transport modes such as public transport, walking and cycling as alternatives to the private car	11. Ensure transport infrastructure is designed to adapt to climate change effects such as flood risk and severe weather conditions	12. To maintain and improve the health of the whole population, promote healthy lifestyles and reduce health inequalities	
Evolution of Baseline	-	-	-	-	-	-	-	-	-	-	-	+	-
Overall, slightly negative impact on the SEA objectives. Significant negative impacts on water, due to the impacts of growth on the quality and availability of water. The sole positive impact is against health which is expected to improve over the 20 year projection.													
No NDR Package	+	+	0	+	0	0	0	0	0	+	0	+	0
Overall, neutral impact on the SEA objectives. No negative impacts on any objectives this package scores positively against five of the twelve objectives.													
Part NDR Package	-	+	0	++	--	-	-	--	+	+	0	+	0
Overall, neutral impact on the SEA objectives. Significant negative impacts against open space and landscape largely due to the NDR, which indicates mitigation is required if this package is implemented. However, there are significant positive impacts on accessibility and social exclusion.													
NDR Package	-	+	0	+	--	-	-	--	++	+	0	+	0
Overall, neutral impact on the SEA objectives. Significant negative impacts against open space and landscape largely due to the NDR, which indicates mitigation is required if this package is implemented. However, there are significant positive impacts safety and security.													

10 APPENDIX D: Example from London Mayor’s Transport Strategy of high-level carbon targets

This is from http://www.london.gov.uk/sites/default/files/MTS_Chapter_5_pt5.pdf which contains this diagram of CO2 emission reductions in London to 2025 as discussed with GNDP staff in autumn 2009.

Figure 61: Mid-range estimate of CO2 reduction impacts of transport policy areas by 2025

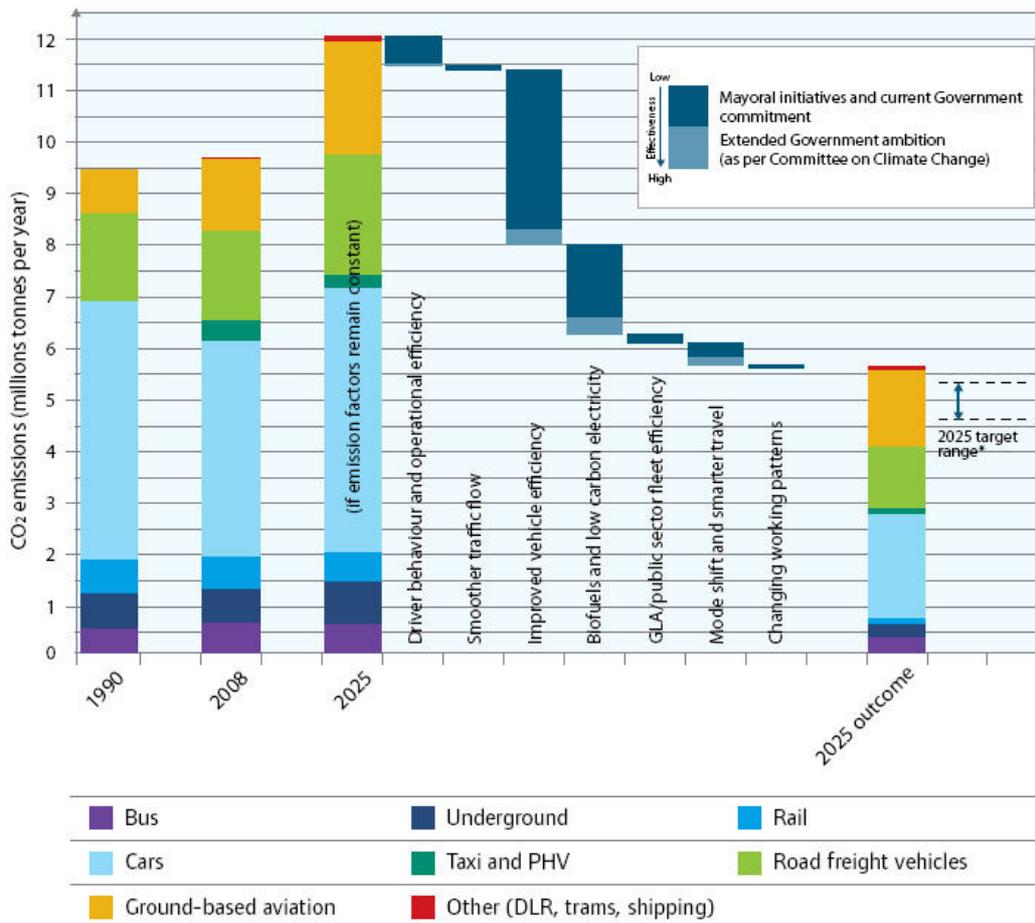
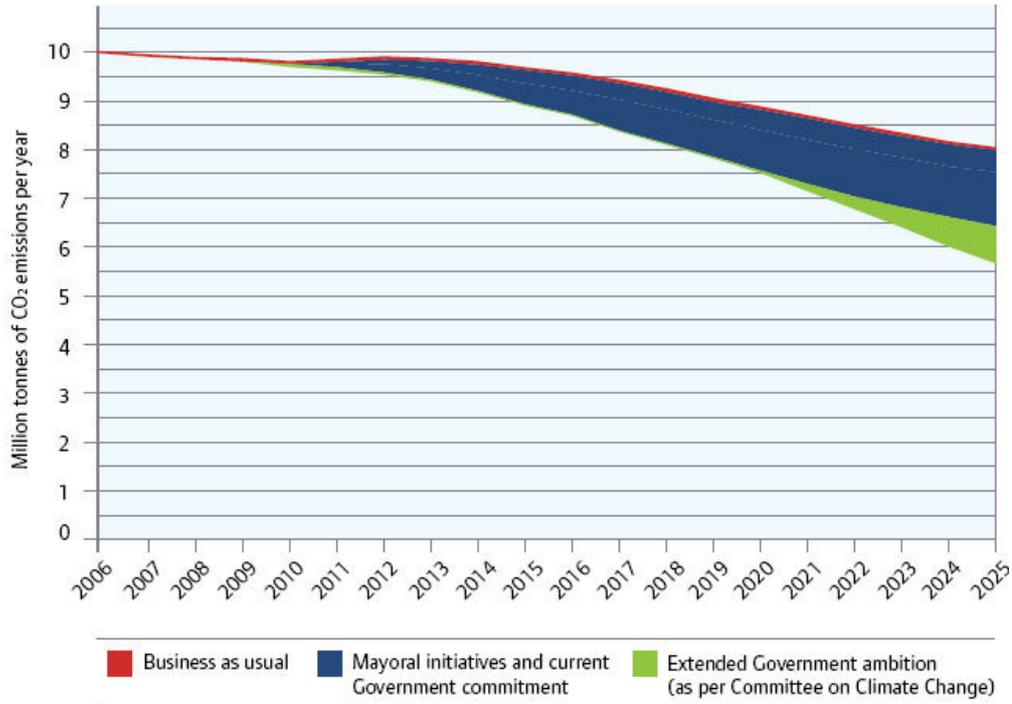


Figure 62: Projected transport sector CO₂ emissions to 2025



11 APPENDIX E: Pages from Mayors Transport Strategy: Integrated Impact Assessment Scoping Report



4 The Baseline for the IIA

Travel Report 2007 notes that for 2006 road traffic deaths were reduced from the baseline by 7 per cent, serious injuries by 42 per cent and slight injuries by 34 per cent.

- 4.6.3 Crime and anti-social behaviour on or near transport systems and in the public realm are not only a threat to the effective running of the transport system, but also discourage the use of transport by all people, with disadvantaged groups often being adversely affected. The mayor must have regard to the impact on crime and disorder in developing the Mayor's Transport Strategy.
- 4.6.4 The threat to the transport system from terrorist attack remains. TfL and its partners will continue to put in place and review effective measures to counter this threat and to deal with any consequent disruption to transport services.

Summary of Key Issues/Opportunities for the IIA Appraisal and MTS Strategy Development:

- 4.6.5 The key issues and opportunities identified are as follows:
- Reducing accidents and casualties on all transport modes including road safety (users, non-users and staff);
 - Tackling crime and fear of crime, signal crime (vandalism) and anti-social behaviour;
 - Addressing perceptions of personal security, in particular, for target groups such as women, Lesbian, Gay, Bisexual and Transgendered community (LGBT) and Black, Asian and Minority Ethnic (BAME) groups;
 - Ensuring appropriate levels of contingency planning and preparedness for major incidents; and
 - Using the design of infrastructure and vehicles, including the design of interchanges and public space in and around interchanges, in designing out crime.

4.7 Climate Change

- 4.7.1 London is responsible for approximately 8 per cent of the UK's total carbon dioxide (CO₂) emissions. Approximately 22 per cent of London's CO₂ emissions (excluding aviation) is due to ground-based transport. CO₂ emissions associated with transport have remained at the same level over recent years despite population and economic growth. This has been due to an integrated approach of traffic management policies, large-scale investment in public transport networks and technological advancements (Mayor's Climate Change Action Plan, 2007).
- 4.7.2 In the absence of an effective strategy it is possible that car kilometres in London could increase by 8 per cent by 2025 (Mayor's Climate Change Action Plan, 2007) and freight traffic increase by 30 per cent from current levels, resulting in an increase of approximately 25 per cent in the annual CO₂ emissions from ground-based transport.
- 4.7.3 **The IIA will involve the modelling of traffic and travel patterns (which will be undertaken by TfL) in a future do-minimum reference case (i.e. a future situation without the adoption of the new MTS). These findings will be used to determine the future emissions of CO₂ in the absence of the strategy as the IIA progresses.**

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exploring both inequalities and opportunities, challenging the Strategy to identify and contribute towards enhanced health and wellbeing through both direct and indirect application.

5.7 Safety and Security

- 5.7.1 The policies, plans and programmes and objectives reviewed demonstrate the importance of safety and security for staff and users of the transport system. There is a fundamental requirement to ensure physical safety from accidents on the roads and public transport system. TfL also has a legal duty under Section 17 of the Crime and Disorder Act 1988 to work with other agencies to address crime and anti-social behaviour. Crime and fear of crime, including apprehension about encountering anti-social behaviour while travelling, are major influences on travel choice behaviour, particularly for those who are vulnerable such as women, children and young people, ethnic minorities and lesbian, gay, bisexual and transgender groups. Security from theft and the risk of terrorist attack are also important aspects for the Strategy to consider in bringing forward proposals for managing both freight and passenger transport.
- 5.7.2 In appraising the sustainability of the MTS the Assessment Framework will have regard to the key aspects of safety and security, such as accident prevention, crime prevention, tackling fear of crime and apprehension, and security against terrorist or other illegal actions. The Assessment will pay due attention to the importance of perceptions of safety and security, recognising that this has an important influencing role in how people use and engage with the transport network. In this way this IIA will provide a means to check that the Strategy does contribute towards achieving not only a safe and secure transport system but also one that feels safe.

5.8 Climate Change

- 5.8.1 The policies, plans and programmes and objectives set out the urgency of dealing with climate change, both in terms of reducing the CO₂ emissions which cause it, mitigating its impacts and ensuring future proofing to protect against it. This needs to be addressed across all sectors/sources. Following the Stern Report the UK has established progressive targets for CO₂ reduction and it is the responsibility of all stakeholders to collectively work towards and even beyond these targets. The Mayor has endorsed the commitment to reduce London's CO₂ emissions by 60 per cent on 1990 levels by 2025. Transport is a key source of CO₂ emissions and is, thus, a key sector with respect to progressing carbon constrained policy, and indeed greater sustainability generally. The MTS should contribute towards more sustainable transport provision within London and provide a context for further engagement with stakeholders to achieve this collaboratively.
- 5.8.2 It is also necessary that future plans for transport in London have due regard to both mitigation of anticipated climatic change but also adaptation to anticipated or potential climatic change, manifested through changing patterns and more severe weather conditions.
- 5.8.3 In light of this, the Assessment Framework includes specific appraisal objectives in relation to carbon emissions from transport and future proofing which will be used to evaluate the performance of the emerging Strategy. These appraisal objectives will play an important

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role in developing MTS to take full account of transport-related climate change, and climate change mitigation and adaptation.

5.9 The Physical Environment and Public Realm

- 5.9.1 The physical environment covers a wide range of environments, from waterscapes to greenscapes. It is important that these valuable assets are protected and enhanced for the benefit of current and future generations. The policies, plans and programmes reviewed set out both the planning context and key principles of sustainable management which should help to achieve this objective. This approach has been used to inform the Strategy and the Assessment Framework. In achieving this objective, the Strategy will need to have regard to existing services, facilities and operations and also the planning and delivery of future infrastructure and services. It is also important to consider the interaction of the transport network with its surrounding physical environment. This includes the impacts of transport on street and landscape, designing out crime and also the role which the transport network plays in enabling access to key assets such as rivers, parks and open space.
- 5.9.2 It is also important to consider the likely future context for the physical environment, and in particular the potential impacts of climate change, and the opportunities for mitigation and adaptation. The Assessment Framework, therefore, establishes objectives in relation to the physical environment both under the specific heading of the Physical Environment and in other sections, such as Climate Change and Health and Wellbeing. The inter-relationships between these objectives and issues are critical to ensuring the Strategy maximises the benefits which can accrue from its delivery.

5.10 Summary

- 5.10.1 Some central points to emerge from the review are as follows:
- The context for the IIA is to provide an overarching, holistic approach to assessing the potential impacts of the Strategy and the contribution it can make to sustainability in the round. The suite of policies, plans and programmes explored within the review demonstrates the breadth of strategic aspirations and specific objectives which exist in and across specific components of sustainability such as climate change, safety and security, and health and wellbeing.
 - While the strategies have been explored under their primary headings, the inter-relationships between these policies, plans and programmes is critical to the delivery of sustainability and specifically, in this context, sustainable transport. The Assessment Framework equally notes objectives and questions under their primary headings but also explores the inter-relationships between these and how in conjunction or cumulatively, impacts can be maximised or minimised as appropriate.
 - The IIA draws upon the objectives outlined in the policies, plans and programmes to predict impacts that may be disproportionately felt by particular Equality Target Groups, noting the nature of such impacts and the particular Target Groups in question. In effect, the whole Assessment will be equality proofed to ensure that such considerations are at the forefront of the Assessment and not solely delivered through the specific objectives cited under the Equality section of the Assessment Framework.

References

- DfT (2007) – Regional Transport Statistics 2007
<http://www.dft.gov.uk/pgr/statistics/datatablespublications/regionaldata/rts/regtranstats2007>
- GLA (2008) - Information London <http://www.london.gov.uk/gla/publications/transport.jsp>
- ONS (2007) – Focus on London <http://www.statistics.gov.uk/focuson/london/>
- TfL (2007) London Travel Report 2007 <http://www.tfl.gov.uk/corporate/about-tfl/publications/1482.aspx>
- TfL (2009) London Travel Report 2008(unpublished)

8 Climate Change

Subject: Climate Change

Baseline Characteristics:

Greenhouse gas (GHG) emissions affect global warming and climate change. Carbon Dioxide (CO₂) is the largest and most important component of GHG with respect to climate change, being highly dependant on human use of fossil fuels.

CO₂ Emissions:

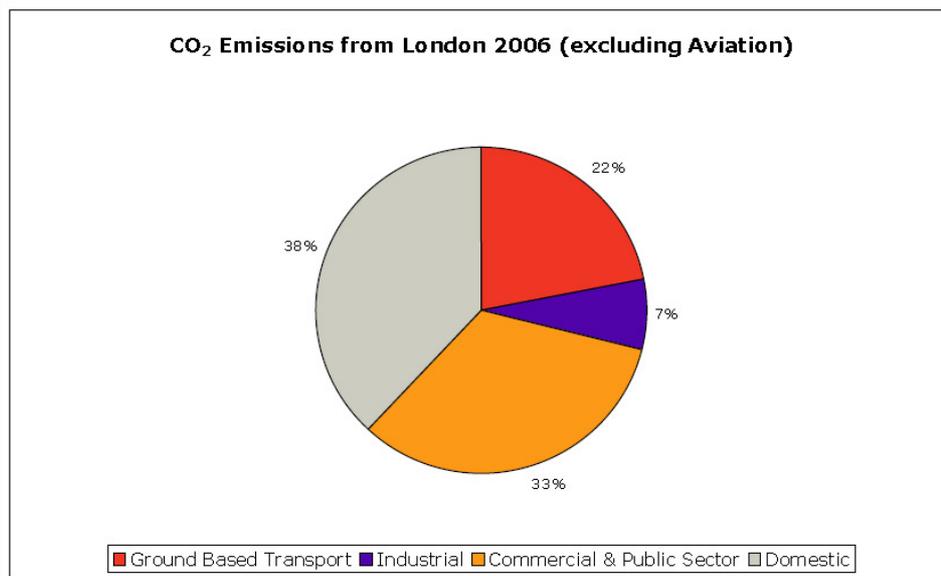
- London produces 8 per cent of the UK's total CO₂ emissions (Mayor of London 2007).
- Ground-based transport is responsible for 22 percent of London's total CO₂ emissions (excluding aviation) (see figure *CO₂ Emissions from London 2006 (excluding Aviation)*) (Mayor of London 2007).
- Based on 2006 figures of ground-based transport emissions in London, car and motorcycles trips are responsible for 49 per cent, road freight 23 per cent, National Rail 4 per cent, Underground 4 per cent, Taxi and Private Hire Vehicles 4 per cent, Buses 5 per cent, and landing, taking off and taxiing aircraft 11 per cent (see figure *CO₂ Emissions from Transport in London during 2006 by Mode*) (Mayor of London 2007).
- The principal TfL sources of CO₂ are the London bus and London Underground networks – in roughly equal measure and each emitting over 0.6 million tonnes of CO₂ per year. The next most significant sources are taxis and private hire vehicles – each responsible for about 0.3 million tonnes of CO₂ per year (see figure *Carbon dioxide emissions (tonnes) from transport-related sources under direct TfL control, 2007/08*) (TfL, 2009)
- Car-based modes typically emit up to twice the CO₂ per passenger kilometre as the public transport modes. Particularly notable are the values for domestic aviation – comparable per passenger kilometre to those from cars, but involving typically much higher distances (see Figure *Comparative emissions of carbon dioxide by mode of transport, 2007/08*) (TfL, 2009)
- Per capita, CO₂ emissions associated with transport in London are 45 per cent lower than the UK average (Mayor of London 2008).

- The Central London Congestion Charge has been in place since 2003. When the charge was introduced it led to a reduction of carbon emissions by 16 per cent within this zone, compared to pre-charging levels (Mayor of London 2007).
- A total of 27 million individual trips are made within London each day, leading to emissions of approximately 9.6 million tonnes of CO₂ per year (Mayor of London 2007).
- In London, the average car emits 178g of CO₂ per kilometre (Mayor of London 2007).

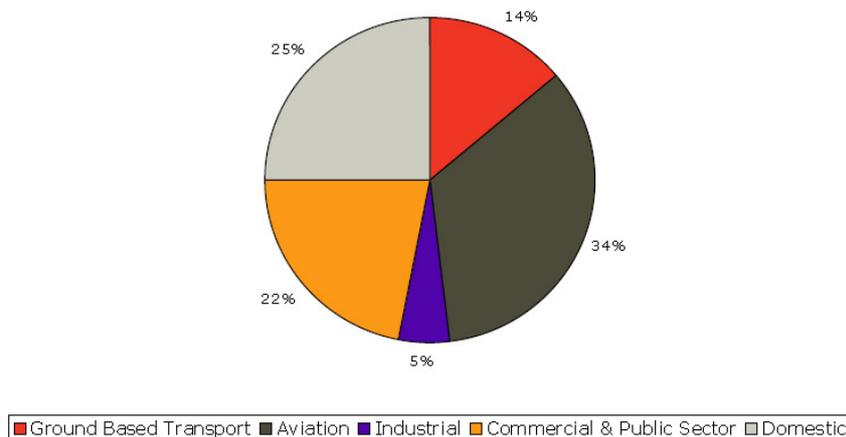
Future Trends:

- In order for London to limit its CO₂ emissions to 600 million tonnes between 2007 and 2025 London must reduce all CO₂ emissions by 4 per cent per annum (Mayor of London 2007).
- The projected economic and population growth forecasted for London will increase all of London's emissions by 15 percent, from 44 million tonnes of CO₂ to 51 million tonnes per year by 2025 (excluding aviation emissions) (Mayor of London 2007).
- By 2050, ambient air temperatures in London are expected to increase by 1.0 to 2.0°C in winter and 2.0 to 3.5°C in summer (London Climate Change Partnership 2005).

Figures / Tables



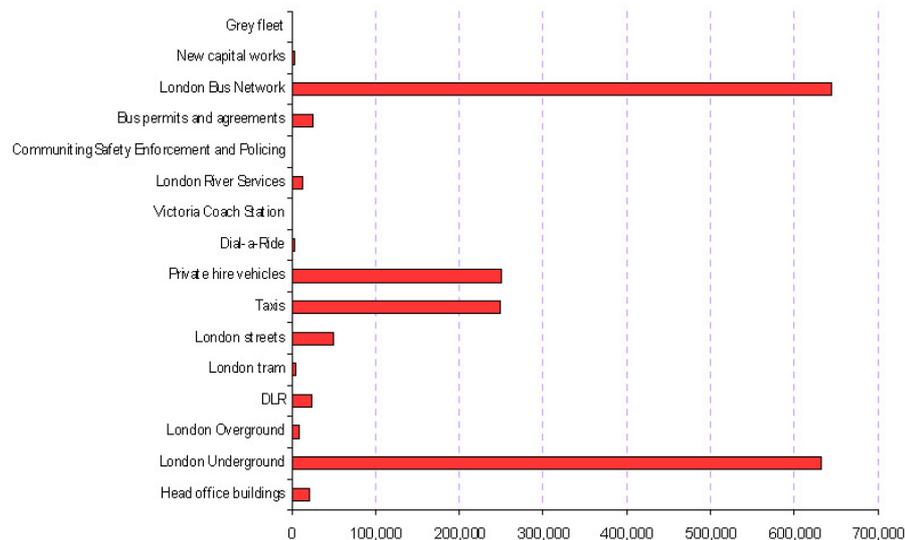
CO₂ Emissions from London 2006 (including Aviation)



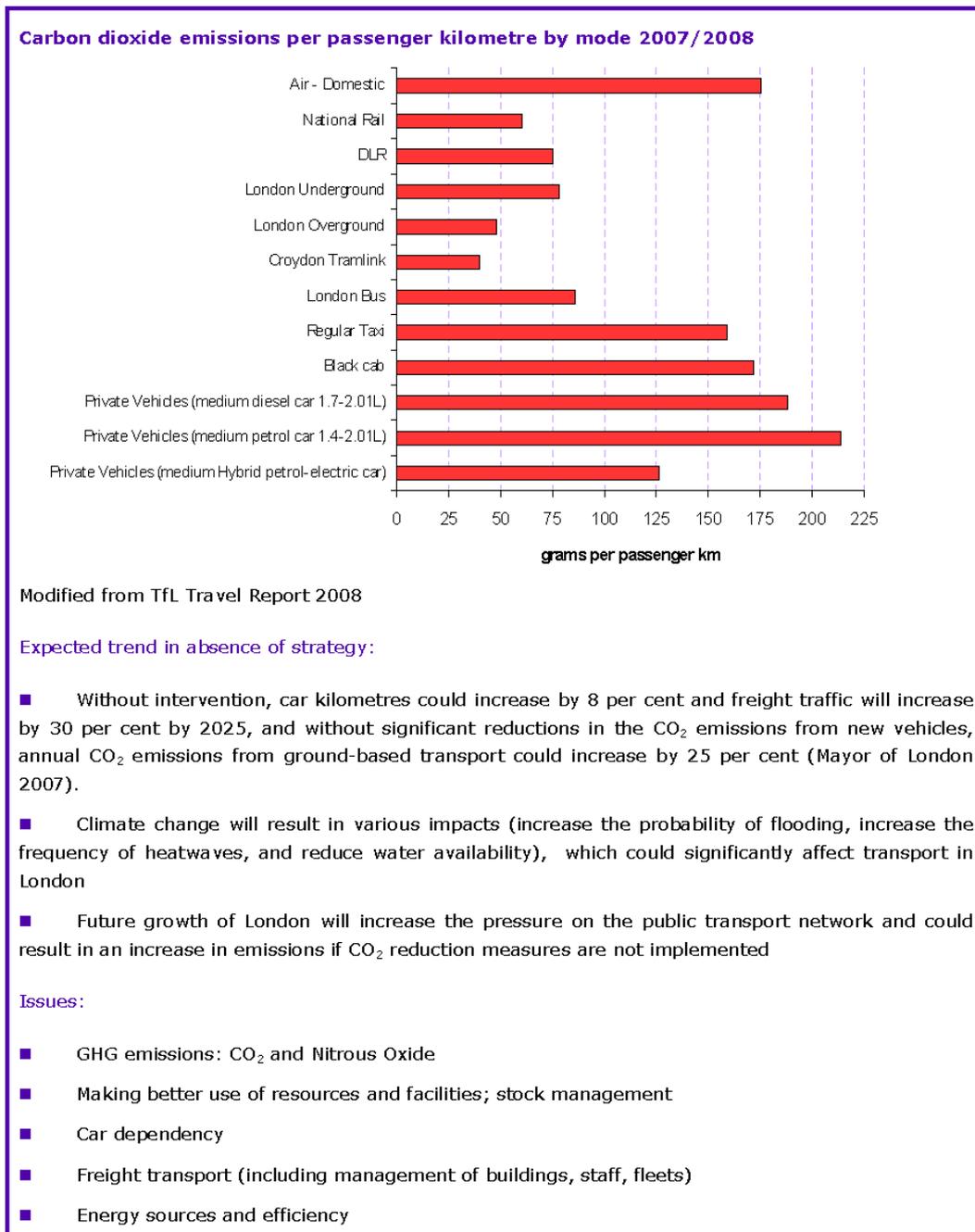
Modified from Climate Change Action Plan (Mayor of London) sourced from London Energy and CO₂ Emissions Inventory (LECI) (GLA)

Note: 2006 figures are based on latest available LECI data (for 2003) projected to 2006 based on projections for each sector.

Carbon dioxide emissions from TfL by mode 2007/2008



Modified from TfL London Travel Report 2008



- Security of supply of energy
- Tackling congestion
- Adaptation measures to mitigate impacts from climate change (e.g. flood risk, hotter temperatures etc) on transport network and services

Opportunities:

- Reduce carbon emissions from travel
- Promote more sustainable patterns of travel and increase modal share of 'greener' transport options
- Sustainable transport planning and changing people's travel patterns to reduce their sustainability footprint
- Use of communication to produce more sustainable outcomes (e.g. smarter travel)
- Efficiency of transport provision
- Adapted service facilitating greater access
- 'Making better use of' what we have
- Use of renewable energy in existing and new transport infrastructure and facilities; development of Environmental Technology Sector
- Low carbon fuel and technology
- Smarter driving, better planning, technological developments e.g. low-emission vehicles
- Transport providers' buildings, staff and fleet management
- Procurement
- A public transport service that can still run under different climatic conditions
- Reduce the need to travel / travel shorter distances

References

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