Expert and Government Review Comments on the IPCC WGIII AR5 Second Order Draft – Chapter 8

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
27153	8					Row 3 - see also Committee on Climate Change (2009), "Meeting the UK aviation target", Committee on Climate Change (2011) "Bionergy Review" - biofuels could provide up to around 10% of aviation fuel given scarce resources and competition from other (non-transport) sectors. Row 1 - see Committee on Climate Change (2012) "The 2050 Target - achieving an 80% reduction including emissions from international aviation and shipping" - EVs/PHEVs could be 100% of UK car fleet by 2050, coupled with decarbonised power system could reduce emissions from surface transport to close to zero. Row 10 - possible for significant modal shift but limited emissions reduction potential in aviation given majority of aviation emissions are from long-haul flights (see Committee on Climate Change (2009), "Meeting the UK aviation target").	Aviation potential considered in other section. References used
27138	8					What are last 3 columns (EIT, LAM, MAF)?	Accept. We will reword but the range is important.
31445	8					We do not understand the inset in this figure - how are the years indicated?	Accept. Caption amended
31446	8					This figure might be somewhat misleading due to the use of logarithmic scale on the x-axis. We suggest that if this kind of scale is to be used, more labels are included on the x-axis.	Accept. Will correct.
20103	8					Could be deleted without prejudice	Rejected - sets the scene for the chapter
20104	8					The use of logarythmic scale is useful to put all transport modes on a same graph, but can let people think for instance that passenger ferry and passenger air are equal ,wh ile they are not. I would not use such a scale	Acept - note added to caption to clarify.
34527	8					It is suggested to replace "the transport sector's GHG emissions could double by 2035" by "transport-related CO2 emissions are expected to increase 57 per cent worldwide in the period 2005-2030", considering the latter is quoted by UN on New Partnership Calls for Copenhagen Climate Agreement to Tackle Growing Transport Emissions in 2009 and this data is more credible. Moreover, in section 8.3.2.5 of chapter 8, it is stated that "GHG emissions from ships are projected to increase by 50% or more between 2008 and 2050 (IEA, 2010b)".	Accept- amended
34537	8					In the "Barriers" column of item 12 in table 8.8.1, the following is proposed to be added after "competitiveness.": "no specific policy or incentive strategy to encourage modal shift from high CO2 emission transport sub-sector to waterborne transport, espeically for freight movements". This is the reason that more and more freight movements used by road rather than ships, it is also mentioned in section 8.1 of chapter 8, i.e., "GHG emissions from the transport sector have more than doubled since 1971... Over three quarters of this increase has come from road vehicles", and "over the past few decades, air and road freight have increased their share of the market at the expense of rail and waterborne transport [8.4.2.2]".	Agree - these words are basically there. There are examples of specific public policy initiatives to promote a modal shift to waterborne transport e.g. EU Marco Polo / motorways of the sea initiative - UK government - freight facilities grant programme
25870	8					I could not find a definition of the term "light-duty vehicle" in the chapter, neither in the glossary. Please include it in one of these so it is clear which vehicles are included in these categories.	Accept - will add a footnote
31252	8					Left column, rows 5-9: I would delete the word "efficiency" because you are not talking about efficiency (in a strick sense of the meaning of the term, which is a ratio of output over input), you are talking about energy intensity. In the 2nd column - rephrase to refer to energy intensity. You refer to MJ/km as a "fuel economy", but this (a ratio of fuel energy use over distance) is inconsistent with the US practice of referring to mpg (a ratio of distance over fuel use) as "fuel economy". I would just say "50% reduction in energy intensity (MJ/km) ...". Similar wording changes are needed elsewhere. The heading for rows 5-10 could then just be "Energy intensity". The next heading (for rows 11-18) could just be "System infrastructure".	Accepted - table 8.6.1 will be entirely revised.

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31254	8					Is the given source something that the reader can access and check him or herself? Will information on how to do this be given? Same Q applies to subsequent figures.	At the time of publication of the WGIII report, the IAMC AR5 Database will be made publicly available in a single database. This is the main source of data for all graphs in section 8.9.
20787	8					This chapter contaions a lot of information. However, it is really difficult for readers to make out the key messages. This might be due to the very complex structure of this report. It might be too late to discuss the structure, but it would be worth revisiting.	Reject- structure was set by IPCC Plenary- but will try to provide clearer messages.
26342	8					There is an overlap in the scope and desciription of mitigation actions between this Chapter and Chapter 12: Human Settlements, Infrastructure and Spatial Planning. Both chapters describe the effects of urban form and infastructure on mobility and modal shift opportunites, the relationship between land use, population density and the chose of mode of transport and their effect on GHG emissions from land trasnport, describe oppprtunities offered by urban planning to guide infrastructure and transit oriented development to reduce transport-related GHG emissions, have sections citing information on costs of transport systems (long-distance rail, mass rapid transit, light rail and bus rapid transit infrastructure). Since both chapters exceed the allocated number of pages (with Chapter 8: Transport being 29 pages over the target) and the Technical Support Unit requests to indicate where the chapters can be shortened, one way of doing it could be to clarify the scopes of both chapters and focus Chapter 8: Transport on mitigation opportunities and costs associated with improvements of individual vehicles and transport systems such as public transit, whereas Chapter 12: Human Settlements, Infrastructure and Spatial Planning devote to mitigation opportunities offered by wider systemic improvements such as urban form and urban density, transit oriented development and integrated urban and transportation planning.	Accept- have strong links with Ch 12 in place so will try where feasible
33250	8					I don't understand why BEVs can reach 0 emissions but H2 FCV not?	Figure replaced, no longer a problem.
34423	8					This figure and/or the underlying data and explanatory text around it should be consistent with option-specific potentials under development for section 8.6.	Accept - will check but this from bottom up literature and is historic data- not potentials.
30117	8					Row 1, column Economic: "Terms of trade for oil-importing countries by increasing the costs of production." This makes no sense. It should say something like "Improves terms of trade for oil-importing countries by reducing the volume of oil imports, and potentially decreasing the costs of production if oil prices fall as a result."	Accepted - text rewritten
30118	8					Row 1, column Other: Could also mention possible problems associated with sustainable supply of biofuels, and/or link to section 8.7.3	Accept - amended
30119	8					Row 2 (Reduction of energy intensity), column Social: States "Under some circumstances, can increase travel costs for the consumer". How can this happen? Please explain? Is it due to possible higher production cost for more energy efficient vehicles? Even so, I would have thought that this would be outweighed by fuel cost savings.	Accepted - sentense deleted
30120	8					Row 3 (Modal shift etc). I would class health benefits from active travel as social not environmental, i.e. move to previous column. Also, noise reduction (from shift to walking and cycling) should be included in social column. Accidents: some studies suggest total accidents can increase if extra safety measures for cyclists are not introduced (Woodcock et al 2009)	Taken into account - Categories clarified. Health included into Environment to avoid repititons. Accepted - Point and reference added
30121	8					Row 4 (Journey avoidance): Should add noise reduction and accident reduction in Social column.	Taken into account

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30124	8					Row 2 (Reduction of energy intensity), column Environmental: perhaps you should mention the potential conflict that switching to diesel fuel can reduce carbon dioxide emissions but can increase other pollutants. A similar conflict between energy efficeincy and air quality is noted in section 8.7.3 (lines 25 and 26) but not reflected in the table.	Accept - Text amended
29542	8					Having found at least two press releases in the listed literature sources, we would like to ask authors to check references carefully, ensuring that the recently adopted procedures are fully applied. This includes the need to use non peer-reviewed sources only when no adequate peer-reviewed documents are available. In addition, the procedures specifies that "use of this literature brings with it an extra responsibility for the author teams to ensure the quality and validity of cited sources and information".	Accept- these were place holders whilst hunting out journals.
29199	8					What evidence is there for the suggested improvements in emissions from the various vehicle types in section FAQ 8.2. Some look optimistic, especially for HGV in a dense urban environment driving scenario as is normally found in Europe. Is this a worldwide target or what does it refer to? Perhaps this needs qualifying about what the scenarios are here.	Accept- referenced to 8.6
29196	8					In Figure 8.1.1, the 'Waterways' figure I believe should also include national shipping (i.e. between all UK ports) and not just river/canal traffic. Assume that 'Road' also includes off-road vehicles used in industries such as quarrying and mining vehicles but the precise definition needs checking against the original source and should be included.	Accept - amended
29197	8					Figure is difficult to read and the comment about two thirds of total energy demand are heat losses is unclear. Was it meant to convey that the efficiency of deriving kinetic energy from the fuel is 33%?	Accept- ig will be redrawn and caption changed
26639	8					Adding data of Japanese Shinkansen will be helpful, since its transport is highest in the high speed rails in the world.	Accept but section shortened
34905	8					Detail: Row "1. Biofuels": in col 2 it says up to 80%, in col 3 "more that 80%" - please sort out this contradiction	Accepted - table 8.6.1 will be entirely revised.
34898	8					Design: Symbolism of lightening is unclear. Please clarify or replace.	Will be redrawn
34899	8					Structure/Content: This section is far too long. Suggest to focus on options, move any discussion on costs, potentials, barriers, co-benefits and policies to respective sections. Establish a format of listing options that allows these to be easily referenced in following sections.	Reject- This is not consistent with the chapter outline and framework that we have developed for the Chapter. We feel the drivers and trends need to be explain to support other sections.
34903	8					Design: This figure is hard to grasp. Please redesign in such a way that it becomes clear that the Gasoline ICE @ 2007 is the reference case. Try to update to baseyear 2010, as this is the basis for most throughout the report.	Agree, will update figure
34904	8					Structure: Move this figure to the Costs & Potentials section as that is what it is about.	Figure replaced with new approach but cost figures will indeed be placed in 8.6.
34911	8					Detail: In the first set of three the colour of the third one is wrong (should be red instead of green)	The graph has been updated and hence this comment is no longer applicable.

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34912	8					Content/Design: This figure and the other ones that are similar should present the median value, too. Please also consider whether it would be of benefit to show the single data points as in figure 6.36 in order to be transparent about the amount of studies considered - this is particularly relevant if the number of studies is rather small.	The median value has been added to the graphs and rather than including individual data points we have added details on the number of scenarios included. Adding single data points would not help visualization given the very large number of observations.
32447	8					Policies – here the debate should include the need for new institutional and organisational structures so that action can take place, and this would include regulations, standards and effective enforcement mechanisms. The presentation is very much embedded in traditional views of transport as a separate sector – two questions here. Would it be better if transport was much more closely integrated with other sectors as it provides a service in the sense of linking together people, businesses and places? So should transport be linked to development (Ch12 more closely, or to the energy sector as one future might make more use of electricity, or to the agricultural secto through the biofuels debate, or to ICT as much of transport is now dependent both directly and indirectly on technologies. Secondly, should transport be seen explicitly as a service that is made up of a combination of different modes – most journeys use more than one mode of transport (both in the passenger and freight sectors). At present each mode is considered as being separate and in competition with each other – surely a better perspective would be to look at transport as providing the links between activities in a more sophisticated way?	This point has particular relevance to freight as many freight movements are inter-modal and as freight transport is now considered an integral part of logistics systems comprising other actitivies. There has been limited research, however, on emissions from the door-to-door movement of freight and how it can be reduced. More reference can be made in the chapter the WEF / Accenture study on the opportunities for decarbonising global logistics at a multi-modal / supply chain level.
20614	8					Cut by 45%.	Reject- but cuts made
33259	8					Why is modal shift partly lumped together with infrastructure and only comes up here and there in the other sections? Modal shift can be a main driver for reducing emissions and needs a dedicated section. Some examples for dedicated modal shift policies: Remove Tax incentives that are biased towards LDVs or aviation. fully attribute external costs to the mode that caused them. In regions with rather small countries, rail networks are often not well coordinated across borders, making international long-distance freight transport by rail complex, although it would be more economical and lead to lower emissions. In such cases (e.g., EU or south-east asia), political intervention could lead to improved cross-country rail usage. T	Agree It would be better to have separate modal split section - but may be constrained by the overall structure of the chapter
33260	8					One piece of information that I am missing in the text: city budget spending for LDVs (road construction/parking/…) is usually a factor of 10-100 higher than spending for cycling. Changing this can lead to substantial increases of the modal share of cycling.	Accept in part but no literature and very variaable.

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32438	8					note that almost all action and debate has concentrated on efficiency and to some extent modal split – but not on the means by which transport and travel can be reduced (shorter distances) or avoided (use of internet and teleconferencing etc). The second paragraph here illustrates this well – it only addresses mitigation as efficiency. There are ten pages on efficiency – and only 1 page on behavioural aspects – this again illustrates the overwhelming interest in only one part of the solutions. Little is said on modal shift or avoid strategies – the ASI framework is lost. The impression given is that technology has all the solutions and nothing is really said on the scale of change and the rate of innovation that is required to achieve change. For example, the case of hybrids is given – the Toyota Prius was launched in 1997 and it has taken 15 years for sales globally to reach 3 million. Even though it has been very successful, it takes time to make an impact on the market. The basic question in this section on trends is what has been achieved over the past ten years in the transport sector – and what might be the combined effect of all the innovations over the next ten or twenty years? At present the view given is very unclear – we know that the innovations are not additive, but there is no attempt to give a holistic view, given certain assumptions about take up of the technologies. This Section needs an authoritative summary, as the view at present is that achievement of major change is not a problem – some of this is attempted in Table 8.6.1, but even this table does not try to put the pieces together.	Substantial changes bave been made throughout the chapter to present a more balanced perspective on the needs, opportunites, and mitigation potentials of technology and behavorial factors. Section 8.2 has been revised along these lines as well.
20606	8					Cut by 45%.	Reject. Given the need to add additional materials o n hehavois and to provide adequate foudnation for the rest of the chapter, we are keeping the section at 4 pages.
34876	8					Trends & drivers. As the Data Task Group (DTG) has failed to provide you with data and figures on historic trends and drivers, we ask you to include these once provided by the DTG. Further, please try to further quantify and visualize the content of Section 8.2.	Reject - Section 8.1 includes historical trends and 8.2 is intended to focus on factors that will impact future emissions. We do not have data for future emisisons so we cannot proivide the suggested chart beyond what is already presented in 8.1.
27144	8					This paragraph would be better represented in a graph (bar chart).	Reject - We feel that this paragraph provides some important data and a graph would not present the key points better.
27146	8					This feels like a duplication of other parts of the chapter.	Duplications have been removed from the chapter but 8.2 is an important framing part of the chapter. The repeat of the same material in further section or duplicaiton from 8.1 has been removed.

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29198	8					In section 8.2.3, the point isn't made that increasing the cylinder temperature of an IC engine will improve engine efficiency and hence decrease CO2 per km travel. However, it will increase the production of NOx so there is an engineering compromise between engine efficiency, NOx emissions and post-combustion scrubbing technology development.	Reject - This is a very narrow perspective on trends and drivers as the systems optimzsaiton of engines, powerrsystems snd mobility are more complex then suggested in this comment. To the degree that increasing engine pressure is part of fugure vehicle technology, it is covered in section 8.3.
20607	8					Cut by 45%.	Section 8.1 includes historical trends and 8.2 is intended to focus on factors that will impact future emissions. We have edited and reduced redundancies to make this clearer to the reader.
34424	8					This section and section 8.6 on costs and potentials are by nature closely intertwined. A lot of the text in this section already addresses the cost and potentials of mitigation options in the buildings sector. I would move all quantitative information from this section to section 9.6 and use this section only to qualitatively describe the different types of mitigation options, incl. their mutual interdependencies, and their interaction with broader developments in the buildings/settlements and the energy sector (densification of cities, decarbonization of power). This would result in a slightly shortened section 8.3. Section 8.6 may, in turn, increase in size, though much of the material can be further synthesized.	Reject - We feel that this sentence provide an important introduction for the section.
29200	8					In the Waterborne transport section, mention should be made of technology being developed for the use of a bubble curtain to reduce drag.	Reject - We do not agree that this fact should be suppreessed from the report.
34426	8					The figures, underlying data and explanatory text should be consistent with the information on option-specific potentials under development for section 8.6.	We have added the suggested text
33247	8					say: "As with electricity, H2 can lead to 0 direct emissions, depending on the PE used"	This has been corrected.
29201	8					After 8.3.4.4 Biofuels, you may want to mention the possibility of synthesising hydrocarbon fuels from carbon dioxide and hydrogen from electrolysis (see above). This will be another way of getting both range of vehicles and zero emissions (if the electricity is made carbon free) and could compete with BEVs in many applications.	Reject - This is not a well accepted view and not strongly supported in the literature.
33245	8					I thought CO2 emissions per energy were quite different for LPG and CNG, with only CNG offering some real emission reductions. If this is the case, it should be stated clearly! Add	Taken into account, have updated estimates.
33249	8					I would think it is better to identify the changes at the different levels autobody and drive train, and clearly say that these reductions can be combined: you can reduce vehicle energy use by 20-40% through reducing weight/drag/rolling resistance etc. On top of this, you can then change the drive train and make it hybrid/PHEV/FCV/BEV, thereby reducing energy use by another 10-70% - but you still take advantage of the reductions you got from changing the rest of the car. Thus research into improving the auto body is a step that can be advantageous no matter which drive train you think will be most economical in the long term.	Unclear why this comment - this is the approach we use
34902	8					Content: "Comparative analysis" - please add to the title of what	Unclear meaning - you want a longer, more descriptive heading? Comparative Analysis seems sufficient.

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32440	8					Section 8.3.6 is excellent – a clear set of comment presented in a clear and concise manner.	Thank you.
32441	8					Systemic perspective – important to include this, both in terms of illustrating the high levels of investment in the infrastructure, and in terms of looking at the embedded energy and carbon in the system. There needs to be some mention of the capacity of the system, not just through the infrastructure, but the capacity of the vehicles that operate on the infrastructure (load factors and occupancy rates). This is where technology that controls the system can have a key role to play in optimising the use of capacity, through pricing, access restrictions, automation (vehicle platooning and gap controls), information and route guidance, slot allocation etc.	Agree. We will include a statement to this effect.
24698	8					This whole section provides many useful figures and concepts, essentially the value of modal shifts (e.g. Passenger aircraft to rail). It is these modal shifts, especially those available with current infrastructure, which should be emphasised. Suggest that modal shifts should be heavily emphasised in the executive summary, preferably on page 4, after line 21, and that this section should be kept in the event of shortening the chapter.	Reject. This is an important point representing changes in mobility,
20608	8					Cut by 45%.	Accept
33251	8					To me, the difference between 8.4.1 and 8.4.2 is not really clear. Why are indirect emissions from infrastructure discussed in 8.4.1.1 which should be a subsection of 8.4.1 "path dependencies"? And why does 8.4.1.1 also discuss the influence of infrastructure on direct emissions in the text below table 8.4.1, which is again discussed in 8.4.2? I think the "indirect emissions from infrastructure" should be discussed separately, and there should be a figure like 8.1.6 but with total direct+indirect emissions.	Accept
33252	8					State more explicitly: "sustainable infrastructure planning can have a substantial and long-term influence on transport demand and transport emissions"	Accept
26640	8					This section relates urban design and human behavior (e.g., if there's no public transport in the destination, people prefer car travel)	Reject. The proposed 15% is too general and fuel production is covered in another chapter.
26641	8					This should be most important discussion in this chapter. Unfortunatelly not revised from FOD. DIfficulty of rail freight is not rail capacity but scheduling. Algorythms for efficient transportation are proposed. (e.g. Sato, "A Formal Approach for Milk-run Transport Logistics" IEICE Trans. on Fundamentals E91-A (2008) pp. 3261-3268) In Japan Sagawa Express Co., is operating fast cargo train and basic technologies are proven. The missing piece is an actionl plan. Also some plan about freighter version of high speed rail is studied (e.g., by Yukitaka Ishii of former president JR-Kyushu is proposing).	Rails's share of the freight market is constrained by its capacity and scheduling constraints, as well as numerous other factors. There is little literature on the potential for and net environmental effects of fast railfreight services. Given the mix of commodities rail typically handles and their typical order lead times, these fast services are likely to be niche and likely to have limited effect on the overall carbon intensity of freight movement.
32442	8					Again important as it moves the debate beyond mitigation to adaptation – less work has been carried out here in the transport sector. But there are important issues relating to flooding of infrastructure and resilience – action is needed in terms of design standards, the robustness of systems, the shortening of supply chains, and contingency planning when the system fails. Potentially the costs are enormous and many are uninsurable, meaning that the state has to bear both the risk and the cost of remediation. With increased frequency and severity of events, this must feature much more highly in the debates about transport and climate – the transport system is key when a disaster occurs, yet it is the transport system that is also most vulnerable.	Taken into account. However, a more in depth debate on adaptation issues is covered in the WGII part of the report.

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20609	8					Cut by 45%.	Taken into account. Length slightly reduced.
32443	8					Costs and Potentials – this Section tries to respond to some of the comments made above – but it is very selective and unambitious in what it actual proposes. The messages are not clear as it is more of a list of what might be done rather than being an authoritative statement of the best opportunities. The tables here and later on in the Chapter should be clearly labelled so that they relate back to the relevant Sections	Accepted - section will be revised.
31251	8					This section is very disappointing, primarily because the is no integration of the net effect of all the emission reduction measures listed here in combination with the driving factors (which are pushing emissions up). Section 8.9 does present integrated results, but the results are completely opaque - the reader has absolutely no idea what combination of specific, actionable measures would lead to the results shown in Section 8.9. What is needed is some discussion of integrated results that is also completely transparent. I wrote a paper ("Global climate-oreinted transportation scenarios", Energy Policy 54, 87-103, 2013) that is both transparent and presents integrated results, and is cast in terms of the driving factors used in AR5 - it contains a very detailed accounting framework and a high level of representation of different technological, fuel choice and behavioural changes to show what would be the integrated of effect on both fossil fuel and biofuel or H2 demand of various sets of aggressive emission reduction measures. At the risk of perhaps sounding a bit self-serving, I think that the key results should be highlighted here or in Section 8.9 - they show what we would actually have to do if we really wanted to stabilize CO2 at ~ 450 ppmv or if we truly serious about limiting warming to < 2 K. I recommend including Fig 12a from my paper, which is a wedge-type diagram that shows the cumulative effect of successive policy measures, leading to zero transportation emissions worldwide by about 2070.	Accepted - section will be revised and a better integration with 8.3 will be presented. The new reference provided will be taken into consideration.
20610	8					Cut by 45%.	Accepted - section will be revised and reduced.
34425	8					The trends in unit cost of fuel production of the most relevant low-carbon fuels in comparison with conventional diesel and gasoline consumer cost ranges should be discussed and ideally presented in a figure.	Rejected - section will be revised and, because of space constrains, this information cannot be presented.
34429	8					I am not fully convinced that the structure of the section is a good one for the following reasons. Activity reduction almost always seems to include not only a total reduction in p-km traveled, but also a shifting between transport modes. Structural change, in turn, such as developing suburbs that are more suited for walking and mass-transit also leads to activity reduction in motorized transport etc. Maybe a graphical representation of mitigation options at different levels of aggregation would be helpful to include in section 8.3 already, This could then be refered to here and help restructuring the section.	Accepted - the structure of the section will be totally revised.
34430	8					This section would benefit, if figures could be included, e.g. showing the specific GHG emissions of different transport modes per p-t-km (the difference to the baseline,e.g. a gasoline car, would then be the specific technical mitigation potential) and the associated costs of GHG reduction. Much of the data in this section could feed into such a figure.	Accepted - this is exactly what is going to be shown in the revised version of 8.6.
27151	8					There is duplication here of section 8.7.2	Accepted - section will be revised.
32444	8					Co-Benefits – FAQ8.3: “remains challenging” – can this be rephrased to “still needs measurement.” Generally, this Section on the co-benefits is clear, but too negative, as it is the carbon reduction combined with these other factors that make the most compelling case for change. So this should have a strong positive message – and perhaps include a reference to quality of life – this is central to the Jan Gehl thinking.	Accepted but needs to be balanced
20611	8					Cut by 45%.	Reject but been cut

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34879	8					Co-benefits & opportunities. In Section 8.7 the usage of “opportunity” is not clear. It is regularly used synonymous to “co-benefit”. Please use “opportunity” meaning “situation favorable for a certain mitigation option”. When you are referring to “risk tradeoffs” you should rather refer to “risks” as “risk tradeoffs” refer to opposed risks being associated with a certain option. Further, please use “social acceptability” instead of the inadequate term “public perception”.	Accept
32445	8					Barriers and Opportunities – Again it is difficult to get the main messages from the information provided, but the Sections on finance and the institutional, cultural and legal frameworks are well presented. It is here that the decoupling arguments might be made more strongly, and also the need to package policies in mutually supporting ways so that real changes can take place. Too often the thinking is still constrained by relatively simple views that behaviour can be changed by simply altering the price. This is not true, as behaviour is far more complex and substantial change requires a combination of policy interventions to be effective, including engagement and debate about why change is necessary – this is true at all levels, and it relates to governments, businesses and people. The important role of regulation and standards seems to be missing, and the discussions with industry to set longer term legally binding targets so that there is clarity on long term objectives.	Agree - Decouplng is now a much bigger part of the whole chapter. Regulation is clearly shown in the Table.
20612	8					Cut by 45%.	Disagree - 3 pages
34881	8					Content: It is not clear which part of this section refers to developing countries only and which is general or industrialized country specific. The section is located in the section on barriers and opportunities - I question whether it belongs here! If this is about lack of finance being a barrier then this should be framed, if it is about how financing can overcome barrieres then this should be moved to the policy section. If it means to outline that development programs provide opportunities to implement low-carbon transport, then it needs to be phrased differently, as now it argues that there are not many opportunities. With this section moved in the policy section financing options should refer to previously mentioned barriers and how they can overcome these. General points on financial aid for developing countries should in my view be possibly placed - depending on the specific content - in the section on sustainable development.	Disagree - Finance section has to be done here
32446	8					Sector Implications – this Section gives some indication on the potential scale of increase in transport related carbon in 2100 – perhaps these figures ought to be placed at the beginning to illustrate the scale of the problem – certainly mention should be made in the Executive Summary. The 3+ increase (7 GtCO2e to 22 GtCO2e) is huge. Again, can there be more clarity given on where the potentially big contributions can come from either through individual policies or more likely through combinations of policies – and the possibilities for synergies or positive trigger effects that might have snowball effects. The text is good on possible transformations, but there needs to be much stronger coherence to the storyline and a focus of where action should be directed to achieve the greatest reduction in carbon.	Noted. Suggestions are good text will be revised and suggestion incorporated. However, the section cannot be moved from where is placed in the report.
31253	8					The results in this section are completely opaque, as there is no indication of what specific combinations of actionable policy measures would be needed to achieve the various emission reductions shown. There is also no obvious connection between the results shown here and the list of measures in Table 8.6.1. This could be remedied by including Fig. 12a from my paper ("Global climate-oreinted transportation scenarios", Energy Policy 54, 87-103, 2013), which is a wedge-type diagram showing the cumulative effect of implementing successive packages of measures.	Accepted. This problem is being recognized and the section is now linking better 8.6 with cost and potentials this section and the next 8.10 on policies.
20613	8					Cut by 45%.	Not sure what is the indication or suggestion here.
34878	8					Uncertainty & pathways. With respect to scenarios you regularly write about “uncertainty” while what the ranges actually encode are mostly the diversity of possible pathways.	Uncertainty will be linked to its meaning as explained in Chapter 6.

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34909	8					Throughout this section it needs to be specified which mitigation category is referred to.	Text is reviewed suggestion accepted.
34910	8					The entire section is written as if presenting facts, but it is actually about presenting scenarios outcomes. This needs to be reflected in the language used.	Accepted. Text is checked for consistensy.
33258	8					I am missing some quantitative comparison of emission reductions from bottom-up and top-down studies.	Good suggestion - orders of magnitud comparison can be commented in text.
34884	8					Content/structure: This section needs to be fully rewritten as it is lacks to provide information of relevance for the scenario-sector nexus and as it is in parts incomprehensible. As the intent of Section 8.9 (and resp. sections in other chapters) is to link more general systemic model outcomes with sectoral studies, I suggest (as I did previously) to merge Section 8.9.1 and 8.9.2. This section (i.e. what will become of this section in Section 8.9) should systematically assess bottom-up scenarios and other studies on the transport sector and put these in context with what comes out of the scenario database (for examples see Chpater 9 Figures 9.17, 9.19, 9.23). The group of authors working on the Scenario-Sector-Nexus has explored and is further exploring options of how to link bottom-up and top-down analysis with currently a number of ideas in the room. This will be further discussed at the SIE-4 meeting right in advance of LAM4. In my view a core task of this section should be to pick up from the discussion of options in the cost&potential section and to link these to the overall picture, outlining which options are essentially required for which different strategies to meet specific mitigation goals. This should also include pointing out deadlock options, i.e. options that are not able to contribute significantly to an overall sectoral mitigation goal.	Section is being fully re-written. New Figures are being produced after discussion in SIE-4.
34921	8					It is absolutely unclear what the title of this section means or refers to - the term "possibilities" is not adequate	Text is reviewed suggestion accepted.
34923	8					There is a policy section to this chapter. That is where policies should be discussed.	Text is reviewed suggestion accepted.
34930	8					This section needs to be completely rewritten, please see detailed comments.	Section is being fully re-written.
34933	8					Do not discuss policies here. There was an agreement between sectoral chapters to discuss policies in the policy section.	Section is being fully re-written.
34858	8					Content/Structure: Please consider changing order of paragraphs, placing the 2nd after the 6th. This will FIRST name the trends, drivers and challenges and only THEN detail the assessment outcome of the feasibility to meet certain goals GIVEN the previously listed challenges.	Accept - assuming it still meets the guidelines
24037	8					contrails and cirrus clouds from aviation are completely missing in the Executive Summary	Reject- too detailed
35350	8	0				D. Dimitriu, L. Dobbie, V. Galotti, A. Lieuwen, S. Nakao, D. Raper, H. Somerville, R.L. Wayson, S. Webb (1999). Aviation and the Global Atmosphere; Chapter 8: “Air Transport Operations and Relations to Emissions” , Intergovernmental Panel on Climate Change Special Report, Cambridge University Press, Cambridge, 271-291.	Useful ref
35351	8	0				Macintosh, Andrew and Downie, Christian (2008). Aviation and Climate Change: Can the airline Industry Continue to grow in a Carbon –constrained economy? Australian Journal of Environmental Management, Vol. 15, No.4. Dec 2008: 253-265.	Useful ref
35352	8	0				Smith , Inga J. , Craig J. ,Rodger (2009). Carbon emission offsets for aviation-generated emissions due to international travel to and from New Zealand; Energy Policy; Volume 37, Issue 9; September 2009; 3438–3447; Available at: http://dx.doi.org/10.1016/j.enpol.2008.10.046.	Useful ref
30916	8	0				The chapter does not include references to operating in cold climate conditions (e.g., northern hemisphere driving conditions), which are different than equatorial conditions, and subsequently can impact GHG intensities significantly.	Accept - will try and include under regional deifferences if space available
19989	8	0				There are much less tables/figures than AR4. ASIF analysis framework makes this chapter focus more on discuss mitigation technology, instead of mitigation policies.	Accept.Balance needed

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
29954	8	0				The transport chapter needs, in my view, a much clearer presentation of the climate impacts of the various transport sectors and their contributions to total man made climate change (on long and short timescales). There are many studies in the literature that could form the basis for this.	Accept- incuded - and in Ch 5
33520	8	0				Overall chapter 8: far too little room is given to behavioural change and climate governance in comparison to technical discussions. I also miss a discussion of the vast differences in individual contributions to mobility, see e.g. Gössling, S., Ceron, J.-P., Dubois, G., and Hall, C.M. 2009. Hypermobile travellers. In Gössling, S. and Upham, P. (eds) Climate Change and Aviation. Earthscan, pp. 131-149.	Accept Behavioural change being expanded.
24659	8	0				Suggested reference: the Australian 'energy efficiency exchange' website. Citation - Australian Government Department of Resources, Energy and Tourism (2013). Energy Efficiency Exchange website. URL: www.eex.gov.au The Energy Efficiency Exchange is a joint initiative of the Australian, state and territory governments administered by the Department of Resources, Energy and Tourism. It aims to support the development and implementation of energy management and energy efficiency strategies by providing quality information from respected national and international sources in one location. It includes a range of recently researched and thoroughly referenced material looking at significant energy efficiency potential. In many areas, it seems to go beyond existing resources in this chapter in identifying innovative mitigation/energy efficiency strategies.	Thanks Will see if the En effic refs fit with text.
24660	8	0				Mitigation policies for transport and related investment decisions should also consider the costs of providing infrastructure to cater for widely dispersed road vehicles that rely upon a rapidly declining resource in crude oil. Should crude oil become prohibitively expensive it will be much more difficult to repower these vehicles (e.g. with natural gas) than it would be to repower a smaller number of trains. Rail transport can already function effectively with electric power, which can be generated by a variety of sources. While opinions on when peak oil occurs vary, a number of sources including the IEA place peak oil before 2050 and indicate significant price rises. Such energy security considerations may be relevant given that the document is looking at the period to 2050 and the increase in road transport energy consumption in figure 8.1.1 continues. Suggest that road constructions have long timelines and fuel availability should be a consideration for the IPCC. Citation: World Business Council on Sustainable Development, (2010) Vision 2050: The new agenda for business, WBCSD, p.3	Accept - covered in 8.4 and ch 12
24661	8	0				Oil price is not given much emphasis in this chapter, even though oil prices are one of the strongest economic drivers of transport costs. The oil price increases of the last decade raised the cost of gasoline by around 60c/L. That is equivalent to a $240/tCO2e carbon price. The future is not expected to be any different - that is, the potential range of movement in future oil prices is far greater than the range of movement in future carbon prices in terms of the impact on retail prices of petroleum products. Current language on oil prices (e.g. 'could shape' p8 line 11-14) and the general absence of discussion on oil prices through the chapter may be misinterpreted by readers as the authors placing oil prices as a relatively unimportant driver. Suggest that this chapter could have a stronger emphasis on the role of oil prices as the strongest economic driver of change, particularly (but expanding on) the current discussion on p.8 lines 11-14.	Accept - oil price also covered in Ch 7
21915	8	0				Would be good to mention the point that aviation is much more limited in terms of technological opportunities for mitigation than all other modes of transport in the SPM	Accept

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
29909	8	0				The SOD of chapter 8 has considerably developed and improved and is much more coherent than the FOD. Some comments and suggestions remain. Throughout the whole chapter there is a strong emphasis on infrastructure and urban form as driver of mobility and traffic demand. However, this emphasis seems to be biased in the sense that1 changing the urban form (of existing urban structures) is very costly and time consuming and should not dominate short-term mitigation options such for instance pricing and regulatory policies. So the suggestion is to elaborate on the hierarchy of transport mitigation options in terms of feasibility, time frames and costs and differentiate more the geographical regions to which these concepts apply (this comment is not meant as a negation of the relevance of structural issues). In contrast to the structural emphasis, behavioural aspects of transport mitigation options are assessed in a rather compact way (only about 1.5 pages (8.3.6)). A more balanced view would be appreciated, e.g. putting a higher emphasis on travel/demand behavior and the relevant determinants (e.g. income and prices) as drivers of change. There is indeed much more literature on behavioural aspects of transport demand than cited in the chapter (e.g. Faber et al., 2012, Behavioural Climate Change Mitigation, Options and Their Appropriate Inclusion in Quantitative Longer Term Policy Scenarios, EEA, 2013, Achieving energy efficiency through behaviour change: what does it take? to mention a few). What is missing in the chapter is the transport-economy nexus, i.e. the fact that transport (especially the production of vehicles, the provision of transport services and the construction of transport infrastructure) – constitutes an important economic factor. Worldwide, industries related to transport employ millions of workers, have a significant contribution to GDP and international trade and are involved in manifold research and development activities. The objective should thus be to turn this whole sector towards becoming carbon and energy efficient and to highlight the opportunities for employment and economic growth. Finally it is not clear why the section 'Sectoral policies' follows the section 'Sectoral implication of transformation pathways and sustainable development' and not vice versa. As 'Barriers and opportunities (8.8)' can be enhanced or overcome by adequate policies section 8.10 could be a natural successor to section 8.8.	Accept: behaviour- being improved. Industry comment added. But reject in part as Chapter structure set by IPCC plenary.
33224	8	0				For efficiency improvements/intensity reductions, using percentage values makes it more difficult to correctly assess the importance of strong and small reductions. Maybe consider the phrase "reduced by a factor of 10" instead of "90% reduction"	Reject. % commonly used in literature
33225	8	0				The chapter focusses too much on the technological options, and not enough on the modal shift/activity reduction through infrastructure planning / land use policies / less mobility-incentivizing policies / life styles. It should point clearly to the fact that modal switching can have much higher effects than improving technologies in the next decades - going from trucks to rail decreases emissions by a factor of 10-20 (90-95% reductions), which is much stronger than improving truck efficiencies and maybe reaching reductions of 20-40%. You somehow mix this in with the infrastructure chapter, but it should be given more prominence.	Accept - being addressed in revisions - but needs reference
33226	8	0				there are substantial redundencies in the chapter, and information is not always presented in the most fitting section	Accept- revised
24507	8	0				Overall the Chapter offers a thorough review of the literature, and is a significant step forward compared to earlier work by the IPCC, which focused too much on technological solutions. The use of the A-S-I-F scheme and of the A-S-I approach is most welcome and reflects the growing international consensus on mitigation in the transport sector.	Accept- thanks
24508	8	0				The point that climate change mitigation is a co-benefit is sustainable transport is made explicit only once (8.7.4) and implicitly at several other places in the beginning – would be good to be more consistent	Accept - will consider in the revision

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
24509	8	0				There is a general lack of developing country/emerging economies perspective, although there is clear evidence that much of the future growth in energy consumption and emissions will occur in those regions. An example: The massive growth in two/three-wheeler fleets is barely adressed.	Accept- being addressed throughout chapter
24511	8	0				The 'transport system' is not very well explained, and many terms (e.g. 'equity')are not defined/explained	Reject - equity should be in glossary
36907	8	0				If a Table extends beyond one page, the column headings should be shown on each page. This would make it easier for the reader to digest the material.	Not sure which table but graphic design will do the task
36908	8	0				If the Chapter must be shortened, the following are suggested in priority order: -eliminate the FAQs. They serve no purpose and seem out of place; -eliminate Section 8.5. While this Section has valuable information and insights, it seems out of place and might be better located in an adaptation chapter; -eliminate or reduce Section 8.9, especially 8.9.1 and 8.9.2. The discussion shows a relatively high degree of uncertainty and is duplicated in earlier Sections; - eliminate or reduce Section 8.10. Much of the discussion in this Section is duplicative of earlier Sections; -eliminate or reduce section 8.11. Much of the discussion in this Section is duplicative of earlier Sections.	Reject. FAQs in all chapters Sections set by IPCC plenary. 8.9.1 merged with 8.9.2
36909	8	0				The Chapter provides a very comprehensive description of the issues and solutions facing the Transport sector. However, it lacks cohesion or a sense of how the solutions relate to each other. Adding a graphic or text summary that shows how the solutions compare to each other in terms of the potential greenhouse gas emissions reduced - most likely in the Executive Summary - would be very helpful for illustrating those relationships. In addition, some suggestion of prioritization of those solutions, depending on individual national circumstances, would be also be helpful for helping the reader understand how to view the sector as a whole.	Accept - in 8.6 (not feasible in Exec summary)
36910	8	0				Mobility and accessibility in less developed countries (LDCs). Since the level of mobility and accessibility are low in these countries at present, the improvement of mobility and accessibility through motorization will certainly increase GHG emissions in these countries. This future trend of increased GHG emissions but with increased personal mobility benefits in LDCs needs to be elaborated clearly in the Chapter (p.11, line 10 and other places).	Accept- been done
36911	8	0				Indirect emissions. The chapter spends a considerable amount of space to discuss indirect GHG emissions, especially indirect land use change emissions from biofuel production (p.13, lines 6-8). These indirect emissions are mainly simulated with global scale economic models, which still have technical problems to address indirect effects and indirect emissions. While significant efforts have been made in the past several years to improve these models, they are not at the state to predict emissions of fuel production pathways. For example, the models often cannot differentiate causal effects from co-relationships. Key parameters in these models (such as price elasticities, rebound effects, and co-products) are not addressed in scientifically satisfactory ways. In addition, similar to emissions from fuel cycle, vehicle cycle, and infrastructure building, indirect land use change emissions would be addressed in other chapters covering agriculture and forest, thus causing a double counting problem.	Accept. We are aware of these issues and have been working with the Annex II authors to address them.
36912	8	0				Fuel carbon intensity. It is commended that Chapter 8 identifies that reduction in fuel carbon intensity is one important mean to reduce transport GHG emissions (Section 8.3.4). While the section covers extensively potential fuel options with lower carbon intensities, it did not point out that there is a risk of increasing petroleum fuel carbon intensities with oil sands, shale oil, etc., if no policies are in place to reduce fuel carbon intensity. This risk needs to be discussed explicitly.	Accept. Included

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
36913	8	0				Induced transport demand from expanded transport fuel supplies. The chapter discussed this issue in the context of biofuel production (p.26, lines 11-15). The same argument can be made in the context of expansion of other transport fuels (electricity, hydrogen, alternative fuels, and even shale oil). If new supplies of transport fuels become available, they will potentially reduce prices of transport fuels, inducing additional transport demand. Later in the chapter, integrated assessment modeling was introduced, which is the right approach to address induced transport demand from both expanded fuel supply and reduced fuel demand via vehicle efficiency and transport system management. That is, discussions regarding rebound effects from measures of both fuel supply increases and fuel demand decreases need to be balanced and complete to cover all fuels and efficiency measures instead of singling out certain fuels (such as biofuels).	Accept- will aim for balance
36914	8	0				Suggest adding these references to Chapter 8 Burnham, A., J. Han, C. Clark, M. Wang, J. Dunn, and J. Palou Rivera, 2012, "Life-Cycle Greenhouse Gas Emissions of Shale Gas, Natural Gas, Coal, and Petroleum," Environ. Science and Tech., vol. 46: 619-627. Cai, X., X. Zhang, and D. Wang, 2011, "Land Availability for Biofuel Production," Environ. Science and Technology, 45, 334â€“339. Dixon, R.K., X. Wang, M. Wang, J. Wang, and Z. Zhang, 2011, "Development and Demonstration of Fuel Cell Vehicles and Supporting Infrastructure in China," Mitigation and Adaptation Strategies for Global Changes (2011) 16: 775-789. Dunn, J.B., S. Mueller, H. Kwon, M.Q. Wang, 2013, "Land-Use Change and Greenhouse Gas Emissions from Corn and Cellulosic Ethanol," forthcoming in Biotechnology for Biofuels. Dunn, J.B., L. Gaines, J. Sullivan, and M.Q. Wang, 2012, "Impact of Recycling on Cradle-to-Gate Energy Consumption and Greenhouse Gas Emissions of Automotive Lithium-Ion Batteries," Environmental Science and Technology 46:12704-12710. Elgowainy, E., Y. Zhou, A. Vyas, M. Mahalik, D. Santini, and M. Wang, 2012, "Impacts of Charge Choices for Plug-In Hybrid Electric Vehicles in 2030 Scenario," Transportation Research Record 2287: 9-17. Gelfang, I, R. Sahajpal, X. Zhang, R.C. Izaurralde, K.L. Gross, and G.P. Roberson, 2013, "Sustainable bioenergy production from marginal lands in the US Midwest," Nature, www.nature.com/doifinder/10.1038/nature11811. Kim, S. and B.E. Dale, 2011, "Indirect land use change for biofuels: Testing predictions and improving analytical methodologies," Biomass and Bioenergy, http://dx.doi.org/10.1016/j.biombioe.2011.04.039. Klverpris, J.H. and S. Mueller, 2012, "Baseline time accounting: Considering global land use dynamics when estimating the climate impact of indirect land use change caused by biofuels," Int J Life Cycle Assessment, DOI 10.1007/s11367-012-0488-6. Scown CD, Nazaroff WW, Mishra U, Strogen B, Lobscheid AB, Masanet E, Santero NJ, Horvath A, McKone TE. 2012. "Lifecycle greenhouse gas implications of US national scenarios for cellulosic ethanol production." Environmental Research Letters 7:014011. Tyner, WE. 2012. "Biofuels and agriculture: a past perspective and uncertain future." International Journal of Sustainable Development and World Ecology. 19: 389-394 Wang, M., 2002, "Fuel Choices for Fuel-Cell Vehicles: Well-to-Wheels Energy and Emission Impacts," Journal of Power Sources, 112: 307-312. Wang, M., J. Han, J. Dunn, H. Cai, and A. Elgowainy, 2012, "Well-to-Wheels Energy Use and Greenhouse Gas Emissions of Ethanol from Corn, Sugarcane, Corn Stover, Switchgrass, and Miscanthus," Environmental Research Letters, 7 (2012) 045905 (13pp).	Accept - used where appropriate but cannot use "forthcoming" . Biofuel refs sent to Bioenergy Annex authors

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
36915	8	0				This chapter needs more emphasis on how behavior can affect transportation and its impacts on climate change.	Accept. Now improved
36916	8	0				There is a great deal of repetition throughout the chapter. You may want to repeat the same things across different sections in order to make sure that policy makers, who may only read one section, get the appropriate information -- but if you are looking to cut pages, this is the best way to go. For example, page 63, lines 39-44 basically repeats the same claims that are made many times over in the chapter.	Accept.
36917	8	0				It would be great to have a scatter plot at the end of the executive summary that shows mitigation potential (either % GHG or energy reduction) on the y-axis, and cost on the x-axis. Error bars on both the x and y axes would indicate the level of uncertainty in each value. This could be done somewhat easily by simply using Table 8.8.1, but that table has its own problems.	Reject- No figs in Exec summary and new cost/potential figure produced.
36918	8	0				It would be nice to have a table of abbreviations for this chapter.	Reject - In Glossary and not usual IPCC structure
36920	8	0				The chapter provides an effective overview, but a shortcoming is the limited information on and perspective of the behavioral aspects of transportation. Transportation is a behavioral phenomenon, and in many ways the key movements forward in our understanding of transportation over the past 50 years have flowed from viewing transportation as a behavioral phenomenon. Chapter 8 obscures that perspective. A reader, after going through Chapter 8, would not understand the vital role of prices, urban form, and human behavior (including education and psychology.) Certainly these points are mentioned in Chapter 8, but they are not emphasized sufficiently. One tension is that the short-term progress on transport sector GHG emissions will flow mostly from changes in vehicle efficiency and the carbon intensity of fuels. But deep long-term reductions will require changes in urban form and changes in pricing. Citing the below NRC report may illuminate this: Driving and the Built Environment: The Effects of Compact Development on Motorized Travel, Energy Use, and CO2 Emissions. Washington, D.C.: National Academy of Sciences / National Research Council, August, 2009. Cite the above report, which finds that changes in urban form (residential density) could lead to 10% transport GHG reductions by 2050 -- generally supportive of the other numbers in the report. On p. 9, urban design is incorporated under infrastructure. This is odd, intellectually incorrect, and serves to reduce the role of urban form and urban design. No doubt infrastructure influences the growth pattern of urban areas (see, e.g., R. Funderburg, H. Nixon, M. Boarnet, and G. Ferguson, "New Highways and Land Use Change: Results From a Quasi-Experimental Research Design," Transportation Research A, volume 44, issue 2, February, 2010, pp. 76-98.), but the role of urban design/urban form/ built environment should be called out separately from infrastructure. Several of the factors related to the "six D's" cited later are not infrastructure but design. More generally, there is a key link from infrastructure to the development pattern of cities ... discussed some in NRC 2009 cited above (see around chapters 2 or 3 of that report) and in the literature such as the Funderburg et al. paper or, more generally, Baum-Snow, American Economic Review, 2007. On p. 15, where costs are discussed, there should be an explicit mention of externality costs related to driving and questions of full cost pricing of the externality. The lack of mention of any external or social costs there does a disservice to readers ... the idea should be introduced at that point. Small and van Dender's Transport Economics book gives a good background. More generally, see the evidence in: D. Salon, M. Boarnet, S. Handy, S. Spears, G. Tal, "How Do Local Actions Affect VMT? A Critical Review of the Empirical Evidence," Transportation Research Part D, volume 17, issue 7, October, 2012, pp. 495-508.	Accept - most points included where possible.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
36921	8	0				There is some redundancy throughout the text that could be eliminated in order to shorten the chapter--for instance, the costs and potentials section (8.6) repeats some of the content in the mitigation (8.3) and the interaction with adaptation (8.5) sections. Cost and potentials of options for mitigation (and to some extent adaptation) could be discussed within 8.3 and 8.5. Transformation pathways (8.9) could be merged with barriers and opportunities (8.8). In general, it seems there are substantial opportunities to group existing section content in ways that reduce redundancy and chapter length.	Accept- been revised
36922	8	0				The need for more research that compares the effectiveness of mitigation strategies, alone or in combination, and how these effects are transmitted across global markets should be noted. This research in turn requires further understanding the responses of consumers and producers to these measures, and incorporating a better representation of these processes into models used to assess policy.	Accept but reference needed - could go into Gaps section.
36923	8	0				For the sections "8.4.2 Path dependencies of urban form and mobility, 8.4.2.1 Modal shift opportunities for passengers, 8.6.1 Activity demand reduction, and 8.6.2 Structure and modal shift".... -->There's no mention of virtual travel (telecommuting, virtual travel to entertainment/recreation, etc.) and its potential mitigating effect on travel budgets, network operation flexibility, and on areas such as rural and suburban that have more limited modal options.	Accept - but references limited.
36924	8	0				The chapter does not discuss the complete move to non-emitting transportation by the middle of the century (i.e., zero emissions). While it may be socially and politically challenging (from today's perspective), it's not technically impossible. It should be made clear in the chapter that what's has been presented as "optimal" in the text is based on a combination of best-case economic, political, and technical pathways as perceived today. This should not preclude at least a discussion of the possibility for far more transformative scenarios with all necessary caveats of uncertainty in accompaniment. This would help establish the "upper bounding" parameter to pair with the "lower" bounding parameter of a business-as-usual projection/response so that the range of scenarios currently discussed in the text reside somewhere between the two. By doing so, the chapter will provide a better sense of context for the reader.	Accept - but determined by Ch 6 and integrated assessment model discussion. None show extremes for transport.
36925	8	0				Clarify if percent reductions are below a certain baseline or if they are absolute. With baseline emissions (business as usual) expected to grow, we will still have increased emissions considerably compared to existing emissions. This needs to be made clear.	Accept- need to clarify where literature allows.
36926	8	0				Chapter lacked discussion regarding operator behavior with respect to trucks and cars in particular. Studies have indicated that significant reductions in energy consumption in the freight sector, for example, could be from behavioral and operational changes.	Accept- behaviour being strengthened. More reference can be made to changes in corporate, as opposed to personal, behaviour in the transport sector.
36927	8	0				Recognition of lack of information on consumer behavior is important. It is good that this was mentioned. What was not mentioned was behavior by producers -- will they incorporate technologies that may not lead to profit maximization? The interaction between consumers and producers is important and another area where more research is needed.	Agreed. But no literature. More reference can be made to changes in corporate, as opposed to personal, behaviour in the transport sector.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
36928	8	0				Although freight is important, passenger travel still seems to dominate the contributions.	Accept- balance aimed for but literature biased. Given freight transport's share of energy use and carbon emissions and the relative rate at which it is growing, it merits more attention in the chapter.
36929	8	0				What challenges does cheap oil from tar sands, shale, or non-conventional sources present to meeting any mitigation targets?	Given freight transport's share of energy use and carbon emissions and the relative rate at which it is growing, it merits more attention in the chapter.
36930	8	0				Be sure you have the total reductions correct from NRC report on HDVs. These options were not necessarily additive, so hopefully you didn't take each option and add together.	Accept-will check
36931	8	0				Recommend citing U.S. Department of Transportation, "Transportation's Role in Reducing U.S. Greenhouse Gas Emissions," 2010. http://www.climate.dot.gov/resources/presentations/html/2010_06_16.html	Accept- but currently text is too US dominated and after a balance.
36932	8	0				Care should be taken on the use of non-peer reviewed citations.	Accept - but not always possible where none exists to back-up a point being made in the grey literature
36933	8	0				Throughout the Chapter, certain strategies are described that "may" or "could" have a desired outcome. Is it possible to assign more certainty to the discussion? For example, in the Executive Summary, terms such as "robust evidence, high agreement", etc. are used. Can similar terms/concepts be used in the Chapter? This would assist the reader in determining those strategies that would likely have the desired outcome versus those that could potentially but are, in reality, unlikely to have the described outcome.	Reject. IPCC suggest certainty terms only used in Exec Summary and SPM. In text with so many variables, references and regions, making high certainty statements is often not possible
27789	8	0				Different ways to replace oil products in the transport sector are mentioned. Unfortunately, the possibility to generate gaseous and fluid fuels with regenerative electricity (power-to-gas and power-to-liquid) is not considered although it plays a crucial role in mid- to long-term strategies to decarbonise the transport sector.	Reject- covered in Ch 7 if anywhere
27790	8	0				Throughout the text there is a very western concept of development. E.g. page six, line 18 "National mitigation options vary with the stage of economic development", page 6 line 21 "Regions with existing and mature transport infrastructures in place may find it easier to improve energy intensity.." - what is "mature" supposed to mean in this context? Page 6 line 27 "In non-OECD countries, improving transport accessibility is essential for sustainable economic development.". The idea that non-OECD-countries have an underdeveloped transport sector that needs to be developed in line with OECD-country transport systems is exactly the reason why transport demand and associated emissions are likely to increase. It would thus be much more useful if the IPCC could identify other transport development pathways that are adapted to local circumstances and focus on transport need and not transport accessibility.	Accept - text being revised accordingly where possible.
23380	8	0				As the latest report of "Review of Maritime Transport. United Nations Conference on Trade and Development" is available on UNCTAD website, all data and conclusion related this publication need to be updated accordingly.	Accept - thanks
23381	8	0				There are much less tables/figures than AR4. ASIF analysis framework makes this chapter focus more on discuss mitigation technology, instead of mitigation policies.	Reject. More figures being added and policies in 8.10

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
23382	8	0				Trolley and tram are not mentioned in this Chapter. The total social benefit from trolley and tram are controverial among literatures. E.g. sources: Kuhne (2010), Kliucininkas, et al. (2012), Prud'homme et al. (2011), etc.	Accept - but need full references
23383	8	0				The present Rules for applying the Kyoto Protocol and national cap and trade laws contain a major carbon accounting flaw in assessing bioenergy(biofuel is counted as zero carbon emission now), it is prudent to correct that error and reassess the biofuel's net emission reduction.(Timothy D. Searchinger,Science,2009)	Reject. Covered in Bioenergy Annex not in Ch 8. Passed on.
19737	8	0				This chapter is very clear on technological options and infrastructure aspects, but is not equally clear on the POLICIES required to enable these mitigation options. Although policy discussion is included in different parts of the chapter,	Reject.8.10 covers policies- been redrafted
19738	8	0				In the interest of shortening the chapter, I believe that section 8.9 could be removed; I don't think that it offers much useful information in the contect of the overall IPCC AR5; for example, Figures 8.9.1-8.9.5 are very busy and not very informative. Moreover, section 8.10 on sectoral policies could be shortened and merged with section 8.6 (costs and potentials). And, although section 8.3 is very important and informative, it is by far the longest section of this Chapter, therefore authors should consider shortening it considerably.	Reject- chapter structure fixed by IPCC plenary- but major changes made to 8.9 text. 8.3 shortened thanks
34871	8	0				Main General Comment: Lack of storyline. While the chapter has greatly improved in content, I still see a lack of storyline. While you mention the dramatic changes needed to meet ambitious mitigation targets and that the transport sector is the most difficult to decarbonize, it still does not come across in the chapter what this implies. This was not only criticised from me in previous drafts! The chapter should run through a set of strategies from A to Z to give policy makers a picture of what the different pathways entail (covering the respective options involved, potentials, costs, trade-offs, barriers and possible policy instruments). Combining this approach with the usage of tables will allow to make the chapter less anecdotal and more comprehensive. Following this approach will hopefully also allow to also formulate more concrete key messages.	Accept. Point noted and storyline improved
34872	8	0				Main General Comment: Lack of structure and redundancies. There are designated sections in the chapter where technical aspects of options (8.3), costs (8.6) and policies (8.10) are covered. The chapter does not adhere to this and covers these aspects throughout. This has negative consequences for the structure of the chapter, introduces redundancies, increasing the chapter length and causes the text to be often only anecdotal.	Accept- reworked
34873	8	0				Main General Comment: Lack of intra-modal policies. The policies section (8.10) focuses nearly exclusively on intra-modal changes and ignores policies affecting modal changes, general demand reduction, etc. which is at the core when aiming for drastic changes.	Accept- been redrafted
34874	8	0				General Comment: Usage of same set of mitigation options throughout the chapter. There are redundancies in the chapter when referring to options, further when options are discussed it is often only referred to a subset. By establishing a list of options in e.g. Section 8.3 that could be referenced throughout the chapter would allow for less redundancies and greater comprehensiveness.	Accept - where possible to do
34875	8	0				Main General Comment: Missing bottom-up top-down linkage. While the contributions of Section 8.9.1 are very insightful, the chapter is lacking linkage to sectoral expertise. Section 8.9.2 has to be fully rewritten as it is lacks to provide information of relevance for the scenario-sector nexus and as it is in parts incomprehensible. As the intention of Section 8.9 (and resp. sections in other chapters) is to link more general systemic model outcomes with sectoral studies, I suggest (as done before) to merge Section 8.9.1 and 8.9.2. The core storyline that emerged from SIE-3 (fuel/mode switch to electricity; decarbonization of electricity; see SOD Fig.6.38) does not come across in 8.9.1.	Accept- been revised

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
34877	8	0				General: Clarity about mitigation categories. At several instances in the chapter when discussing scenarios it is not clear whether a statement refers to all scenarios, certain mitigation scenarios or baselines.	Accept - will check the new draft
34880	8	0				General: Energy intensity. As the differences between changes in end-use technology efficiency and (infra-)structural efficiency, please aim to distinguish between the two when working with identities and avoid summing both under the label of energy intensity.	Will check
34882	8	0				Main General comment: Nowhere in the chapter are distinctions made between population groups within (let along between) regions/countries. Given the great differences in service damand and available financial means (plus differences in behaviour) this is important to take into account.	Accept - being considered
34883	8	0				General: The chapter needs to heavily link to specific sections of Ch.12; under the (currently not met) condition that Ch.12 provides sound, structured and broad data on general form and infrastructure issues, your chapter should reference the respective sections and then built upon it adding sector specifics. Please avoid redundancy by citing the same studies as cited in Ch.12 but rather refer to the Ch.12 sections and - if needed - summarize the Ch.12 content for your own purpose.	Links with Ch 12 in place - but also aware Ch8 may well be read in isolation.
34885	8	0				Main General comment: The chapter is, though this comment has been included in previous rounds, still lacking a clear comparision between technology focussed and structureal and behavioural oriented strategies. Though I am aware that the two can be combined, the chapter needs to provide clarity about these different approaches including the pros, cons, risks, co-benefits, barriers, etc. Treating it as implied on p.53, l.5-10 dismissing structural and demand change as too difficult is not in line with the task of the IPCC assessing all mitigation options.	Accept - being considered
34886	8	0				Main General comment: The chapter is still far too much focussed on technologies. I am aware that LDVs are currently major emitters, but taking into account a demand increase of 200-400% until the end of the century and taking into account that the status quo and marginal improvements to it will not provide the needed emission reductions that is commonly (see e.g. Section 8.9.1) attributed to the transport sector to provide to meet high mitigation goals, a wide portfolio of mitigation options needs to be explored with an more even weighing. The assessment needs to go beyond exploring the details of marginal changes to the current system as used in OECD countries.	Accept - changes made
34887	8	0				Main General comment: The chapter is very weak on detailing the specifics of developing countries. Strategies and option portfolios are different than those in industrialized countries. The exisiting literature on this needs to be assessed thoroughly. Major changes are needed.	Accept- being considered
34888	8	0				Main General comment: Reading the chapter the impression is that there are a wide range of options that just need to be applied at tolerable costs and the problem is solved. This is in my view in full contrast to the real world situation. See e.g. your following bold claim in the barriers section (p.53,l.4-9): "In most places, reducing fuel carbon and energy intensities are likely to be relatively easy as they are technology-based, though they can meet captial investment barriers in developing regions and may be insufficient in the longer-term." When discussing options not only the techical feasibility needs to be assessed but also the potential for implementation - either in the cost & potential or the policy section. Economic circumstances need to be taken into account (e.g. ownership of LDVs/HDVs in emerging economies) as well as average life times (which greatly vary between regions). Based on this the contributions of different options over time and policies affecting this need to be assessed.	Accept - being considered
35106	8	0				General Comment: More discussion on barriers of electric cars is needed (mass deplovment of batteries, life time of batteries, resource availability)	Accept
35107	8	0				Please check as it seems that the potential for the usage of biofuel in avaition is overestimated.	Has been checked

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
35108	8	0				General Comment: Please take into account the actual situation in developing countries: I question the soundness of the indicated high mitigation potential due to awareness raising. Also the reasons for low consumption need to be better analysed as these are in my view not due to insights/awareness but simply due to poverty.	Developing countries being reviewed throughout text
26700	8	0	0	0	0	This chapter needs to include a section about how mitigation policies impact the transport sectors and economy (exports, imports, consumption, etc).	Reject - covered elsewhere so not in Ch 8
33231	8	0				I am missing a chart differentiating total CO2 emissions from Freight and Passenger transport - or even better, like figure 8.1.1 but for each of the modes the part that is freight is shown in a different color or with hatching.	Accept - will try to include new figure. But Lack of data at a global level to compile such a graph
32431	8	1		117		This Second Draft is much improved and, it provides a wealth of information on the transport sector and the difficulties (and opportunities) to substantially reduce its environmental impact, including its levels of carbon emissions. This commentary is intended to raise issues and to comment on the Draft, as well as highlighting other important issues. There is an excellent range of literature cited.	Accept- thanks - but can still be improved
26774	8	1				PV and CSP are discussed, but there is no mention of concentrator photovoltaics (CPV) in the chapter. There should be some reference to the efficiency improvements these offer: P. Pérez-Higueras, E. Muñoz, G. Almonacid, P.G. Vidal, "High Concentrator PhotoVoltaics efficiencies: Present status and forecast", 2011, Renewable and Sustainable Energy Reviews, Volume 15, Issue 4, May 2011, Pages 1810–1815	Reject- not relevant to Ch 8. Passed to Ch 7.
20429	8	1		70		The following comments apply to the entire chapter. 1) Many of the citations (and this applies throughout much of the chapter) do not explain what the papers cited concluded or did. In the text it should indicate more clearly what the contribution made by the cited work is, rather than just listing a number of articles with no apparent understanding of why they are being cited. 2)Many citations are somewhat dubious and are not peer-reviewed publicatons - you should not be citing textbooks but should go to original source material. Restrict your citations to government or agency reports and high-quality peer-reviewed publications. 3) There are many parts of the chapter where material appears to be repetitious; too many for me to point out hear. The entire chapter needs a thorough rewrite to eliminate repetitious material.	Reject- limited space to review papers in detail. Accept - quality of references improved but for transpirt not always possible to rely on peer-reviewed alone. For example is an IEA report "peer-reviewed" ? Not seen to be even though it is usually reviewed by dozens. Accept - was a draft.
23392	8	10				The sources of right figure are not peer-reviewed publications. It is scatterd point diagram but the point is linked by time. That lead to backward tendency for EIT and LAM countries. The figure just include the OECD 1990 and neglect the trends since 1990s for OECD countries. It is worthy to check whether there is some turning point with this relationship	Reject as taken from the literature.
21929	8	10	10	10	10	"Desirable" is not scientific - remove.	Section deleted to reduce length
33232	8	10	10	10	13	Please add that per-capita transport energy use and CO2 emissions differ widely even for regions with similar per-capita income. E.g., the US have ~ three times the per-capita transport energy use and 2.5 times the per-capita transport emissions than EU or Japan. (Source: Enerdata/IEA Balances)	Accept - included. see response to comment 501
27137	8	10	11	10	24	Paragraph needs splitting in 2 - either into total emissions (today and future)/modal share (today and future), or into today (emissions/modal share) and future (emissions/modal share).	Accept- amended
21930	8	10	12	10	12	Here the figure for global energy-related CO2 proportion for transport is 22% but in the executive summary is it referred to as "around a quarter". 22% is closer to "around a fifth".	Section deleted to reduce length
21931	8	10	14	10	16	Sentence omits reference to demand-side policies, growth drivers, etc.	Section deleted to reduce length
36966	8	10	16	10	26	This section only addresses current rates of motorized travel in regions, both in the text and the graph. It should also mention non-motorized rates of travel in these regions, as it does not clearly illustrate current rates of travel in non-developed countries and how those may change to motorized rates over time.	Reject- this covered in later sections
21932	8	10	18	10	20	The comment "being based on the options available" is too vague. Using infrastructural lock-in or social lock-in would be better.	Section deleted to reduce length

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
30311	8	10	18	10	18	The phrase "buses increasing shares in all regions" is doubtful because the share of buses seems declining in developed countries, which can be inferred from Fig. 8.1.4.	Section deleted to reduce length
30312	8	10	18	10	21	The sentence "Future modal shares are uncertain …" should be modified because the well-know Shafer & Victor model (A. Schafer and D.G. Victor, 2000. "The Future Mobility of the World Population." Transport Research Part A 34, pp. 171-205) can explain the past and current trend of passenger modal choices. They insist that fixed travel time budget, path dependence, and land-use patterns are the driving forces of passenger modal choices. I recommend you to modify the description according to this literature.	Accept- amended and ref included
21933	8	10	22	10	26	Fig. 8.1.3 and Fig. 8.1.4 need to have similar orders for the categories so that they are more easily comparable, i.e. "LDV" and "Road" to be the top shaded areas in both cases.	Accept. Will amend
30313	8	10	22	10	23	Schafer & Victor (2000) indicate that modal shares are determined by non-political factors, such as fixed travel time budget, path dependence, and land-use patterns. Furthermore, Schafer & Victor (A. Schafer and D.G. Victor, 1999. "Global Passenger Travel: Implications for Carbon Dioxide Emissions." Energy 24, pp. 657-679) indicate that if policy advanced or retarded the natural selection of modes, the transport system would recover its natural dynamics over time. Therefore, I doubt if policy interventions in total mobility and/or modal choices could bring about a low-cost reduction in GHG emissions from the transport sector, especially from a short- to medium-term perspective. If you indicate that reducing demand for journeys and shifting modes can contribute to reducing GHG emissions from the transport sector, then you need to insert reliable references, which can convince us.	Accept- reworded with refs
26693	8	10	25			Please spell out regions as it is done in figure 8.1.4 or give a legend	Accept. Will clarify.
36967	8	10	25			p.10, Fig. 8.1.3. The upper right chart embedded in the figure is difficult to read and is not useful. Please consider deleting it.	Reject- as illustrates a key point as in caption
36968	8	10	25			figure 8.1.3 insert is interesting, but may need more explanation (or remove).	Accept - caption amended
36969	8	10	25			The figure legend has "CO2" but it appears that it should be "CO2-eq"	Reject - this for insert
32183	8	10	5	10	6	Suppress	Section deleted to reduce length
23390	8	10	13	10	16	The sentence"Future GG are difficult to predict …..are unknown" is conflict with the argument at the beginning of executive summary: page 4,from line 5 to line 7	Section deleted to reduce length
23391	8	10	17	10	19	Obviously, figure 8.1.4 indicate that share of buses in OECD countries decreased in 2010 compared to 2000	Accept - though little change
24672	8	10	24	10	26	Please spell out acronyms in the figure are undefined (LAM, MAF, EIT) - probably Latin America, Middle East and Africa, Economies in Transition. Suggest that the graph also show bicycles and electric bicycles. For an electric bicycle assuming power of 200W and speed of 20km/hr would enable an estimate of emissions per passenger based on the GHG intensity of electricity, (e.g. for a 200W bicycle at maximum output, energy consumption = 0.2kWh/20km = 0.01kWh/km, GHG intensity = 0.92kg/kWh = 920g/kWh x 0.01 = 9.2g/passenger.km. This is a very conservative figure but can easily be estimated more accurately) Citation for the average emissions intensity for electricity: Productivity Commission 2011, Carbon Emission Policies in Key Economies, Research Report, Canberra, Appendix D. http://www.pc.gov.au/__data/assets/pdf_file/0004/109921/13-carbon-prices-appendixd.pdf	Accept acronyms. Cycles and electric bikes too small to show at this scale and not in literature.
19993	8	10	4	11	11	Lack of a whole picture about freight/passenger transport structure. Freight transport is much less discussed.	Accept- will strive for better balance
20391	8	10	4	11	11	This section should be shortened and consolidated with the previous section. Delete last paragraph of section on sustainable development, not needed here.	Accept- amended
23393	8	10	4	11	11	Lack of a whole picture about freight/passenger transport structure. Freight transport is much less discussed.	The chapter is more strongly focused on personal movement than freight movement.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
30921	8	11				The table description suggests modal share however is actually presented in levels - suggest revising to show shares, indexed to 100, to enable easier cross comparisons of actual modal shares.	Accept - caption changed but change not made to figure as shows km travelled
24040	8	11				Is it possible to make one extra Figure (or extra column) with modal share worldwide (Aviation, Rail, buses, LDV, ...) as addition of the of the information in the different columns? This 'global modal split' should give a hint to what extense which technologies of different transport carriers should be discussed in AR5 in this chapter. In light of that the discussion of LDV technologies (e.g. fuel cell, hydrogen or page 28) is emphasized too much	Accept - good idea if can fit it in but will affect y-axis scale. Also is covered in part in Fig 8.1.4.
29800	8	11	1			The figure provides no information on non motorised transport which account for close to 50% of passenger mobility in developing countries within Asia e.g., India. At least the role of NMT should be highlighted in this figure.	Accept- added to caption.
36970	8	11	1			The figures 8.1.3 and 8.1.4 are sufficiently similar that it doesn't seem useful to have both. 8.1.4 is a lot easier to read.	Reject- one shows GHG the other modal shares.
36971	8	11	1			Are the "transition economies" defined anywhere? Perhaps they should be included in the legend.	Reject- defeined in glossary
36972	8	11	1			Suggest "modal distribution" as opposed to "modal share." Also, if the data is available, it might be preferable to show the 1970, 1990 and 2010 values to correspond with the previous figure.	Accept - caption amended but will need to check data availability for other years.
27140	8	11	10	11	11	This last sentence lacks meaning.	Accept- reworded
36973	8	11	15	11	17	The relationship between the different types of vehicles is unclear as described. The one sentence says that "heavy-duty vehicles, plus agriculture and construction machinery, [makes up] about one-quarter." It then says "Freight transport consumed almost 45% of total transport energy fuels." As heavy-duty vehicles make up a portion of freight transport, this comparison is confusing.	This is a good point. There may be an inconsistency in the data here. This will be investigated and, if necessary, corrected. - figure shows details
21935	8	11	17	11	17	Was aviation freight included in the "freight transport" figure and, if so, how was this done given the complications regarding attributing emissions to freight and passenger in mixed purpose aircraft?	Accept - is a limit of the literature but figure indicative. This is not made clear in the IEA report from which Figure 8.1.6 was taken. It has not been possible to find separate statistics for the emission split between bellyhold air cargo and cargo moved in dedicated air-freighters.
21940	8	11	17	12	13	"Freight movement is dominated by road transport" is an incorrect statement in that around 10 times more freight tonne-km are due to shipping than to road. This entire section needs rechecking for data inconsistencies and to make units uniform (as mentioned above).	Reject as no reference given. But section deleted to reduce length. This should be corrected to either 'surface' or 'domestic' freight movemnet is dominated by road transport. No comparative figures have been global tonne-kms by the various modes. The figures will be rechecked
27139	8	11	3	11	11	This paragraph could be deleted - it has limited added value.	Accept- been shortened
21934	8	11	3	11	4	Dependence on oil isn't the key issue. It is a resource constraint and so oil used needs to be progressively reduced, but it shouldn't be replaced with other non-sustainable resources. For climate purposes, constraining GHG emissions is enough to also sufficiently constrain oil use.	Accept- reworded

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
20743	8	110	1	110	2	This looks like a wrong citation. Here is the correct one: Tanaka K, Berntsen T, Fuglestvedt JS, Rypdal K (2012) Climate effects of emission standards: the case for gasoline and diesel cars. Environmental Science and Technology 46:5205-5213.	Accept will check
26153	8	116	19	116	20	Add a reference:Xie G.(2012). Navigation, energy conservation and air pollution mitigation. International Workshop on Reducing Air Emissions from Shipping. Available at: http://www.theicct.org/sites/default/files/Piloting%20and%20energy%20saving_Ch.pdf	Thanks - will check it and see where it fits
40710	8	116	8	116	8	This background document was developed in equal collaboration of Japanese MLIT (Ministry of Land, Infrastructure, Transport and Tourism) and WSC. Therefore, "WSC (2011)" should be replaced with "WSC and MLIT (2011)".	Accept
21938	8	12	1	12	1	Something might be wrong in this graph. IEA data for CO2 suggest that shipping has a higher value than	Reject - Than what? It is based on IEA data but will check.
22739	8	12	1	12	1	Figure 8.1.5 Final Energy Demand could be eliminated	Reject. It could be but why not show efficiency?
36974	8	12	1			Figure is blurry and difficult to read. It is a very busy chart that isn't well explained in the text; not sure it's adding much value to the discussion. Could be cut if space is needed. It does not seem vital to have at this point in the chapter and takes up valuable space.	Reject- to be redrawn.
36975	8	12	1			The fuel/energy usage among different areas of the sector use different measurements from each other, making it very difficult to compare. Using the same form of measurement (percentages or BTUs or amount transported) would make it much clearer.	Accept- hence the reason for using EJ.
36994	8	12	1			Figure 8.1.5's depiction of fuel streams is very compelling, but the figure needs to be captioned and labeled better for clarity.	Accept - will be redrawn.
21937	8	12	10	12	12	"…a share likely to increase to 53% by 2035 (Pratt et al.)". It is not robust to use just one source for a projection such as this as it is dependent on so many factors, including the scenario assumed for the rest of the tourism industry. Either remove or use more than one source. Also, this figure (53%) is very precise given it is such a long-term projection.	Accept - taken from reference but amended
27142	8	12	11	12	11	Likely increase to 53% by 2035 is incredibly specific! Better to say around 50%/over 50%.	Taken from referece - but agree
36977	8	12	11	12	11	"CO2" here should be "CO2-eq", apparently. Please check.	Accept
36978	8	12	11	12	11	Replace "likely" with "forecast".	Accept
23395	8	12	11	12	12	According to UNCTAD, about 80% of world trade by volume is carried by sea where demand for seaborne transport is closely linked to the development of the economy. See Review of Maritime Transport, United Nations Conference on Trade and Development (UNCTAD), also see Second IMO Greenhouse Gas Study 2009, Page 10. Considering, also, the comparative long shipping route, the Freight movement should be dominated by waterborne transport instead of road transport.	This comment has been addressed by the response to comment 519.
30922	8	12	13	12	17	Need to check the numbers pertaining to tonne-kilometers of freight movement between air and marine. The text suggests aviation moves more than marine, which seems incorrect and inconsistent with the report that states the marine sector is responsible for higher overall emissions than aviation but with lower GHG intensity.	Not any more in the new version ref to this comment; thank you. The aviation figure is expressed as tonne-km whereas the maritime figure is simply tonnes. Multiplying this by distance moved would substantially increase the maritime figure. See response to comment 522
36979	8	12	13	12	13	The tilde in the reference to air freight should not be necessary. If everything is kept to 2 significant figures and rounded correctly, there is no need to use the tilde or write "around" or "approximately." The reference (ICAO, 2010) should be (ICAO, 2010a).	Thank you for correcting this.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
24041	8	12	13			350 bn t-km freight on rail global is wrong, it is a mistake to which which I already hinted in FOD. At UIC 'bio transport unit' is not 'bio tkm' ! Alone the big 3 (China, USA, Russia) cover 7.5 trillion tkm, compare wikipedia on UIC database as well as in this chapter page 67/38: 8845 bio tkm; furthermore for the lay reader It might be helpful to explain the difference between light and heavy rail	Thank you for correcting this figure again and apologies for letting this inaccuracy slip through into the SOD. We will amend it.
34528	8	12	14	12	15	"International and coastal shipping transported around 7.8 bn t in 2009 (UNCTAD, 2010)," is proposed to be replaced by "Around 80% of world merchandise trade by volume is carried by seaborne transport, in particularly international shipping transported around 8.7 bn t in 2011 (UNCTAD, 2012), correspoding the contribution about 2.7% of the global emissions of CO2 (IMO, 2009),". The data need to be updated considering latest report of Review of Maritime Transport released by UNCTAD, and the conclusion drawn by IMO in the final report of "Second IMO GHG Study 2009" respectively. (Reference: UNCTAD (2012). Review of Maritime Transport. United Nations Conference on Trade and Development, New York. Available at: http://unctad.org/en/PublicationsLibrary/rmt2012_en.pdf)	Accept- reference added
27801	8	12	16	12	19	Keep in mind various ways to differentiate between domestic and international shipping, also differently reflected in various studies (not all following IPCC 2006 guideline definitions).	Accept - but limited space for detailed breakdowns
21939	8	12	17	12	19	There is a comparison here for shipping vessels in terms of emissions when all other units are either in Mt (for fuel) or bn t-km. If emissions are to be compare, do that in all cases. Also, the graph is in E Joules, so this adds to the confusion. And, comparing freight tonne-km with tonnes adds further to the confusion.	This tonne-km / tonne inconsistency has been addressed by the responses to comments 522 and 532
36980	8	12	17	12	19	The claim here is that small boat data are uncertain, and the implication is that there is no uncertainty in the other numbers. That is not correct, and the text should be softened or made more inclusive of the uncertainty overall - especially for International and Coastal shipping. Review the IMO GHG Study 2009 to see that there were very large uncertainties in the various parts of the shipping sector; this also applies to rail and road estimates. Suggest changing the language here - at a minimum - to read: "... particularly difficult to assess and therefore more uncertain than better documented estimates of shipping and other freight modes."	We accept this point and agreed that there is a need to keep the text on data uncertainties consistent.
36981	8	12	17	12	19	This paragraph begins by referencing % of fuel use, then freight tonnage, but ends by referring to emissions for one sector. There was no context for the change in reference, and it's somewhat confusing trying to determine what the author is trying to convey and what kind of comparison is being made.	Accept- since amended
32736	8	12	20	12	24	Reference missing.	Refers to figure - amended
21941	8	12	20	12	24	There is a wide range of emission factors applicable to shipping which should be reflected here, e.g. small gas carriers can emit around 25gCO2 per t-km. Given the very wide range of ship types and sizes, this variance is much greater than for other modes of transport. For a recent summary paper see Walsh and Bows, 2012, Applied Energy, Size Matters: Exploring the importance of vessel characteristics to inform estimates of shipping emissions, 98, 128-137.	Accept - added
25874	8	12	22	12	24	For passenger transport also specify modes corresponding to the given range as for freight (i.e. passenger transport ranges from ~20gCO2/p-km for coach, bus and rapid transit to 200gCO2/p-km for taxi)	the passenger data comes from a single source which states a single average whereas the freight data is assembled from several sources - hence the range. We could make this distinction clearer in a footnote
27802	8	12	22	12	24	Do you have a source for this information?	Sources are in quoted figure
27141	8	12	6	12	19	This paragraph could be split into bullets for each sector.	Accept but deleted
20105	8	12	6	12	19	Too many figures in a single paragraph. Need some sorting	Accept- amended

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
21936	8	12	6	12	6	The use of the term "consumed" here is problematic given the nature of international flights covering international airspace. Consider being more explicit about what this measure means, i.e. it doesn't mean that the fuel is consumed within the nation, but that it is presumably purchased for a flight in that nation and "consumed" in flight.	Accept but now deleted
33233	8	12	6	12	19	Though you have lots of numbers here, e.g. on the share of aviation emissions in total tourism emissions, but these shares would make more sense if you gave the ratio to total transport emissions, or maybe simply state what share of aviation emissions comes from freight and what from passenger. Another idea would be to add a figure like 8.1.5 but with tn-km and pkm by mode.	Not any longer in the new text, due to reduction; thank you. We have not found a data source for the split in CO2 emissions and difference in carbon intensities per tonne-km for bellyhold freight and air cargo moved in air freighter
36976	8	12	6	12	19	p.12, lines 6-19. This paragraph has many confusing numbers. It should be rewritten concisely with key points.	Agree - now amended with text deleted
23394	8	12	6	12	19	This paragraph expresses very confusing information. According to the title of section 8.1.2, it seems the authors wanted to compare the energy demand and emissions within and/or among transport modes. However, the comparison in this paragraph is confusing (inconsistent), e.g. comparing aviation fuel consumptions among regions, tourism trips among modes, aviation CO2 emissions to total tourism emissions, freight tkm among modes, tonnage among waterway transport modes, CO2 emissions among waterway modes, etc.	Agree; paragraph taken out in new version of text
30314	8	12	8	12	10	The phrase "the tourism sector" should be revised to "the passenger sector" because the latter is a more popular and widely used expression.	Reject- not all passengers are tourists
27800	8	12	8	12	10	The sentence implies that the share of the private cars is “just the rest” – but the rest must be about 50 % - so I would recommend adding the detailed percentage.	Accept but now deleted
29849	8	12	11	12	17	Incoherent unity of measurement : while road, rail and pipelines freight movements are evaluated in bn t-km, shipped freight volumes are only evaluated in bn t. The comparison of the different freight transportation means that is suggested in this paragraph is biased by this incoherence. Anyhow, evaluating international exchanges in bn t alone leads to much more approximative figures than bn t-km.	Section deleted to reduce length. This is a good point. It would be preferable to compare all modes on a tonne-km basis, if the necessary data can be found. Tonne-kms are preferable to tonnes as they correlate more closely with GHG emissions.
19994	8	12	8	12	8	Why suddenly mention the tourism sector?	Section deleted to reduce length
20392	8	12				Fig 8.1.5 is a bad image, please delete	Reject- will be redrawn
19995	8	12	45	12	46	There is also no consensus about taking urbanization as low carbon transport strategy.	Accept - Urbanization in itself is not a strategy but proper urban planning can me an effective low carbon strategy. We will revise text to clarify. IS PAGE 14 Note
23396	8	12	45	12	46	There is also no consensus about taking urbanization as low carbon transport strategy.	As above
21942	8	13				The graphic says that it displays only direct emissions. However, it shows emission for electric freight trains and passenger trains so this statement is incorrect. It would be more consistent and usefulf to show well-to-wheel emissions for all modes to enable better comparison.	Agree- but not possible. Electricity input taken as direct. See box in figure. It would be preferable to present well-to -wheel estimates for all modes of passenger and freight transport - but the necessary data is lacking.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
33234	8	13				By putting this figure in logarithmic scale, you make it possible to see the different values for different modes, but at the same time you make it easy for people to completely misinterpret the figure. People are not made to think logarithmically - if they compare, e.g. freight trucks to freight rail and just look at the picture without really thinking about the numbers, they can easily get the impression that the former has maybe half as much emissions as the latter - but not that it has 20x lower emissions! I would strongly suggest using a normal (non-logarithmic) scale, and underneath putting a table with the numbers so that one can still look up the small values that will not be visible in a normal scale anymore.	Reject - but added a footnote re log scale. The text could state more clearly that the scale is logarithmic and we could also insert the numbers into the logarithmic graph to highlight the wide differentials
25875	8	13	1			Is it possible to include more details in the category "passenger aircraft" (i.e. long and short-haul)	Reject as cannot have too much detail and data not available
25876	8	13	1			In the legend highlight the log-scale of the horizontal axis.	Accept- note added to caption.
36982	8	13	1			The data is interesting to be displayed, but the chart needs to be "cleaned up" in terms of the text font etc. The text box insert is way to0 big; that information should be sent to a footnote.	Accept- will be redrawn.
26694	8	13	10	13	12	I'm afraid methane is a short-lived ghg for example pls see http://www.grida.no/publications/vg/climate/page/3060.aspx	Reject - This definition comes from WG1 and is well supported by the scientific literature
21943	8	13	12	13	16	Surprised to see no reference to aviation-induced contrails here.	. Ref to contrails exist in Ref chapter; text shorter in new version;
26695	8	13	14	13	16	Ozone and many of the aerosols are not directly emitted by transport. Their precursors are emitted, such as VOC and Nox emissions, and formation of ozone is location specific dependent on sunlight and background emissions. See for example, Chameides W. L. et al. Ozone precursor relationships in the ambient atmosphere. J. Geophys. Res. 97, 6037–6055 (1992) and WG1	Accept - Will need to correct wording for clarity
20107	8	13	17	13	17	Do not see clearly the difference in content between 8.1 and 8.2	Section 8.1 includes historical trends and 8.2 is intended to focus on factors that will impact future emissions. We have edited and reduced redundancies to make this clearer to the reader.
36984	8	13	18	13	19	This sentence is weak and does not add useful content. It can be cut.	Reject.
29801	8	13	2	13	5	The Figure title needs a little amendement " … by fossil fuels including emissions from electricity for rail."	Accept - amended
32184	8	13	20	13	22	Suppress	We do not agree that this fact should be suppreessed from the report.
33235	8	13	20	13	21	please add "even for countries with similar level of per-capita incomes" at the end of the sentence - currently it seems strongly framed "the rich vs the poor countries", which does not fully reflect the reality. On p.60 you give some numbers: transport energy use is 75TJ/cap in US, 25TJ/cap in Japan.	Agree. Will reword for clarity.
29802	8	13	22			Reference Salter and Newman, 2011 is same as Salter, Dhar and Newman, 2011. This needs to be corrected.	Will correct
24045	8	13	26			Please mention that growth of LDV often by public interventions to keep gasoline prices, they are often subsidised and thus low	This is not a well accepted view but we will add text to provide the connection with policies and LDV growth.
30114	8	13	6	13	16	This paragraph should also state that figure 8.1.6 does not include the impact of the additional radiative forcing caused by aircraft emissions at high altitude (NOx leading to ozone formation in particular), so that the actual warming effect of air travel can be roughly double that calculated from the carbon dioxide emissions alone.	We will make the context of this section and Figure 8.1.6 clear but the stated doubling not an accurate estimate for all cases.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
36983	8	13	6	13	16	GHG emissions of fuel cycles, vehicle cycles, and infrastructure building (p.13, Fig. 8.1.6). It is commended that Chapter 8 considers emissions from these stages as well as vehicle operations to provide holistic comparison of technologies in terms of their GHG footprints. However, emissions from these different activities in this chapter need to be put into a broad context with separate emission assessments of other sectors that are already covered in other chapters. If one considers life-cycle emissions of vehicle/fuel systems in this chapter together with emissions of other sectors in other chapters, there will be double-counting problems between this chapter and other chapters. Also, some of the emissions (such as those from infrastructure building) considered here are historical emissions. If one adds these historical emissions together with future emissions of new technologies, this will create a problem of overestimating time-dependent emission trends.	Accept. LCA controversial and tried to explain constraints in 8.3.
27143	8	13	7	13	7	Need to make clear purpose of LCA - indirect emissions should be included, but in a production based accounting system they are not being "missed" - they are simply allocated to a different sector.	Accept but LCA now covered in Annex 2 and not Ch 8
33516	8	13	7			Please also outline that 51% of international arrivals in 2011 were by air. United Nations World Tourism Organization (UNWTO). UNWTO Tourism Highlights 2012 Edition. 2012. Madrid: Spain	Accept
32737	8	13	5			There is considerable repetition in this section. The amount of energy used by different transport modes and various countries is mentioned in three places throughout the section.	Section amended to reduce length
20393	8	13				This section is supposed to be on "new developments in emission trends and drivers" yet not much of this is about new developments. The main new developments over the last few years are: BEVs and more stringent fuel economy standards and expanded natural gas resources (i.e., fracking). Also, the flattening of VMT per capita in developed countries, although this is largely due to the economy, see, e.g.: Trip Making and Activity Participation of Youth: Trends from 1990 to 2009 by Michael Smart, presented at the 2013 TRB annual meeting.	Reject- This section is not intended to summarize what has happened in the past few years but rather the trends and drivers that will impact emissions in the coming decades.
24341	8	13		18		The Chapter 8 should be shortened removing all the sections 8.2 (this section is relevant, of course - but not so much considering the main objectives of Chapter 8) and 8.9 (this section should be removed to the Chapter 4).	Reject - This section is required and will not be removed
32435	8	14				This is good, but the last sentence is again too weak – see comments above – unless action is taken transport's share of global CO2 emissions will increase. You can put figures on this, as suggested for the executive summary. Transport is the one sector where reductions have not taken place and where there is substantial room for growth 9even if weak action takes place).	Accept -amended
29803	8	14				The figure for CO2 emissions put as 6.8 GtCO2 whereas on Pg 8 this figure is put as 7 therefore consistency lacking. Also the second para lacks reference.	Accept - amended
21945	8	14	1	13	4	This section is somewhat repetitive of previous sentences and could be shorterned to be more succinct.	Reject - Previous review comments have requested this level of detail.
36987	8	14	10	14	10	"Black carbon and aerosols" should instead read "black carbon and other aerosols" since black carbon is itself an aerosol in this context.	Accept - Wording has been corrected.
24042	8	14	10			it is necessary to mention contrails u cirrus clouds from aviation - they same radiative forcing as CO2-emissions from aviation (e.g. David Lee, http://elib.dlr.de/59672/1/scientdir.pdf)	Accept - Wording has been corrected.
21946	8	14	12			To these emissions should be added the approximately 15% extra emissions associated with the production of the fuel to give the full picture of transport GHG emissions.	Reject. The proposed 15% is too general and fuel production is covered in another chapter.
21947	8	14	13	14	21	This section is confusing. It starts by discussing freight and air travel, and then makes a causal link to 'rapid growth in light-duty-vehicles' which is unrelated to freight or air travel!	Reject - This text aswers the stated FAQ and needs to be brief and address all sectors of transport.
26526	8	14	13		16	take out : This rapid increase will be in part motivated by a fast demand growth in non-OECD countries that are starting at a very low base, but also by the strong growth of freight and air travelled kilometers worldwide.	Reject. This is an important point but is made clear in other section of the chapter. The answer to the FAQ needs to be brief.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
21948	8	14	22	14	34	There is little in the way of context to understand some of the spatial issues associated with transport, that do play a strong role in influencing energy use/co2 from sectors. For instance, domestic aviation co2 has been dominated by the US because of its very large land-mass. This context is lost in the broad comparison of figures.	Reject - Good point but given space considerations, we are not able to provide a more detailed anbalysis by region or specific country.
29804	8	14	23	14	34	The para lacks any description of bunker fuels as the national emissions do not include these. Also it requires some clarification as to what part of bunker fuels is accounted where i.e., OECD and Developing	Reject - The data presented is by tranportaion sector and not fuel type. International shiping is listed and data is provided. The exact split of OECD and Non-OECD activity can be obtained from th reference for the curious reader but there is not adequate space to further develope the details of the data.
36988	8	14	23	14	23	p.14, line 23. Transport CO2 emissions should be updated at least to 2010 (instead of up to 2006).	Reject - As noted below, the economic downturn starting in 2007-2008 makes the data from 2006-2010 very difficult to interpret. A statement to this effect has been added.
27803	8	14	25			For shipping and possibly others it is important to note that this is data until 2006. After 2006 this situation has changed because of the economic crises. It is important to highlight this. If new data is not available, than at least it has to be highlighted in the wording.	Accept - Text has been added to this effect.
34529	8	14	29	14	29	After the "having negative growth (IEA, 2009).", a new sentence is suggested to be added: "shipping contributes 3.3% of the global emissions in 2007 and about 2.7% of the global emissions of CO2 for international shipping (IMO, 2009)". This is the conclusion drawn by IMO in the final report of "Second IMO GHG Study 2009".	Reject - This is covered already in 8.1. This section is focussing on trends and drivers. Given the issues of the global economic downurn the interpretaiton of these numbers is difficult to assess.
35267	8	14	30	14	34	The finding presented here contradicts with Figure 8.1.4 which clearly shows that the passenger transport by LDVs in OECD is still increasing after 2000. Thus, it is suggested to make necessary modifications or explanations.	Reject - Figure 8.1.4 shows growth between 1990 and 2010 but does not have the resolution to show any shorter term trends. There is no contradiction between the text and the Figure.
32738	8	14	32	14	34	Peak travel in Schipper refers to distance per unit GDP rather than total distance travelled.	Accept - This is understood and we believe that this is consistent with the text. No changes were made.
34530	8	14	34	14	34	It is proposed to delete the following sentence: "This is not expected to offset growth in developing countries (8.2.1.2)." , as there is no section 8.2.1.2 and no conclusion mentioned about this sentence.	Accept - The reference to 8.2.1.2 has been remove but this sentence and reference has been clarfied but the point is important and will not be deleted.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
36989	8	14	36	14	46	The urban planning section here is devoid of hard numbers and is therefore quite weak.	Given the space limitation and regional differences, it is not feasible to provide specific numbers that are comprehensive and meaninngful.
24043	8	14	36			I appreciate very much that that travel time budgets are respected that prominently	No repsonce needed.
36990	8	14	37	14	39	Clarity edit, change: "From an urban planning perspective, the spatial structure and existing systems for moving people and freight impact on the demand for transport and modal choice" to "From an urban planning perspective, the spatial structure and existing systems for moving people and freight impact the demand for transport and modal choice" or "From an urban planning perspective, the spatial structure and existing systems for moving people and freight have an impact on the demand for transport and modal choice."	Accept
20394	8	14	39	14	39	Suggest that the work of Waddell on land use and GHG emissions be mentioned, more recent than Anas et al. 1999. Waddell, Paul, Gudmundur F. Ulfarsson, Joel P. Franklin, and John Lobb, 2007, Incorporating Land Use in Metropolitan Transportation Planning, Transportation Research A (Policy and Practice), 41: 382-410.	Accept
36991	8	14	39	14	42	Suggest deleting phrase "there is increasing appreciation" and instead starting with "Changing urban form through planning and development . . ." Add references to support.	We have added a reference but have not changed the wording as we feel that the increasing appreciation is important.
20395	8	14	43	14	43	Last sentence of paragraph says "…there is no clear consensus…". Please provide a citation for this assertion. think there is a consensus and those that disagree have a very biased perspective. The relevant question is how much can GHG be reduced and how long will it take to change urban form. Also, don't see the link here to fig. 8.1.4.	Accept - We have deleted to reference to Figure 8.1.4 and have rewritten the sentence as suggested below.
32185	8	14	43	14	46	Suppress	Reject. This is an important point and should not be suppressed.
33237	8	14	43	14	45	Why do you state it from the negative ("no consensus on the right approach")? I would say "several different approaches can clearly reduce demand and shift the modal distribution compared to an unmanaged case, thus reducing GHG emissions"	We will revise as suggested above.
23397	8	14	43	14	46	Fig. 8.1.4 shows nothing to support the argument. Suggest to delete the "(Fig. 8.1.4)" after the sentence.	Accept - The reference has been deleted.
36992	8	14	46	14	46	It is not clear how Fig. 8.1.4 makes the point stated in the sentence. This should be made clear, or else either the figure or sentence should be changed.	Accept. We have removed the reference.
20106	8	14	6	14	21	FAQ 8.1 quite redundant with chapter summary . Could be deleted	Reject. FAQs are imposed requirements. Now moved to end as for all chapters
36985	8	14	6	14	21	This entire section largely summarizes and repeats information that is in previous sections. It breaks up the flow of the chapter and is redundant. As it is part of 8.1, it seems out of place and confusing in section 8.2. Suggest either deleting it or shortening it substantially and place it more prominently in section 8.1. Is it also intentionally lacking citations? These two sentences are strong ones that need a citation if possible: "Transport demand... travelled kilometers worldwide" and "If no mitigation options... share of global energy-related CO2 emissions." Also in this FAQ, in the section on line 13, demand does not equal consumption, clarity is needed. If this FAQ is kept, rewrite the sentence on line 16 to read, "This growth is due to factors like the steady increase of income per capita." (As currently written, the sentence needs a clear subject.)	FAQ moved and rewritten

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
36986	8	14	8	14	12	Replace "currently" with "directly" (since the value cited refers to vehicle operating emissions). Also, it would be worthwhile to mention other elements of the transportation life cycle (fuel, vehicle and infrastructure).	Accept
21944	8	14	9	14	9	The statement that 'one quarter' of total emissions are due to transport is misleading, as it is closer to 'one fifth'.	Accept
33236	8	14		15		"infrastructure" is an own driver/determinant in ist own and should be stated in line 36/37 already, as well as have an own subheading and text. A city built for LDVs will produce high LDV shares, no matter the costs, while a city built for public transport/cycling (high density) will lead to low LDV shares.	Reject. The inclusion of infrastructure as a driver depends on the time horizon. Given that a key message of the section is that the development of low emisisons mobility infrastructure is an important mitigation strategy, we do not agree that infrastructure is a driver.
19624	8	14	36	14	20	The exportation of used cars from developed countries to developing countries, is as well one of the main problems regarding low efficiency and high emission vehicles fleet in developing countries. Address this issue in the future can contribute to reduce GHG emissions from the road transport sector	Reject - This is clearly an issue for air pollution but it is not clear that this is a major driver in the fleet average fuel efficiency in developing countries.
29850	8	14	39	14	46	Redundancy : The sentence from line 39 to 41 («There is increasing appreciation that changing urban form through planning and development can play a large role in the mitigation of transport GHG emissions ») is paraphrased from line 45 to 46 (« urban development can be used as a tool to reduce the demand for transport and shift the modal distribution »). Therefore, the sentence from line 39 to 41 seems unnecessary.	Reject. This is an important point representing changes in mobility,
32436	8	15				Travel time budgets – two points here. The use of averages tells only part of the story as there is huge variation around these figures – for example children walking for 2 hours to get to school in Africa, others travelling by air around the globe, and elderly people not getting out of their homes at all. We should also be looking at variation in travel times between different locations and social groups – the inequality issues. These are raised in part later in the Chapter, but inequality in access to transport should be a major them, and the 10% of the global population that make 80% of the travel. A second point is that even if travel times are relatively stable, one of the real changes has been that people are using faster forms of travel and travel distances have increased substantially over the last 20-30 years – the faster forms of transport and longer distances means more energy is used and more carbon is produced. This is the fundamental problem that is faced.	We agree that these are important points but there is not sufficient space to adequately address the issues of distribution. Modal shift is dsicussed in 8.3 and 8.4 and is not a driver or trend. No changeds were made.
36993	8	15	1	15	20	For the "Travel Time Budget" Section. -->Perhaps there should be an inclusion here about telecommuting or virtual travel for entertainment and what the impact of these are on travel time budgets.	Accept- Sentence added at the end of section 8.1.2.1
24044	8	15	1	15	11	I appreciate very much that that travel time budgets are respected that prominently	No comment needed.
20396	8	15	10	15	10	I think too much is made of travel time budgets here, rather than a general consideration of the economic concepts of supply and demand. That is, if price is reduced, you will increase demand (i.e., induced travel). Travel time is the price. This would imply that budgets are not fixed. What happens when automated vehicles become feasible and cheap? Will they increase VMT and total travel because the cost is reduced? Also, commuters are willing to travel long distances (an hour each way or more) if the job is worth it. So there is already evidence that the value of the trip exceeds any arbitrary one hour travel time budget.	Reject. We feel that this is an important point and it is supported by other reviews. A purely supply and demand perspective does not fully address the bahavorial issues that build on this section.
32739	8	15	14		15	Reference missing for the dramatic reduction in travel time, including of the rebound effect described here.	Text has been revised to clarify

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
21951	8	15	14	15	14	"New road infrastructure has reduced car travel time" - needs a reference to research.	Reference provided in following sentence
36997	8	15	14	15	15	Citation needed for sentence : "New road infrastructure… increase in the use of road transport."	Reference provided in following sentence
36998	8	15	18	15	18	The Schafer 1998 citation would be a good one to add to the Mokhtarian and Chen 2004 citation. (Schafer 1998 (10.1016/S0965-8564(98)00004-4)	Reject - We agree that this is a good refernece but we are limited in refernece and are using the more recent one listed.
36995	8	15	2	15	4	"Travel time budgets have been shaping cities and causing competitive advantage in regional freight movements for as long as human settlements have existed." This is quite a bold statement and doesn't sound very scientific/rigorous. It at least needs a citation. Alternatively one could hedge and change it to "Travel time budgets have been shaping cities and causing competitive advantage in regional freight movements since at least the advent of modern transportation."	The subject sentence is not important and has been deleted.
20397	8	15	21	15	23	The relative decline in transport costs has much more to do with the increase in income driving the increase in demand.	Agree, but do not see any conlfict with this statemen and the text.
36999	8	15	23	15	23	The influence of energy costs on transportation is overstated here. Suggest eliminating the word "major." For instance, this statement may not pertain to the United States, where increased fuel prices have not been tightly correlated with decreased LDV use.	Accept - Sentence has been rewriten to inlcude other factors.
20398	8	15	26	15	26	"there are no clear trends to predict future fuel prices". I think this statement is misleading. There is good evidence that the cost of production won't go up too much more given existing technology and supply. The only uncertainty is political factors that may cause fluctuations in price. The "trend" is pretty clear, it is relatively flat in real terms.	Reject. There is not real consensus on this point on the 10-50 year horizon.
21952	8	15	28	15	28	More evidence than one source required here.	Reject - Additional references do not seem necessary and the point that basis greenhouse reduction scenarios on expected future fuel prices is not robust is not a controversial concept. The setnece has been qualifiied to make it clear that this is on the 30-50 year horizon.
29805	8	15	29	30		Kindly cite other literature also as the elasticities for LDV to fuel prices are not high in both short and long term	The subject sentence has been deleted.
21953	8	15	36	15	36	"…given fuel costs are a relatively high share of total aviation or boating costs" - this is true for aviation, but for shipping, less so.	We agree but given shipping costs, fuel costs for ships sis still important.
30549	8	15	38			Modal instead of model	Editorial
21949	8	15	4	15	5	Repetitive - comparing 1 hour with 1.1-1.3 hours. Doesn't add anything.	Reject - Providing the range is helpful.
36996	8	15	4	15	7	Consider inserting figure 4 of Schafer 1998 (10.1016/S0965-8564(98)00004-4).	Reject. No space and this is not really new so referencing is more appopriate.
33238	8	15	40	15	41	I think this could be phrased clearer in the current context. "if daily needs can be satisfied locally, people walk/cycle. If shopping is concentrated to (greenfield) malls , travel distance increases, often necessitating LDV use"	Reject - We p[refer the current wording.
37000	8	15	44	16	17	This entire paragraph is organized in a confusing manner. It would much clearer to have how disposable income influences mobility choices in one paragraph, and how other societal factors influence mobility choices in a second paragraph.	Accept - The paragraph has been divded into two paragraph as suggested.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
37001	8	15	44	16	17	This paragraph can be condensed greatly, especially the second half (basically the part on page 16).	Reject. This section will be revised for clarifty but is important to the behavioral aspects of the chapter
21950	8	15	6	15	9	The term 'mass transit' is used here but if it includes air travel, which is arguably 'mass transit' then the 'usually designed so that destinations can be reached in half an hour' statement is not valid.	Accept. Will clarify as Urban Mass Transit.
24673	8	15	10	15	20	The figure of 40-50km/h for LDVs seems very high for cities, implying a cruising speed of around 70-80km/hr if it includes stoppages. This is unlikely in any major city. The notion that increased road infrastructure has improved car travel time also needs to be referenced as it is contradicted by the statement on lines 17-18 that the travel time eventually resumes the previous level. The reference to pedestrian and cycling congestion should account for the differential costs of infrastructure for these more compact modes compared to passenger cars, and the reduction in parking infrastructure requirements.	Accept - W ehave revised to "up to 40-50 km per hour. In addition, we have clarified that new roadway will lead to shorter travel times only in the short run. A reference has also been added.
29851	8	15	2	15	3	The claim that « for as long as human settlements have existed » time optimization has been the main determinant of a competition between different regions seems arguable. It might be true for some (maybe most) cultures in the world, and is especially visible in the history of the Mediterranean basin, but anthropologists have shown that there has been cultures where settlements existed but where time consumption was not even an expressible concept. Gift economies in Latin America are a good example of another conception of relations with neighboring settlements where no such thing as a competition centered around time optimization existed. To say the least, this assertion seems a bit too controversial to be placed here as a self evident fact without references.	Accept. We do not seek to resolve anthropological issues and will focus on helping to reader understand the drivers.
32437	8	16				On the trends it seems that there is an underlying standard argument that cannot be changed, namely that transport will increase (likely), but that it is an essential part of growth (needs to change) and that transport costs will come down in real terms (open for discussion) – it is business as usual. The possibilities of decoupling of economic growth from transport growth is not featured highly in the Chapter – this is an essential part of decarbonisation (both the relative intensity which China and India have committed to and the absolute intensity which is apparent in Finland) – namely that technology on its own cannot reduce carbon emissions in transport substantially, as there must also be reductions in the amount of travel (distance and activities). Transport costs must be raised to fully reflect the economic, environmental and social costs imposed on society. There also ought to be mention of NOx and photochemical smog (Beijing and elsewhere) – these are trends that must be reversed and they may provide a trigger for action.	We agree with this analysis but not sure what is being requested. We feel the chapter does make this argument but this is not what is intended for the disussions of trends.
26527	8	16			14	ADD La Branche (2011) found that for those who have changed modes of mobility from car to public transit, one of the main drivers is a rupture in mobility habits (accident, breakdown) followed by a perceived advantage at keeping the new mode (comfort, time for reading, being in one's 'bubble'). « Les déplacements quotidiens face à la schizophrénie écologique. Le cas de Lyon ». No. Spécial de Vertigo. Hors-série 11, may 2012 « La mobilité urbaine durable : du concept à la réalité ».	Reject. Too specific of a scenario.
27145	8	16	1	16	8	These may be important factors but seem slightly overdone - maybe reference a couple.	Reject - Given that these issues were not addressed in previous IPCC reports, we feel that this deserves more attendtion and references.
21954	8	16	11	16	11	Comment regarding 'younger people' sounds as if it is place specific not a general trend visible globally?	Accept - See comment below.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
37004	8	16	11	16	12	The statement "Conversely, there is some evidence of younger people choosing mass transit" is lacking context. It appears to be a broad statement as currently worded, but this trend appears to occur mainly in cities within OECD countries. It also does not say why this trend may be, which is important because it conflicts with the rest of the trends stated in the paragraph.	Accept - Has been reworded.
37005	8	16	11	16	12	p. 16 lines 11-12: "Some urban dwellers avoid using mass transit or walking due to safety and security issues. Conversely, there is some evidence of younger people choosing mass transit over LDVs (Parkany et al., 2004)." May want to elaborate on this statement and cite additional authors to support this claim, as a growing body of recently published literature suggests that the millennial population in some OECD countries have become less interested in car ownership than previous generations.	Accept - Test has been quailified as noted above.
37006	8	16	14	16	14	This would be a good place to mention the potential impact of improved telecommunications on travel demand.	Accpet - has been added at the end of the paragraph.
21955	8	16	16	16	17	"consumer based manufacturing" - it is not clear what this means.	Accept. We will define as 3-D Printing.
32740	8	16	18		40	The trends presented here are familiar, if not repetitious, from previous sections.	Accept - The text has been edited to remove what has already been stated.
20108	8	16	18	16	18	8.2.2..2 a good advice to shorten is to limit the level of subtitles to 2, keep all sections not further than 8.2.2, and summarise/combine what is in it : it will be shorter and more readable	Reject. We believe the current subheadings helpf the reader.
21956	8	16	19	16	20	This statement should be written in the past, as it won't necessarily continue to be in this direction	Reject- This statement if written in the present as this is happening in many developing countries and is expected to continue in other coutnries for decades to come.
37007	8	16	19	16	22	These statements -- that the emissions from the transport sector have risen and that as people become richer total and per capita emissions have increased -- are highly redundant.	Accept - Paragraph has been shortened and reducnent staetments have been removed.
37008	8	16	21	16	22	It is worth noting here that regional differences can be large and significant within countries even while this general trend is observed (example: the variation in per-capita income and vehicle ownership levels across China's provinces, which can be related to differences in policy, city planning, and public transit infrastructure development).	Text has been added to refelct these regional differences.
19742	8	16	24			Reference for Bleijenberg (2012) is missing. It is the following: Bleijenberg (2012), 'The Attractiveness of Car Use'. In: Zachariadis T. (ed.), "Cars and Carbon", Springer, 2012, ISBN 978-94-007-2122-7, DOI 10.1007/978-94-007-2123-4_17, pp. 19-42.	Text has been deleted.
21957	8	16	31	16	34	This is misleading as european air travel growth, aside from the recession, continues to be relatively strong. Also the high-speed rail network is not so extensive that the signal across the EU would be visible, perhaps only in France and Germany.	Accept. We need to reword to make the point about high speed rail.
37009	8	16	31	16	32	Please provide primary sources, or be more specific as to data source, for statement that "Air transport demand continues to increase in the US..." The cited article (Millard Ball and Schipper 2011) is a secondary source and is about travel demand flattening out, concluding "total passenger kilometers in motorized modes, has slowed its growth relative to GDP and even declined in per capita terms..." (p. 15). Since these trends are utilized to prioritize other things such as mitigation options, it is important that they be well substantiated.	Accept, where feasible but not always practical.
24046	8	16	33			why no mentioning of the extreme ambitious high speed rail expansion in China - unique worldwide?	Reject - The ambition and growth rate is stated other places but the issue here of the impact on aviation is the critical point here.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
33239	8	16	35	16	37	I would disagree - a factor of 2-3 difference in per capita-emissions at similar affluence levels clearly has implications for total GHG emission growth - if EU and JPN would have the same per capita transport emissions as the US, global transport emissions would be 2GtCO2 or ~30% higher	Acccept. This setence needs to be reworded to emphasize that in the context of mitgation targets from transport the difference acriss countries are not enough. In addiiton, the key issue here is gorwth rates and not absolute emissions.
24047	8	16	37			"Recent transport trends suggest that current economic, social, or cultural changes alone will not be sufficient to mitigate global increases in atmospheric CO2 concentrations. Stringent policy instruments, incentives, or other interventions will be needed to reduce global transport CO2 emissions (IEA, 2009a)" is worth to be in SPM	Accept. The SPM has been rewritten to make this point.
27804	8	16	41	17	36	With regard to non-CO2-effects, the change of natural cloudiness through aviation is described in an incomplete way. A thorough description based on the latest publications is necessary since the RF of contrails cirrus is in the same range as the RF of CO2 (see Nature Climate Change 2011, Burkhardt, Karcher).	Accept. We have added a sentence concerning this indirect effect associate with clouds and the recommended reference.
21958	8	16	42	16	48	Also somewhere here mention water vapour, which is particularly important in aviation	Reject. This is not clear consensus on the role of water vapor from avaiation on climate.
21959	8	16	42	16	49	Methane emissions are mentioned as being directly emitted, but they are also depleted when Nox emissions are released by aircraft at altitude.	Reject. This is covered in WG1 and we cannot dedicate sufficient space here to explain chemical of all of these non-CO2 forcers.
37010	8	16	42	16	44	Carbon Monoxide (CO) should be included in this list because of its indirect effect on the Global Warming Potential of existing methane (CH4) in the atmosphere. In fact, the Unger, et al, citation listed for this sentence explicitly covers the role of CO in the transportation sector and its effect on climate forcing. If the author(s) left this out due to the relative net impact of CO on methane, that's fine, but it should be noted as such then for the full picture of impacts. Additionally, tropospheric ozone (O3) should be listed as well, unless it's implicit from the mention of NOx and methane emissions. Tropospheric ozone is also discussed in the Unger, et al, paper cited.	Accept - CO is added but ozone has not. Ozone is not directly emitted from the transport sector and we cannot dedicate enough space to explain in detail the chemistry.
30115	8	16	44			Should be non-absorbing (not non-adsorbing) aerosols.	Accept
24048	8	16	44			include contrails and cirrus clouds and mention their warming effects (http://elib.dlr.de/59672/1/scientdir.pdf and http://www.mpimet.mpg.de/en/wissenschaft/publikationen/papers/climate-forcing-of-aviation-emissions-in-high-altitudes-and-comparison-of-metrics.html)	Accept- See reply above.
20399	8	16	46	16	46	Nitrous oxide is not emitted; correct terminology is nitrogen oxides. Nitrous oxide is a generic term for a class of compounds that includes nitrogen oxides (NOx), while more specifically nitrous oxide refers to N2O which is direct GHG. NOx works is an indirect GHG gas via its impact on ozone.	Accept - This has been corrected.
37011	8	16	46	16	46	p. 16, line 46. "and nitrous oxide are emitted from vehicle internal combustion engines." Nitrous oxide (N2O) is primarily emitted from older-design catalytic converters, rather than internal combustion engines per se. Nitrogen oxides (NO2 and NO3) are emitted from internal combustion engines.	Accept
21960	8	16	48	16	49	F-gas relating to shipping are highly uncertain	Reject. We are not quanitifying or comparing here but rather stating that these pollutants need to be considered.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
37012	8	16	48	16	49	Recommend adding a citation for the Arctic region here, at least. Dalsren, S. B.; Samset, B. H.; Myhre, G.; Corbett, J. J.; Minjares, R.; Lack, D.; Fuglestvedt, J. S., Environmental impacts of shipping in 2030 with a particular focus on the Arctic region. Atmos. Chem. Phys. 2013, 13, (4), 1941-1955. and Corbett, J. J.; Lack, D. A.; Winebrake, J. J.; Harder, S.; Silberman, J. A.; Gold, M., Arctic shipping emissions inventories and future scenarios. Atmospheric Chemistry and Physics 2010, 10, (19), 9689-9704.	Reject. This is covered in 8.5.
37013	8	16	48	16	49	p. 16, lines 48-49. "All of these pollutants are important to global climate change. Some can have much larger regional climate change effects." As written, "all of these pollutants" appears to refer to previous sentence, which discusses F-gases (i.e., HFCs in air conditioning use), which do not have "regional climate change effects." The last sentence presumably refers to aerosols and black carbon. (?) Suggest: "Aerosols and black carbon can have relatively large regional climate change effects."	Accept. We will reword for clarity.
33519	8	16	5			For reasons of comprehensiveness: mobility consumption is also influenced by mental illness, such as depressions, alcoholism, or personality disorders. Gössling, S. 2013. Advancing a Clinical Transport Psychology. Transportation Research Part F 19: 11-21.	Reject. Too specific to be covered in the limtied space.
37002	8	16	5	16	8	To the statement--> "Affective motives, such as the power and sensation feeling of superiority associated with owning and using a car, influence travel behavior, for example breaking speed limits, with consequences on traffic safety, energy consumption, noise and emissions (Bamberg et al., 2011)." -->There may be a counter-balancing impact in terms of behavior associated with the use of mobile devices. As an example, people that center their activities around the constant use of information-service connected devices may be more interested in a Wi-Fi enabled bus or automated car that they don't have to pay as much or any attention to driving (and hence, not distract them from their communication device, which can also be emancipating) than they are a personal automobile as we presently perceive it.	Reject. We agree that this is a driver but the goal here is top give example and not to be comprehensive concerning bahvoiral factors. In the context of space, there is a lot that we would like to add but cannot.
37003	8	16	8	16	8	The Bamberg et. al., 2011 citation does not appear to be the correct one for this statement.	Reject - We have doubel checked and we feel this reference is appropriate.
19625	8	16	19	16	40	There is a very important increase in the motorcycle fleet, mostly in Latinamerica and Asia. It should be mentioned that the emissions from this fleet will increase in the future	Accept - The text has been revised.
20461	8	17	1	17	9	Worthwhile to cite EPA (2012) study on black carbon that suggests that black carbon emissions from transport will significantly decline over the next 15-20 years due to existing regulations and vehicle fleet turnover. Major gains in reducing transport BC emissions will likely only occur in the developing world where fuel and engine quality significantly lack the developed world	Accept.
25878	8	17	10	17	11	I do not understand the expressions "that do not absorb light". Please be more specific. Do you mean that they do not interact with solar radiation?	Accept. We will clarify
21961	8	17	10	17	15	Lifetime should be included in this discussion	Reject. Not enough space here. This is covered in WG1.
25879	8	17	14	17	15	Please interchange marine boundary layer and troposphere. The way the sentence is written is that contrails impact the marine boundary layer and ships emissions the troposphere.	Accept.
37015	8	17	14	17	15	This sentence states that "Contrails from aircraft and emissions impact on the marine boundary layer," but it is unclear what that impact actually is - if it is a warming or cooling impact.	Accept. Will clarify the effect.
37016	8	17	14	17	15	This sentence is worded poorly. How do the contrails from aircraft and the emissions from ships impact the marine boundary layer? What are the mechanisms?	Accept. Sentence has been reworded for clarity.
26528	8	17	16		23	take out	Reject. This is important information

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
37017	8	17	17	17	18	Remove "realistic" as it suggest that the study may have provided unrealistic projections.	Accept.
25877	8	17	2	17	4	Please also mention the growing PM emissions from direct injection gasoline engines (e.g. Ristimaàki, J.; Maricq, M.; Keskinen, J.; Virtanen, A.; Maricq, M.; Aakko, P. Cold temperature PM emissions measurement: Method evaluation and application to light duty vehicles. Environ. Sci. Technol. 2005, 39, 9424-9430.)	Reject. This is a ermerging technology that is becomes commerically important will need to comply with regulations that limit PM emissions.
37014	8	17	2	17	4	Suggest rewording this sentence to say, "In North America, South America, and Europe, over half of black carbon emissions result from the use of diesel and heavier distillate fuels in transport".	Accept
31442	8	17	24	17	36	We think that the information on release of f-gases (from air-condition and refrigeration) should be updated and extended. Since the use of equipment containing f-gases is increasing, we question the statement in line 35-36, and think that the need for regulation and substitute - gases (low GWP HFCs and natural refrigerants) should be highlighted.	Reject - This recommendation is policy perscriptive and does not seem to as central to transport as mitigation potentials for the transport sector.
21962	8	17	24	17	32	The 'continuous constant emissions from 2000' paper is problematic when considering the real and measurable impact of different transport modes on the climate, and has the danger of providing to misleading insights to policymakers.	Reject. This is indeed unrealistic from an emisisons prespective but provides imporatnt information in comparisons of climate forcing of current day emisisons. This data is not used in the polcy section of chapter 8 and used to show the relative impact of different pollutants from transport.
37018	8	17	27	17	28	p. 17, lines 27-28. Should reference ultra-low sulfur diesel and biodiesel here as greatly reducing particulate emissions, even without dedicated pollution control equipment. Similarly, diesel particulate filters require low sulfur diesel.	Reject - This is not universally true and the reduction are not great compared to a diesel particulater filter.
21963	8	17	33	27	35	Emphasis here should be give to how these strategies would complement others focussing on long-lived species.	Reject. Ths is for policy makers to decide.
26529	8	17	33		36	Take out	Reject. This is important information
34531	8	17	36	17	36	It is proposed to add a new sentence after "with time (Prinn et al., 2000).": "Reduction of sulphur oxide (SOx) and NOx emission from ships entered into force from 1 July 2010, and for Emission Control Areas (ECAs), further mandatory targets of 90% reduction for fuel sulphur by 2015 and 80% reduction for NOx emission by 2016 are also set by IMO (IMO, 2008); moreover, fuel sulphur standards, NOx standards, and EEDI requirements stipulated by IMO could be positive on the emissions of black carbon from ships (IMO, 2012a)." It needs to provide the policies for ships that are already in place for reducing SOx, NOx and black carbon, otherwise it is easy to cause misunderstanding and implies that duplicated short-term mitigation strategies for these short-lived agents should be addressed in shipping community. (Reference: IMO (2008). Resolution MEPC.176(58) - Revised MARPOL Annex VI. International Maritime Organization, 4 Albert Embankment, London SE1 7SR. and: IMO (2012a). BLG 17/10 - Report of the Correspondence Group. International Maritime Organization, 4 Albert Embankment, London SE1 7SR.)	Accept. This is a good reference

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
21964	8	17	38	17	40	Comment regarding 'non-co2 emissions historically constrained by local air quality', does not apply to most of shipping which occurs on the high seas, where such measures are not relevant	Reject. Emissions from ships in ports is a critical issues in some citiies for air quality. This text will be revised for clarity.
29806	8	17	4			Reference Bond et. al., 2013 is missing	Accept. Will add.
25880	8	17	48	18	2	I would suggest also referring to Directive 2008/101/ec of the European parliament and of the council of 19 November 2008 amending directive 2003/87/ec so as to include aviation activities in the scheme for greenhouse gas emission allowance trading within the community. Official Journal of the European Union 8, 3–21. URL http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:008:0003:0003:EN:PDF	Reject. This is more appropriate for the polciy seciton.
37019	8	17	48	18	2	This sentence should cite more than regional European policy. Recommend adding reference to MARPOL VI, international shipping policy on reducing aerosol and sulphate emissions. Suggested citation: International Maritime Organization, Revised MARPOL Annex VI: Amendments to the Annex of the Protocol of 1997 to Amend the International Convention for the Prevention of Pollution From Ships, 1973, as Modified by the Protocol of 1978 Relating Thereto. In International Maritime Organization, Ed. International Maritime Organization: London, UK, 2008; Vol. MARPOL Annex VI, p 45.	Accept
37020	8	17	48	18	2	The sentence beginning on the last line of page 17 and continuing into page 18 currently reads that additional pressures to reduce aviation are being implemented. Is this the intended meaning? Suggest rewording for clarity.	Appropriate references have been added to clarify that this is happening.
30923	8	17	6	17	9	In North America, air emission regulations already in place for LDVs and HDVs are expected to address the majority of black carbon emissions through measures to reduce PM 2.5. The issue is gaps in science and understanding in BC emissions impacts in the Arctic, particularly pertaining to BC dispersal rates from sources other than transportation such as forest fires, kilns and open-wood ovens, and the relative contribution of BC emissions from marine shipping sources particularly those operating in the Arctic.	Not clear what is being recommended here. We agree with this points but this is what is stated
32423	8	17	1	17	2	Please refer to WGI AR5 Ch07.	Accept.
32424	8	17	14	17	14	Please provide a more specific reference to the WGI AR5 contribution, i.e., chapter/section.	Accept.
40697	8	17	33	17	36	"Short-term mitigation strategies that focus on black carbon, contrails from aircraft, and ship emissions can play an important role in developing pathways for climate mitigation (Shindell et al., 2012)." The sentence which includes “can” expresses subjective interpretation. In this regard, the sentence should be deleted.	Reject - Can here is clearly refering to a mitigation option.
32425	8	17	38	17	41	Please specifiy that you probably refer to near-surface/tropospheric ozone.	Accept. Reworded
40698	8	17	48	18	2	"Additional pressures to reduce aviation emissions and national and international programmes to reduce aerosol and sulfate emissions from shipping are being implemented (EC, 1999)." “Additional pressures" to reduce aviation emissions does not make sense. Moreover EC(1999) is too old to be referred in AR5, which should include recent activities after AR4. The sentence should be deleted.	Accept. New Reference added.
24510	8	18		34		The main sections on mitigation options (8.3 and 8.4) lack a clear structure. Chapter 8.3 deals almost exclusively with technological, vehicle-based options. Other issues are taken up in 8.4, but is not clear why the vague title Infrastructure and systemic perspectives is chosen there. A suggestion would be to consolidate (and shorten by up to 5 pages) the two Chapters 8.3. and 8.4 into one coherent section on mitigation options, from technological issues to mode shift etc. The A-S-I approach may serve as a guiding structure. The importance of a package of push and pull policies, especially for urban transport, is not very explicitly dealt with. Several policies are ignored, including vehicle scrapping and speed policies/ impact of speed on emissions.	Taken into account - I think we're stuck with current structure but it has gotten much shorter, will look at how to better align the two sections

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
21965	8	18	1	18	2	Data source/reference too old given recent developments in shipping	Taken into account - shipping section now much shorter but will check references
25881	8	18	13			Also discuss the importance of turnover time in this context.	Accept - lock-in addressed
37021	8	18	13	18	32	Suggest deleting this FAQ section. The placement is awkward and the information is unneccessary and redundant	Taken into account - will check on thisReject. FAQs are imposed requirements. Now moved to end as for all chapters
37022	8	18	15	18	18	This first sentence has been said many times in the text, adding to the repetitive nature of the chapter.	Accepted, changed
20862	8	18	17	18	21	To shift to lower carbon fuels and energy carriers, not only biofuels and renewables but also nuclear energy is important. This point should be noticed.	Accepted, changed
33240	8	18	17	18	22	Please name all 4, not only 3 families of mitigation alternatives: reduce travel, mode shift, vehicle efficiency, and fuel switch. They all can be interrelated, but still they are different families and should be thought of individually	Agree, corrected
29807	8	18	18			Why only compact cities. The trips needs shortening in sprawled out cities.	Accept
26530	8	18	18			in compact… ADD: and multifunctional cities (a compact city may not have at the neighborhood level sufficient services and amenities to reduce mobility !)	Rejected, not enough room, too subtle a nuance…
25737	8	18	20	18	21	The part of "electricity generated by renewables" should include "nuclear power" because nuclear power is also zero emission electricity. Nuclear power has contributed largely to reduce CO2 emission in the world and has a merit to reduce CO2 emission more economically than renewable energy, as described in (Weisser, 2007, page1). This literature is listed in the No2 line of this table.	Accepted, changed
34900	8	18	21			Detail: low-C electricity can originate also from CCS and nuclear.	Accepted, changed
37023	8	18	23	18	23	The parenthetical example "(land, air and waterborne)" can be deleted.	Accepted, changed
27806	8	18	23	18	24	For shipping the potential efficiency ("5-30%" efficiency gains for new ships!) refers only to NEW ships. I would recommend using the total CO2 emission-reduction "by up to 63% per tkm by 2050" (see page 20 line 42). This is also more consistent with the SPM-chapter, where it says on page 18 / line 23+24: Aircraft could achieve efficiency improvement of 50% by 2050 compared to 2005 levels and ships around 60% per tonne kilometre by 2050.	Accepted, changed
21967	8	18	27	18	32	This paragraph starts to discuss 'the potential of transport mitigation options' in terms of percentages of energy efficiency, without presenting it in terms of co2 potential, which is confusing.	Accepted, paragraph reworded
33241	8	18	27	18	28	Please mention the most important option first: mode shift! From figure 8.1.6 it is clear that for passenger, a mode shift from LDV to bus brings reductions of 40-80%, while for freight, a shift from truck to rail brings reductions by 70-95%	Mode shift is in 8.4. The importance of modal shift is emphasised throughout the chapter. This comment presumably relates to the FAQ8.2 box. The initiatives are arranged in the conventional ASIF order with the structural / modal shift action listed second. This does not mean that it is less important in terms of potential carbon savings
30116	8	18	29			Modal shift, not sift	Accepted, corrected
24049	8	18	29			modal shift instead of sift	Accepted, corrected
34901	8	18	29	18	30	Detail: is all of this part of the sentence in the range of "5-30%" if not make it clearer.	Accepted, corrected
27805	8	18	3	18	3	Different ways to replace oil products in the transport sector are mentioned. The possibility to generate gaseous and fluid fuels with regenerative electricity (power-to-gas and power-to-liquid) is not regarded.	Rejected - those are not mainstream approaches, we don't have room for very exotic approaches…

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
26531	8	18	30		32	TAKE OUT	Relevant sentence removed
21968	8	18	33	18	39	This sentence suggests that improved engines could yield a 50% improvement for aircraft. There is no evidence to back up this statement, and I would suggest that even including all airframe technologies in addition to engines, that this is highly optimistic	Taken into account - the efficiency refers to whole vehicle/vessel, so engines only part of this. 50% supported by 8.3
21969	8	18	39			I'd suggest adding the following references for the 2020 targets: http://ec.europa.eu/clima/policies/transport/vehicles/cars/docs/study_car_2011_en.pdf and http://ec.europa.eu/clima/policies/transport/vehicles/vans/docs/report_co2_lcv_en.pdf as well as the recent NAS study: https://download.nap.edu/catalog.php?record_id=18264	Paragraph removed - we no longer mention any 2020 targets
21966	8	18	4	18	26	The thrust of this section is somewhat muddled. The beginning suggests that behaviour and practices will only be considered in the context of mitigation technologies in this section, ie so other behavioural measures, such as spending more time at home rather than travelling, for non-technical reasons, are omitted. Yet, in the next paragraph, one of the options for mitigation is cited as 'avoidance of unnecessary travel', which is not a technology-related measure. Consistency is needed. Also, there is an opportunity here to make it technology related by discussing virtual connectivity, but this is not considered.	Taken into account - with various cuts I think this issue now resolved.
21970	8	18	40	18	45	LDV drive trains – should at least mention that "average CO_2 emissions of new model LDVs in 2010 were 140 gCO_2/km" in stylised laboratory-based test cycles, not in real world driving conditions, where emissions are typically around 15% higher. This is later recognised as a 'behavioural aspect' in 8.3.6, but I think it ought to be acknowledged up front when referring to mean emissions per km.	Taken into account - not enough room for all that but a few words added
21971	8	18	44	18	45	25% or more', is this in total for road transport, or per passenger-km, needs to be clearer	Accepted, per km added
24674	8	18	11	18	12	While there is some excellent data and material in this chapter, mitigation options should be prioritised by their potential and cost. A key barrier to freight energy management is the difficulty of collecting data to enable evaluation of different mitigation strategies - i.e. capturing data to evaluate the effects of varying routes, vehicles and loads so that the energy and emissions savings from improvements can be understood. Quantifying the benefits of changes (e.g. improved maintenance or load scheduling, or more efficient vehicle models) is essential to enable a business to justify the additional investment. Suggest Add a paragraph: 'A key barrier to freight energy management is the difficulty of collecting data to enable evaluation of different mitigation strategies - i.e. capturing data to evaluate the effects of varying routes, vehicles and loads so that the energy and emissions savings from improvements can be accurately understood. Quantifying the benefits of changes (e.g. improved maintenance or load scheduling, or more efficient vehicle models) is essential to enable a business to justify the additional investment.'	Taken into account - good idea but no room. This is a very good point with which we concur. We will incorporate a reference to difficult of assessing the cost effectiveness of carbon mitigation efforts in the freight sector. An attempt is made in section 8.6 to estimate this cost effectiveness for a range of these measures.
24675	8	18	15	18	32	Home-based work taking advantage of ICT and broadband internet services may be another way to reduce transport needs, at least for commuting, and associated congestion. Suggest Revise to: 'Transport is a key enabler of economic activity and social connectivity and its carbon emission are driven by the overall travel demand, mode structure, fuel intensity of each mode and vehicle, and the carbon content of the fuel. As such, three families of mitigation alternatives exist: avoidance of unnecessary travel, for example through shortening distances in compact cities, telecommuting and home-based work, shifting transport to more efficient modes, such as public transport, walking and cycling, improving efficiency of the vehicles and optimising their operations, and shifting to lower carbon fuels and energy carriers, such as sustainable biofuels and electric vehicles relying on electricity generated by renewables.'	Accept- reworded

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
24676	8	18	34	18	45	Figures of up to 50% improvement and 25% or more are separately presented, without an explicit link. Suggest amend lines 36-39 to: 'Recent estimates suggest substantial additional, unrealised potentials exist with up to 50% improvements in vehicle fuel economy 38 (MJ/km) compared to similar-sized, typical 2007-2010 vehicles (Bandivadekar, 2008; Greene and Plotkin, 2011) through a combination of drivetrain improvements and load reduction.' Similar or slightly lower potentials exist for trucks, ships and aircraft.	Taken into account - a change like this has been made, that clarifies the Pct changes for different units
29852	8	18	25	18	25	Spelling : « waking and cycling»	Accepted, changed
29853	8	18	30	18	32	The last sentence of this box is such a commonplace that it can be deleted without affecting the .	Accepted, changed. this for lay audience - but reworded
21972	8	19	1			EU car emissions were 135.7g/km in 2011.	Taken into account - will check on this
37026	8	19	13	19	15	Tthe cited report cannot be found on the web. Is the relationship between fuel economy and vehicle weight linear? Under what scenarios/part of the curve (I'm sure it isn't linear over all weights) is this valid. May be a good place to put a footnote.	Taken into account - fair questions, all we can do is qualify the statement as the relationship is undoubtedlly complex.
33242	8	19	15	19	17	4) decrease vehicle size	Taken into account - point is correct but it is covered by the mention of weight and aerodynamics.
37027	8	19	18	19	19	Change "Other changes that reduce loads include more efficient air conditioners, heaters, and lighting; improved aerodynamics, and lower rolling resistance tires." to ""Other changes that reduce loads include more efficient air conditioners, heaters, and lighting; improved aerodynamics; and lower rolling resistance tires and road surfaces." One citation for the road surfaces point is: Akabarian and Ulm 2012 (http://hdl.handle.net/1721.1/73847). Other citation exust as well.	Taken into account - point is valid but this is about vehicle technologies; road surfaces should be mentioned in operational conditions section
37028	8	19	19	19	20	It would be nice to see a breakdown of these non-drivetrain changes.	Accepted - yes it would, can try
21973	8	19	22			"…by up to half" should be replaced by "at least half". Current evidence suggests higher potential (see references to EU studies.)	Accepted - will reference new NRC study
21974	8	19	25	19	31	Limited discussion of behavioural aspects	Right, they are not supposed to be here…they are at the end of Section 8.3
34265	8	19	25	19	31	"OA FE improvements by the LDV fleet will depend on multiple factors, including the extent to which automakers focus on efficiency and CO2 emissions vs vehicle perf and other features; the size distribution of vehicles chosen by consumers; and changing preference to purchase the most efficient vehicles. Policies can help to encourage production and sales of the most efficient vehicles. Actual in-use FE will also depend on a range of factors. Such as driving conditions […], DRIVING PRACTICES and vehicle maintenance." DRIVING PRACTICES as well have to be encouraged...	Relevant paragraph cut
37029	8	19	28	19	28	p.19, line 28. Policies of fuel consumption/GHG emission standards are extremely important for producing and selling efficient vehicle models.	Taken into account - this is covered in the policy section later
21975	8	19	29	19	31	Better test procedures are needed to ensure that in-use emissions improve as much as test emissions. See e.g. http://ec.europa.eu/clima/policies/transport/vehicles/cars/docs/report_2012_en.pdf	Taken into account - this is partly covered in 8.3.6, though I agree it would be good to say more about this, but not really room.
24050	8	19	30			please insert 'such as fuel prices, driving conditions ...'	Relevant paragraph cut
26533	8	19	31			ADD including urban constraints on most polluting vehicles	Relevant paragraph cut
32741	8	19	33			Reference for 45% thermal efficiency.	Taken into account - will add a reference

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
37024	8	19	4	19	6	The share of hybrids may be small, but it's changing. For instance, hybrids are increasingly the choice vehicle for new taxi purchases in the US. The paragraph seems to imply that the only major thrust of sales is in Japan.	Taken into account - we will update situation through 2012
21976	8	19	40	19	41	EU evidence shows comparable potential. See: http://ec.europa.eu/clima/policies/transport/vehicles/heavy/docs/icct_ghg_reduction_potential_en.pdf	Accepted - will add citation
24519	8	19	40	20	2	The statements both on availabilty of advanced technological solutions outside OECD as well as on the larger HDVs ("no adverse effects") seem too optimistic and, in the latter case, biased. Would recommend checking literature especially on larger HDVs again (considering effects such as possibly increased need for maintenance of roads, road safety etc.).	Relevant paragraph cut
37030	8	19	45	20	1	Disagree that the cited report says that increasing truck capacity can significantly reduce CO2 emissions *without adverse impacts.* The infrastructure section of that report (pp. 26-29) is very careful to hedge on the implications of increased axel weight on infrastructure life. They say: "Such investments, however, need to be considered carefully, as in some cases the costs of adjusting infrastructure to accommodate higher capacity vehicles could outweigh the benefits of their introduction." Some hedging of your language to make it no longer sound like adding to vehicle weight will have no effect on infrastructure (sounds like high certainty) is necessary. Also note that the cited report only discusses the cost of infrastructure. As you discuss in the infrastructure section, it is unclear how the lifecycle energy cost of road maintenance and repair contributes to GHG emissions or primary energy consumption. Chester and Horvath are the only ones who have looked into it.	Relevant paragraph cut
37025	8	19	5	19	5	"few" should be "small"	Accepted, corrected
26532	8	19	7		9	TAKE OUT	Relevant paragraph cut
29854	8	19	6	19	6	Orthography : « 2 million »	Accepted, changed to "two"
24677	8	19	15	19	17	Higher strength steels can provide similar weight reduction to aluminium, with lower embodied energy. Suggest they should be mentioned here. LDVs can also be designed using current technology to make better use of space and therefore enable smaller vehicles to perform similar roles to larger ones in the past. Vehicle emissions and fuel consumption standards have an impact here, which partly explains why there is a much wider range of space-efficient vehicles in the Japanese market than in Australia. Suggest Revise to: 'There are three basic approaches to reduce weight (NRC, 2011a): 1) Incremental redesign by removing material from the structural body; Substitution of mild steel with high strength steels, aluminium and carbon fibre; and 3) Fundamental redesign of the vehicle structure for lightness and better use of space.'	Rlevant paragraph cut, this is interesting but won't fit.
30924	8	19	32			An important mitigation option not addressed in this section pertains to anti-tampering of HDV emission control and fuel saving devices. Tampering of these devices after the vehicle has left the manufacture can significantly undermine the effectiveness of CAFE and tailpipe emission standards, if counter measures not put in place (e.g., inspection and enforcement regimes, promotion and education campaigns, etc).	Taken into account - good point but no room, we don't really cover after-market aspects in much detail.
21977	8	20	1			"without adverse impacts" is highly contested. There are two problems, increase in demand due to the rebound effect from lower costs and the abstraction of traffic from competing modes with lower GHG emissions eg rail and IWW. See e.g. http://www.isi.fraunhofer.de/isi-en/service/presseinfos/2009/pri09-06.php As a result it is not clear what the final GHG impact would be.	Relevant section removed
21978	8	20	1	20	5	Driving practices omitted when discussing trucks and buses in urban areas.	Rejected - not enough room
24051	8	20	1			please add 'without adverse impacts as long as this does not lead to a modal shift from rail to road'	Relevant section removed
25882	8	20	22	20	25	Also mention the potential modal shift from air to rail.	Belongs in 8.4

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
33243	8	20	22	20	24	why don't you give the numbers from figure 8.1.6: "with efficiency gains in the range of 70-95% for freight and 40-80% for passenger"	Rejected - that figure is CO2 per pkm/tkm, this section focuses on vehicle technical efficiency. A reference can be made back to figure 8.1.6 - assuming that this graph remains in this form in the final draft
21979	8	20	27			This statement is not true for RO-RO and super-fast ferries. When ship emissions are disaggregated it is clear that these have higher emisisons than road haulage per tonne-km. See: http://ec.europa.eu/environment/air/pdf/transport/final_report.pdf page 95	The average emission factors clearly depend on the level of modal aggregation. Reference my be made to fact that the range of emission factors for particular modes can overlap.
21980	8	20	27	20	33	There is a bias in how the projected increase in shipping emissions is presented here. In the IMO study, projections are for 100% higher than year 2000 by 2050 for the 'low emission family' to 200% for the 'high emissions family'. (see Anderson & Bows, Carbon Management 2012, 6, 615-628. Saying instead '50% or more above 2008' does not give teh reader this sense of expected potential significant growth.	Relevant section removed

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
35268	8	20	30	68	25	Several descriptions of IMO and ICAO decisions and agreements are not correct or precise. In order to avoid misunderstanding, it is suggested to make the following revisions: (1) At the end of line 27, page 5, a sentence should be added as follows: "Short-term reductions had already been reflected by the significant mandatory requirements of reduction of NOx emission from ships and associated reduction of black carbon [8.2.3]." The IMO has already regulated NOx emission as short-term reduction, which should not be ignored. (2) The current sentence from line 30 to 33 on page 20 is totally a factual mistake, amendments as the follows should be made. "The International Maritime Organization (IMO) has devised an Engine Efficiency Design Index for new ships contracted for construction from 1 January 2015 and onwards, and Ship Energy Efficiency Management Plan (SEEMP) for all ships from 1 January 2013 (IMO, 2011) (8.3.2; 8.10.3). Developing countries such as Brazil, China and India implemented the IMO regulations in order to reduce CO2 emission without delay, although it is allowed for them to waive the EEDI requirements." (Reference: IMO (2011). Mandatory energy efficiency measures for international shipping adopted at IMO environmental meeting. International Maritime Organization. Available at: http://www.imo.org/MediaCentre/PressBriefings/Pages/42-mepc-ghg.aspx) (3) The two paragraphs from line 9 to line 22 on page 68 are not accurate, and should be replaced by the following content. "Energy intensity. Reduction of GHG through technical and operational measures, i.e. implementation of Energy Efficiency Design Index (EEDI) for new ships and Ship Energy Efficiency Management Plan (SEEMP) for all ships, which are effective from 1 January 2013 as required by IMO Resolution MEPC.203 (62), could increase efficiency and reduce the emissions rate by 25% to 75% compared to the emissions in 2007 (IMO, 2009; IMO, 2011). Furthermore, when a minimum energy efficiency level for different ship types and sizes is expected to cover as much as 70% of emissions from new ships, approximately 25-30% reductions can be achieved by 2030 compared with business-as-usual (IISD, 2011). It is estimated that in combination, EEDI requirements and SEEMP will cut CO2 emission from shipping by 13% by 2020, 23% by 2030 and 39% by 2050 (Lloyds Register and DNV, 2011). Some developing countries are also adopting increasingly aggressive performance standards, for example, China regulated the energy intensity for ships in operation in June 2011 (MOT, 2011) which requires cutting GHG emissions per freight by 15% by 2015 below 2005 levels." (Reference: IMO (2009). Second IMO GHG Study 2009. International Maritime Organization, 4 Albert Embankment, London SE1 7SR. and: IMO (2011). Mandatory energy efficiency measures for international shipping adopted at IMO environmental meeting. International Maritime Organization. Available at: http://www.imo.org/MediaCentre/PressBriefings/Pages/42-mepc-ghg.aspx and: MOT (2011). Implementation of energy-saving and emission reduction scheme in transport section under "National Twelfth Five-Year Plan". Ministry of Transport (MOT) of the Government of the People's Republic of China, Beijing.) (4) According to Kyoto Protocol, "the Parties included in Annex I", instead of all ICAO member states, were assigned the responsibility for international aviation GHG emission reduction. Thus, the original text from Kyoto Protocol is suggested to be added here as follows: "The Parties included in Annex I shall pursue limitation or reduction of emissions of greenhouse gases not controlled by the Montreal Protocol from aviation and marine bunker fuels, working through the International Civil Aviation Organization and the International Maritime Organization, respectively." (Kyoto Protocol 2.2	Agreed. The text will be altered to take account of this correction.Taken into account - thanks for good suggestions but most relate to paragraphs that have been eliminated or are too detailed for what remains. Some of it might fit in the policy section. Looks like some ICAO comments relate to section 8.10.4.
30925	8	20	30	20	30	It is an "Energy" Efficiency Design Index, not "Engine"	Relevant section removed
27807	8	20	30	20	33	The EEDI (Energy Efficiency Design Index) entered into force on the 1. January 2013 (starting with a two year "phase zero" when new ship design will need to meet the reference level for their ship type). So the EEDI is in force for ships build after 1/2013 (in the text it says 2015!). The first reduction-level (-10% under the reference line) will start 2015. The next reduction limit (-20%) will come 2020. I think the sentence does not describe that clearly.	Relevant section removed

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
29191	8	20	30	20	33	This has over simplified the details of the Energy Efficiency Design Index (EEDI) which was adopted by the IMO in July 2011. Please rephrase this as- 'The International Maritime Organization (IMO) has devised an Engine Efficiency Design Index for ships and set minimum standards for new vessels registered after 2015 and 2020.The EEDI entered into force on 1 January 2013, although States that wish to may exercise a waiver for up to four years. This is supplemented by a voluntary Ship Energy Efficiency Management Plan for new and existing ships.'	Relevant section removed
30926	8	20	31	20	32	EEDI applies solely to new ships, and came into effect January 1, 2013, not those registered after 2015. In addition, the SEEMP is mandatory, not voluntary, and came into effect January 1, 2013.	Relevant section removed
23400	8	20	31	20	33	The Ship Energy Efficiency Management Plan for new and existing ships is mandatory rather than voluntary.	Relevant section removed
27808	8	20	34	20	44	To specify possible and feasible abatement options for shipping we recommend citing from IMO 2009 instead of combining various individual studies. The IMO-study is widely accepted. Please note: It is not possible to combine all possible measures with each other. Additionally: It is recommended to add the following: From a technology and design perspective [...], and weight reduction (Notteboom and Vernimmen) and the use of innovative energy efficient technologies (i.e., air lubrication systems, wind propulsion systems, waste heat recovery systems or photovoltaic power generation systems)".	Accepted, sentence modified to include these measures, IMO 2009 reference put first.
26771	8	20	37			Include Flettner Rotors in the list of efficiency savings. Enercon claim to have managed a 40% reduction in fuel usage due to their use of the E-Ship 1. There are no papers of this particular ship, although the concept is discussed in a range of literature, including: Salter S, Sortino G, and Latham J,"Sea-going hardware for the cloud albedo method of reversing global warming", 10.1098/rsta.2008.0136 Phil. Trans. R. Soc. A 13 November 2008 vol. 366 no. 1882 3989-4006	Taken into account - will check on this
26773	8	20	37			Waste heat recovery systems need to be in this list	Accepted, added
26784	8	20	37			Possibly the turbosail should be included in this list, though it is not a technology used on any commercial ship at the moment: http://worldwide.espacenet.com/publicationDetails/biblio?CC=US&NR=4630997&KC=&locale=en_gb&FT=E	Taken into account - sails mentioned in following paragraph
26789	8	20	37			Use of renewables and alternative energy sources should also be in this list. For example, PV (although offering a small % saving in large vessals, but 100% saving for small vessals) is increasingly being used on ships, a number of recent examples are: Emarald Ace, Auriga Leader, Turanor Planet Solar and Sun21 . However, the options for renewables are far greater during cold ironing for port stays. Additionally, with beter storage technologies, fully electric ships, assuming the electricty has a low GHG impact, could help reduce emissions from shipping.	Taken into account - good points, will try to fit something in on this.
30927	8	20	39	20	44	We would suggest the CO2 savings identified from retrofit and maintenance measures are overstated - and that there is only one source (from 2009) used to support the estimates.	Taken into account - will check on this
27147	8	20	46	21	3	Reduction in shipping emissions between 2008 and 2010 was not all attributable to slow-steaming. A large proportion of the reduction was due to reduced demand following the recession.	Relevant sentence removed
21981	8	20	46	21	2	Whilst slow steaming can reduce emissions, there is a knock-on impact regarding the potential need for new ships in order that supply rates can be upheld.	Accepted - added mention of this.
26152	8	20	46	21	1	Add a reference:(Xie,2012)	Taken into account - will check on this
23399	8	20	14	20	15	The result of energy-usage comparision between HSR and conventional rail seems not so clear. The INTERNATIONAL UNION OF RAILWAYS (UIC, 2010) indicate that the trains running at higher speeds consume less energy through various real case studies. Ref: High speed, energy consumption and emissions, Study and Research Group for Railway Energy and emissions, UIC, 2010.	Relevant paragraph cut
23398	8	20	14	20	17	If the HSR is more energy intensive, which factor or process make it one of efficiency measures that have contributed to a reduction in CO2 emission intensity of China.	Relevant paragraph cut

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
24678	8	20	22	20	25	The emissions mitigation potential of a shift towards rail is a very important point- suggest that it should be made more prominent. Add the following to FAQ 8.2, Section 8.3, 18, line 32: 'Railway systems are already relatively carbon efficient, and a significant modal shift from road and short-medium aircraft to rail may offer the largest potential mitigation, depending on the types of freight or passenger travel shifted and the load factors involved (IEA, 25 2009).'	Add to 8.4 possibly. Agree with this general point and will consider adding this reference to the IEA - within the space constraints
30928	8	20				We note that the authors seem to be deriving their information from an IMO press release and not primary sources (reference IMO 2011, which is a press release). We suggest the authors refer to MARPOL, Annex VI, Chapter 4 and the associated guidelines for the SEEMP and EEDI.	Taken into account - will check IMO references
40699	8	20	30	20	31	The EEDI (Energy Efficiency Design Index) developed at IMO applies to a ship of which building contract is placed on and after 1 January 2013. Therefore, "for new vessels registered after 2015 and 2020" should be replaced with "for new vessels of which building contract are placed on and after 1 January 2013".	Relevent sentence - mention of EEI removed, maybe add to policy section?
40700	8	20	37	20	37	"aerodynamics" should be replaced with "hydro and aero dynamics" since theoretically hydro dynamics has large influence than aero dynamics from energy efficiency point of view.	Accepted - change made
40701	8	20	45	20	45	This background document was developed in equal collaboration of Japanese MLIT (Ministry of Land, Infrastructure, Transport and Tourism) and WSC. Therefore, "(WSC, 2011)" should be replaced with "(WSC and MLIT, 2011)".	Accepted - change made
20109	8	21	10	21	26	The "slower aircraft"and the "flying wing" options for GHG reduction are not mentioned here, and could be. I remember of a paper by Jonas Akerman comparing both options as risk adverse and risk taking	Accepted, mentioned now, reference Akerman J included; thank you.
21983	8	21	11	21	18	Comment that the 'use of larger aircraft also has the potential to reduce CO2 emissions significantly' is not scientifically robust or justifiable	Rejected - disagree - most efficient aircraft today per seat-km are the largest ones. But will check the citation
21984	8	21	19	21	26	The language of 'emission reductions' should be discussed in the context of growth, or, discussed as emissions intensity savings, as otherwise the reader would be forgiven for thinking that co2 savings are likely to be seen in the aviation sector when they are unlikely due to growth rates. Again, see Bows, Aviation & Climate Change: confronting the challenge, 2010, Aeronautical Journal, 114,459-468,for more information on potential future scenarios and where aviation emissions are heading according to the literature.	Taken into account - true for this entire section, we rely on intro materials to make this clear. Thank you; unfortunately, text of 8.3.2.6. you are reffering to is no longer in the new version
23401	8	21	2	21	5	The 2 references cited here has nothing to do with each other, so there are two examples here. The sentence should be corrected as follows: As an example, total CO2 emissions from deep-sea container shipping were reduced by 11% between 2008 and 2010 (Pierre, 2011) . As another example, the resulting fuel savings more than compensated for the costs and emissions from running additional ships on some routes to maintain capacity for a long-haul liner service line(Meng and Wang, 2011).	Relevant section removed
37032	8	21	21	21	22	What is the magnitude of reductions by adding winglets? Also, Gohardani et al 2011 is not about winglets but about distributed thrust.	Taken into account, will mention winglet impacts - Gohardani relates to engines, Marks to winglets
37033	8	21	24	21	24	Should add the year to citation, e.g., Pyrialakou et al. 2012. Also remove duplicate reference in bibliography. Comment also applies to line 26.	Accepted, corrected.
24052	8	21	26			please insert: Necessary to mention that for aviation warming of CO2 is less than half of full warming (radiative forcing). And that formation of contrails and cirrus clouds is independent from fuel (even if hydrogen) ... this could be avoided from other routing / altitudes	Accepted, good point, will see where best to put this. Thank you, agree, but not possible to insert this sentence, as the new version is shorter. 8.2.3.6. no longer exists

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
30316	8	21	32	21	32	Please be careful to the phrase "turbines for rail and other ground vehicle applications". I think that turbines are not a promising technology option for road vehicles even in the long term. If you continue to use this expression, please use reliable reference(s) which can convince us.	Accepted, corrected.
32742	8	21	34			These sections on new powertrains could be included with each review of modes given earlier. This would reduce the number of pages in the Chapter. In addition, the reviews presented in §8.3.2 include suggestions of novel vehicle powertrains which may be repeated in §8.3.3.	Taken into account - we have condensed a lot, thought not quite this way…
21985	8	21	35	21	38	Tailpipe emissions are not the key issue. Reducing transport GHG emissions means reducing total GHG emissions per unit of transport. Whether the emissions come from the energy supply or in the use of the vehicle, both must be included in the comparison.. Similarly with comparison of efficiency. The main inefficiency in the electric vehicle system is in the electricity generation which may be 30 to 40% efficient. Overall WTW efficiency won't be so different at present.	Not quite clear what this refers to - we do state in many places that upstream emissions are key for Evs and matter for all modes.
30317	8	21	36	21	36	The expression "low-carbon electricity" is a bit difficult to understand. This expression should be revised, e.g., to "carbon-neutral electricity" or "electricity produced from low-carbon feedstock".	Accepted, changed to "low-carbon electricity generation"
35269	8	21	37	47	46	The assessment on electric vehicles and biofuels is not comprehensive. The mass use of battery electric vehicles (BEVs) still faces several challenges, which include the following: 1) The environmental impact of processing used batteries 2) From the life-cycle assessment perspective, BEVs may not be an effective mitigation option if the source of electricity is of high carbon intensity. The report has overestimated the share of biofuel in future aviation fuels. The potential of biofuel for aviation depends on whether sufficient land and water will be available, which is still of high uncertainty. Furthermore, biofuel is not qualified, by many studies, as real zero carbon emission (Timothy D. Searchinger, Science, 2009). Thus, it is suggested to make the following revisions: (1) Add one sentence after"(Kromer and Heywood, 2007)" in line 37 on page 21: "However, there is a continuing debate over whether BEVs reduce CO2 emissions in countries like China, where power generation is dominated by coal." (Huo et al., 2010) (2) Add one sentence in line 46 on page 47: “However, electric LDVs may not reduce CO2 emissions.” (Robert E., Liping K.,Feng A. and Lucia G.W.,2011) (3) The emission reduction goal of 19% to over 50% from line 3 to 4 on page 69 is over optimistic. It is suggested to change the assumption to 10%, which is the most “likely” scenario by 2050 suggested by ICAO 2010 Environment Report.	Rejected - this comment mixes up many issues. In any case we are clear that Evs must have low-carbon electricity to be low carbon. Some bits refered to are now cut. And this section makes no projections of fuel shares. Thank you, text is shorte, but references included
37035	8	21	38	21	40	The sentence that states "...at present, commercially available BEVs typically have a limited driving range of about 110-160 km, long recharge times of four hours or more, and high battery costs leading to high vehicle retail prices" does not take fast charging (where a vehicle can charge up to 80% in 30 minutes or less) into account. While it is unlikely that fast charging will be used often, it is an important option for increasing convenience on long trips where the long recharge times are the most important.	Accepted, good point, added mention of fast charging.
37036	8	21	38	21	40	To the statement--> "ICE LDVs, but at present, commercially available BEVs typically have a limited driving range of about 100-160km, long recharge times of 4 hours or more, and high battery costs leading to high vehicle retail prices (Greene and Plotkin, 2011)." -->This has changed somewhat since the 2011 citation above. The Tesla Model S gets an EPA rated 425 km, and "super chargers" being deployed by the company provide customers with 240km of range from 30 minutes of charge time.	Taken into account - sentence says "typically". Telsa an outlier for now.

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26770	8	21	39			This is outdated, BEV can now charge up to 80% of capacity using rapid chargers such as the "CHAdeMO DC Quick charger" in 15 to 30 minutes. It is hard to get numbers of charging stations globally, but for example Zap Map (which seems the most comprehensive charging point map for the UK) shows there are 3130 charging point in the UK. 2% are Rapid Chargers (15-30min), 43% Fast Chargers (~4 hours) and 54% Slow Chargers (~8 hours).	Accepted, corrected
26788	8	21	39			The lifetimes of Li-ion batteries for BEV seem a little conservative, more papers should be referenced to give a more relistic range. The number of cycles is dependent upon the temperature, depth of discharge and charge/discharge rate. Something to consider is the talk recently to the American Chemical Society by Dr Mikael G. Cugnet, in which the range of lifetime for EV Li-ion batteries was suggested to be 5 to 20 years. I think some more papers should be considered for this line.	Relevant paragraph eliminated
37037	8	21	41	21	45	Recommend citing two seminal papers outlining the technology and economic feasibility for PHEVs. See below. Kempton, W.; Tomi, J., Vehicle-to-grid power implementation: From stabilizing the grid to supporting large-scale renewable energy. Journal of Power Sources 2005, 144, (1), 280-294. and Kempton, W.; Tomi, J., Vehicle-to-grid power fundamentals: Calculating capacity and net revenue. Journal of Power Sources 2005, 144, (1), 268-279.	Taken into account - a bit to detailed for us now, no room for this topic.
30318	8	21	42	21	43	The expression "but emit CO2 when their ICE is operating" should be revised to "but emit CO2 when their ICE is operating with fossil fuels".	Taken into account - if it's a hydrogen ICE there is no CO2 but this doesn't seem worth mention, could be confusing.
32743	8	21	43	21	45	Hydrogen FCV may also have onboard reformers to allow them to accept fossil-fuels, generating H2 on demand.	Accepted - added mention of this.
37038	8	21	43	21	45	The sentence "Hydrogen FCVs generate electricity on board to power a motor..." is repeated nearly word-for-word in the fuel cell vehicle section and should be deleted here.	Accepted - changed
31443	8	21	6	21	7	We think that a reference to to possible environmental gains would be more relevant here than the reference to gains in speed.	Accepted - changed
21982	8	21	6	21	9	Wind propulsion systems are mentioned here but not Flettner rotors which can also play a role. See Traut et al., conference articles at the Low Carbon Shipping conference in the UK.	Taken into account - will check on this
26785	8	21	8			A good further reference for kite based technologies would be the EU Life project, WINTCC, which included demonstrating the system on a cargo ship. However, the website and all associated reports are no longer online, so it is quite hard to reference. The layman's report is available here: http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=home.showFile&rep=file&fil=LIFE06_ENV_D_000479_LAYMAN.pdf	Taken into account - but no room for more on this…
25883	8	21	8	21	9	I do not see the advantage for a ship to get lift from a wind propulsion system.	Answer: there is less hydrodynamic resistance

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
33892	8	21	8	21	14	The text claims that “Further fuel efficiency gains of 40-50% in the 2030-2050 time frame (compared to 2005) could come from weight reduction, aerodynamic and engine performance improvements, and aircraft systems design (IEA, 2009a).” However, the IEA report only lists potentials. There is no technical proof that these potentials can be realized in the given time frame. I would expect a more realistic description of what reductions are feasible. For what I know for aviation research, the realistic potentials are far smaller.	Thank you, but text is smaller in the new version and 8.3.2.6 is outTaken into account - in this chapter, all efficiency estimates are technical potentials, in some cases combinations of individual technology estimates. There is not enough room here to go through all this, but sources like the IEA and others do report on details behind these numbers.
37031	8	21	8	21	9	This citation states 35%, not 30%. Also, it is not a peer-reviewed primary source, nor does it site that particular number.	Confusing - not sure what this refers to…
29856	8	21	8	21	9	“Flettner rotor” is missing in the list of wind propulsion systems that can reduce ships fuel consumption. It would be good to state the different types of sail systems that are available today: traditional sails, Dynarig (a square rig with freestanding and rotating masts) and wing sails (solid structures which resemble aircraft wings).	Taken into account - will check on this. yes, but text out in new version; thank you.
29855	8	21	1	21	1	Repetition : « Corbett et al., 2009 » and « Lindstad et al., 2011 » appear twice.	Accepted, corrected

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
27809	8	21	10	21	26	The focus is so far only on the CO2 emissions of aviation. This doesn't seem adequate. A second perspective should be added. Substantial global greenhouse gas reductions have to take place in the coming decades. Against this background, there is a need to take into account the entire global warming potential of aviation emissions. It has been suggested to use the RFI as a more meaningful metric for climate policy, since it expresses the total atmospheric effect of aviation (RF), close to real time. The relevant studies show a factor 2-3 as a mean estimate, if the other relevant warming factors by aviation are taken into account. But "whilst the different components of RF arising from aviation are useful for evaluating the present-day impact of historical emissions on climate, they do not necessarily reflect the impacts of present and future emissions on the future climate in terms of emissions equivalency", nor do calculations of present-day RF represent the forcing in terms of integrated RF. As discussed by Fuglestvedt et al. (2009), there is not a uniquely correct way to do this, but it depends upon the goals of a particular climate policy. In the Kyoto Protocol to the UNFCCC it was decided to use the GWP with a 100-year time horizon (GWP100) for this purpose (see Fuglestvedt et al., 2009, for definition and discussion of the GWP and other metrics). Recently Shine et al. (2005b, 2007) have proposed a new emission metric, the Global Temperature change Potential (GTP), that is designed to serve a policy consistent with a long-term climate target of constraining the global mean surface temperature increase below a threshold (e.g. the EU's target of keeping it below 2 °C above pre-industrial levels)." D.S. Lee et al.; Transport impacts on atmosphere and climate: Aviation; Atmospheric Environment 44 (2010) 4678–4734; here 4713f.); Lee et al. have presented a table that gives the GWP20, GWP100, GTP20, GTP50, GTP100 and CO2-equivalent emissions for these metrics for the various components of the aircraft emissions and the range caused by uncertainties in the metric values. Different time-horizons were chosen in order to illustrate the variability of values of GWP and GTP for the shorter-lived climate forcing agents. The time horizon of 50 years (TH50) for the GTP metric is used as such a time horizon may be consistent with that for stabilizing global temperature increase. This table 3 as the best available "Estimations of historical and current emissions from inventory models", 1990–2005, should be included in the text of Chapter 8 and referenced in the SPM (D.S. Lee et al. / Atmospheric Environment 44 (2010) 4678–4734, Table 3, p. 4686).	Accepted - good points, will see if we should address this here or 8.2. Thank you for comment. Reference Lee et all, 2010 is included; however, additional text can not be included, due to new version of 8.3., much shorter. Information in tables. 8.3.1. & 8.3.2 are relevant
26787	8	21	34			It could be added that in addition to BEV and PHEV, there are also supercapacitor/ultracapacitor based buses available, which can either be hybrid or totally electric, and charge at bespoke bus stops. I have no peer reviewed reference, although several companies do sell them (eg; http://www.sinautecus.com/index.html)	Accepted, will squeeze it in
30320	8	21	34			I recommend you to mention post Li-ion batteries such as all solid batteries, Li-metal batteries, Li-S batteries, and Li-air batteries. This is because substantial improvements in energy density and power density cannot be expected for Li-ion batteries.	Accepted, will squeeze it in
37034	8	21	34	22	36	This entire section is organized in a confusing manner, as it jumps between different technologies abruptly. It should provide an introduction into consumer uses of EVs and PHEVs, heavy-duty uses of EVs/PHEVs, and then describe the general need for improvements in batteries.	Accepted, section adjusted, should be clearer now

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
23402	8	21	34			i) Add the following sentence after line 36."Actually speaking, the overall progress of EVs promotion in China is not so good for some key reasons/obstacles such as inefficient fiscal budget, product safety, inadequate product reliability, lack of infrastructure and obscure roadmap, etc.(CGTI Report(2012),P118)" ii) Battery electric vehicles (BEVs) as one of mitigation technology options can be used to reduce energy and carbon intensity from new propulsion systems in transport sector. However, battery is difficult to dispose when it is used up and it harms environment. Battery would consume huge energy during its disposure process. Meanwhile, BEVs can sometimes cause electric energy short in some cities of regional developing countries. BEVs is maybe not a strongly effectively practice from life cycle assessment although BEVs is an useful mitigation option in recent years as they emit no tailpipe emissions and very low fuel production emissions when using low-carbon electricity. The mass use of BEVs is confronted more challenges in transport carbon intensity reduction.	Relevant section removed
23747	8	22	1	22	2	It is better to say "Ïnternal combustion engines (ICE) PHEVs do not have….". Rationale - Not only gasoline or diesel fuels are being used for ICE propulsion. NG and biofuels are other possibilities.	Relevant sentence cut
30319	8	22	1	22	2	The expression "have lower public infrastructure requirements" should be revised to "have much lower public infrastructure requirements" because this feature is regarded as the major advantage of PHEVs.	Relevant sentence cut
37041	8	22	13	22	14	p.22, lines 13-14. Cycle life of lithium-ion batteries on HEVs is being demonstrated to approach the life of HEVs and BEVs.	Relevant paragraph eliminated
37040	8	22	13	22	25	These two statements are out-of-date, as they quote a paper from 2010, and the technology has substantially changed since then. Recommend replacing the two sentences "The cycle life of a lithium-ion battery is about 1000 charges to below 80% depth of discharge, typically enough for 5 to 6 years of driving (NEDO, 2010.) This lifespan is targeted to double by 2020." with the statement "Current lithium-ion batteries meet the life requirements of EVs, ranging from 1000 to 5000 deep discharge cycles, or about 15 years. Although the advanced lithium-ion technologies needed to achieve the 2020 performance targets mentioned above currently suffer from low cycle life (less than 1000 cycles), research indicates that these technologies will reach the cycle life requirements by 2020." The citation would be the Department of Energy's 2012 Annual Progress Report in Energy Storage - U.S. Department of Energy. (2013). Energy Storage Vehicle Technologies Office 2012 Annual Progress Report. http://www1.eere.energy.gov/vehiclesandfuels/resources/vt_es_fy12.html.	Relevant paragraph eliminated
32744	8	22	15	22	18	The IEA report projecting Li-ion battery costs of $300/kWh lacksthe detail necessary to support these claims. Overall, the evidence for a number of the cost and efficiency projections of batteries in the literature is weak.	Taken into account - will replace with new NRC 2013 report, which actually projects costs to go below $300/kWh
32745	8	22	18	22	20	The wording of this sentence suggests the presence of multiple EV and PHEV models on the market which is not the case. Quantify “longer” range.	Relevant paragraph eliminated
32746	8	22	21	22	23	All vehicles have a limited range – quantify what is expected to be the maximum range for which electric heavy goods vehicles will be feasilble.	Relevant paragraph eliminated
26534	8	22	23		29	TAKE OUT	Relevant paragraph eliminated
37042	8	22	23	22	26	Perhaps trolley-trucks do not need to be mentioned, given that a number of other technologies with "limited and localized application" were also not mentioned in the chapter. If several studies have investigated efficiency related to trolley trucks, all studies should be cited (only one is presently cited).	Relevant sentence cut
27810	8	22	23	22	26	With regard to trolley lorries: It is unclear when and to which extent this will be possible. 20 years might be too long. Please change into at least 10 years for larger areas depending on the available resources. This could also be done with user payment.	Relevant sentence cut
32156	8	22	25	22	26	If only "trolley truck" use the electricity, it may high capital cost. However, trolley bus, or another BEV can co-use the same electricity line. Therefore, I suggest that we add this co-use scenario.	Relevant sentence cut

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
27811	8	22	28	22	29	Concerning induction: moving induction will never play a role for trolley lorries since this would need a switch on and switch off every 10 meters: this is technically not feasible and would increase the costs by a factor of at least 10.	Relevant sentence cut
32747	8	22	30	22	36	More could be said about electric transit buses. They have been deployed in other parts of the world besides China. The authors should quantify the improvement of using electrified powertrains, compared to conventional ones, for vehicles in service. This is the evidence to support the real-world benefits asserted of using EV, rather than depending on simulations, projections and vehicle advertising. Reference for typical electric two-wheeler battery capacity. Many two-wheelers (in genernal, and in the developing world in particular) use lead acid batteries, rather than the Li-ion which was discussed earlier.	Rejected - unfortunately, no room for more on this…
37044	8	22	30	22	30	p.22, line 30. China has more than 1000 electric transit buses. Please get the most current data to update the number.	Relevant sentence cut
37043	8	22	30	22	31	Specify Adelaide, Australia.	Relevant sentence cut
37045	8	22	30	22	36	This text reads more like a list of observations without providing much in the way of context, and could be reduced or connected with observations elsewhere in the text if space is an issue. For instance, whether these measures or programs represent substantial progress in reducing GHG emissions. Text such as this could be condensed throughout the chapter and summarized with some general observations of the type of programs in existence and perhaps some assessments of progress. In general, citations to articles that provide evidence of program effectiveness are recommended, for example, Huiming Gong, Michael Q. Wang, Hewu Wang. (2012). New energy vehicles in China: policies, demonstration, and progress. Mitigation Adapt Strategy Glob Change. DOI:10.1007/s11027-012-9358-6.	Most of what is refered to here has been cut.
23404	8	22	30	22	31	The number of electric transi bus (1,000) cited from IEA (2009) needs to be updated. Statistics sources might from CRTA(China Road Transport Association) and/or CAAM(China Association of Automobile Manufacturers).	Relevant sentence cut
26380	8	22	39	22	41	SPECIFIC COMMENT. At the end of the phrase: “Worldwide, there are estimated to be only a few hundred LDVs powered by fuel cells and a similar number of buses, all supported by around 250 hydrogen refuelling stations operating under demonstration programmes (Fuel Cells, 2011).” I suggest to add: “in February 2013 Hyundai announced world’s first assembly line mass production of Fuel Cell Vehicles and other carmakers recently have announced their intention to do so in 2014-2015 time frame.” REFERENCES. Hyundai, see: “Hyundai celebrates world’s first assembly line production of zero-emissions fuel cell vehicles”, Feb. 26, 2013 < http://www.hyundaipressoffice.co.uk/release/379/#>. Other carmakers, see: S. Satyapal, “Fuel Cell Technologies Overview” p.4, Table: Major Auto Manufacturers’ Activities and Plans for FCEVs, DOE HTAC, Washington DC, May 2012 <http://www.hydrogen.energy.gov/pdfs/htac_may2012_satyapal.pdf >.	Taken into account - good but too detailed, other sentence refered to was cut.
30321	8	22	42	22	43	Hydrogen can be produced using a variety of processes from almost all primary energy sources, including non-fossil fuels such as biomass, solar energy, and nuclear energy. Hence, this sentence should be revised to "Since hydrogen can be produced from low or even no carbon sources, ...".	Relevant sentence cut
37046	8	22	45	22	45	Does the efficiency range refer to thermal efficiency?	Accepted, clarified
37047	8	22	46	22	26	p.22, line 46. Wang (2002) addressed fuel-cycle efficiencies of various H2 production pathways with FCV applications. Please cite that reference.	Relevant sentence cut

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
26381	8	22	47	23	1	SPECIFIC COMMENT. I suggest to update numbers and reference and to insert data target: “Over the past decade, the estimated largevolume production cost of proton exchange membrane (PEM) fuel cells deemed most suitable for LDVs has decreased from about USD275 /kW to under USD100 /kW, with some estimates as low as USD50 /kW and 2017 target at USD30 /kW.” REFERENCE. US DOE, “Progress and Accomplishments in Hydrogen and Fuel Cells, Office of Energy Efficiency and Renewable Energy”, March 2013, < http://www1.eere.energy.gov/hydrogenandfuelcells/pdfs/accomplishments.pdf >.	Taken into account - good but for cost section, not 8.3
30322	8	22	47	23	2	The statement should be inserted that "these estimates of the specific cost of a mobile PEM FC stack are those that can be reached in the long term". The auto maker Toyota announced to sell a H2 FCV at a price of about 5 million US$ per vehicle, which implies that the current specific cost of a mobile PEM FC stack is much higher than US$150/kW.	Taken into account - good but for cost section, not 8.3
20734	8	22	7	22	20	Discussion of the benefits of Battery Switch Staions required.	Accepted - added mention of this.
37039	8	22	7	22	20	This paragraph discusses future improvements in battery technologies but references dated (2010) studies with now-out-of-date targets. U.S. Department of Energy R&D has proven or strongly suggested that the limitations indicated in the current text will be solved or surpassed in the near future. Current lithium-ion batteries meet the life requirements of EVs, ranging from 1000 to 5000 deep discharge cycles, or about 15 years. Although the advanced lithium-ion technologies needed to achieve the 2020 performance mentioned above suffer from low cycle life (less than 1000 cycles), research indicates that these technologies will reach the cycle life requirements by 2020." (DOE, 2013) Citation: U.S. Department of Energy. (2013). Energy Storage Vehicle Technologies Office 2012 Annual Progress Report. http://www1.eere.energy.gov/vehiclesandfuels/resources/vt_es_fy12.html	Relevant paragraph eliminated
29857	8	22	10	22	11	Maybe here suggest that reverves of lithium may be limited. For example Guillebon and Bihouix (Quel futur pour les métaux? : Raréfaction des métaux: un nouveau défi pour la société. EDP SCIENCES; 2010).	Taken into account - but no room - better for a resource supply section
23403	8	22	30	28	31	The data of China's E-Bus should be updated and refreshed. To 2011,about 9000 new-energy vehicles are operating in Chinese cities, including about 5000 new-energy transit buses. Add data	Relevant paragraph eliminated
24679	8	22	38	23	10	Fuel cells rely upon some relatively rare and costly elements such as platinum and ruthenium. Suggest that this sub-section discusses how the availability of supplies of these elements could affect the potential of fuel cell technology. Recommended wording: 'Research is continuing into fuel cell technologies that do not use expensive elements such as platinum and ruthenium in order to reduce fuel cell costs and promote wider scale commercial deployment.' There are many such projects underway, suggested citation: http://www.sciencedaily.com/releases/2011/04/110421141628.htm for journal reference	Taken into account - but no room - better for a resource supply section
32748	8	23	1	23	1	The DOE FreedomCar estimates are ambitious to say the least. Moreover, a low PEMFC cost is insufficient for such vehicles to make it to the market, or we would have more of them in service. There must be other challenges/costs which have not been overcome to make such vehicles competitive, even if FreedomCar goals could be achieved.	Taken into account - added mention of other barriers like infrastructure
21987	8	23	1	23	8	This focuses just on road vehicles but ships could be discussed in this context now.	Taken into account - meaning H2 for ships? It is mentioned…
26535	8	23	1		9	TAKE OUT	Rejected - not clear what to take out…
30323	8	23	1	23	1	The literature (A. Bandivadekar, et al., 2008. "On the Road in 2035." p. 36) also predicts that the future specific cost of a mobile PEM FC stack will reach US$50/kW, so it can be used as a reference in addition to "DOE, 2011a".	Taken into account - will add reference

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
37049	8	23	1	23	10	P. 23. Fuel cell cost Current: "Over the past decade, the estimated large "volume production cost of proton exchange membrane (PEM) fuel cells deemed most suitable for LDVs has decreased from about USD275 /kW to under USD100 /kW, with some estimates as low as USD50 /kW (DOE, 2011a). Higher estimates quote minimum fuel cell system material costs of USD150 /kW without assembly (Schoots et al., 2010). A typical 80 kW vehicle fuel cell system would therefore cost around USD 4 000 - 12,000 and in addition, a motor/controller system and hydrogen storage tanks costing around USD 5,000 per vehicle based on existing technologies. Compressed hydrogen stored on "board the vehicle is commercially available and offers a driving range similar to today's gasoline/diesel LDVs but with a high cost increment. Please replace "with some estimates as low as USD50 /kW (DOE, 2011a)" with: "with some estimates as low as USD 47/kW (DOE, 2012a) DOE, 2012a is http://www.hydrogen.energy.gov/pdfs/12020_fuel_cell_system_cost_2012.pdf). The Schoots estimate is out of line with other publications, out of date, and should be removed: Higher estimates quote minimum fuel cell system material costs of USD150 /kW without assembly (Schoots et al., 2010) Please add: "In March 2013 the U.S. National Academies of Science and Engineering issued a study which shows that the cost of fuel cells could be reduced to $40/kW by 2020 and $33/kW by 2030. http://www.nap.edu/catalog.php?record_id=18264&utm_medium=etmail&utm_sou..." P. 23. Years to achieve commercial viability - Current: "Overall it could take another 5-10 years or longer for FCVs to achieve commercial readiness based on current oil and LDV purchase prices (IEA, 2012d)." This should be deleted and replaced with the edited version shown below. Edited: "A number of major automakers announced their intent to begin limited sales of FCVs in 2015-2017. It may take up to 10 additional years to achieve a sustained level of sales without incentives (http://www.autonews.com/apps/pbcs.dll/article?AID=/20130311/OEM06/303119... and http://news.bis.gov.uk/Press-Releases/Future-of-hydrogen-powered-cars-ma...)	Taken into account - all cut, but may reappear in cost section, in which case will consider these comments
32749	8	23	11	23	30	The authors have squashed a number of transport modes into a small area of the text. There is little detail provided, even forecast efficiency improvements from certain technological changes. This is onctrast to the section on LEDV and HGV which is much larger, but lacks detail in areas also.	Taken into account - but all the cutting has resulted in lots more squashing, much less (and more even) coverage of each mode and technology now.
24054	8	23	15			please insert we know from experiences e.g. of German Railways (DB AG) that training of train drivers in efficient driving may save up to 10 % of the energy used for driving	Taken into account - but not enough room, have cut behaviour aspects except in 8.5
27812	8	23	17	23	18	It seems to be very unlikely that rails will be powered by fuel cells. Currently, there are increasing doubts that even lorries could be accelerated in a sufficient way by fuel cells. I suggest deleting that idea.	Taken into account - interesting….will check
26536	8	23	20		25	CHANGE TO: other possible technologies as supplementary power include on-board solar power generation systems, solid-oxide fuel cell systems, on board reformers and liquid fuel storage, nuclear power or wind energy.	Taken into account - changes made to sentence along these lines

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
34532	8	23	21	23	24	It is suggested that "Solid-oxide fuel cell systems could be used, along with onboard reformers and liquid fuel storage (in the form of liquefied natural gas (LNG), alcohol or ammonia), though the cost of such systems remains relatively high as is nuclear power used in some navy vessels." be replaced by "Solid-oxide fuel cell systems could be used, other new technologies such as usage of liquefied natural gas (LNG) and Methyl/ethyl alcohol as alternative fuels are put forward while many ships using LNG as fuel are already operating, the International Code for Ships using Gas as Fuel (IGF Code) is expected to be finalized by IMO in 2014 (IMO, 2013). Nuclear power is used in some navy vessels since the cost of such systems remains relatively high." The fact of LNG used onboard by many ships, the process of IMO relating LNG technology and its regulation need to be included, for ammonia mentioned in original section 8.3.3.3, it is used to reduce NOx emissions rather than liquid fuel. (Reference: IMO (2013). BLG 17/18 - Report To The Maritime Safety Committee And The Marine Environment Protection Committee. International Maritime Organization, 4 Albert Embankment, London SE1 7SR.)	Taken into account - changes made to sentence along these lines
21986	8	23	24	23	26	Flettner rotors could be named here. The 'foreseeable future' is ambiguous. Need a timeframe. There is a maringal shift to natural gas use currently and partly in response to sulphur regs. This should be noted here, as it has occurred after the reference used here (2009).	Taken into account - changes made to sentence along these lines
24055	8	23	25			please insert that empirical evidence from additional sails (see e.g. SkySails) could save 20% of energy necessary for the propulsion	Taken into account - note that sails also mentioned in earlier incremental paragraph
30324	8	23	26	23	26	The phrase "their reliability and low cost" should be revised to "their high reliability, high efficiency, and low cost". This is because the fuel cost of ocean-goins ships is important due to their long-distance travel requirements, because their fuel cost can be limited to a low level by using high-efficiency propulsion systems, and because marine diesel engines have a very high efficiency (about 46% on LHV basis).	Taken into account - changes made to sentence along these lines
27813	8	23	31	23	34	This short chapter is misleading and has a partly wrong message. First, with natural gas it is not possible to have low CO2 emitting cars, due to the higher hydrogen content the CO2 emissions are just reduced. Secondly there are tremendous differences between the paths mentioned. And this is already clear today. For biofuels for instance there is not enough agricultural land available. Hydrogen has technical problems (will it really be possible to motorize HDV with FCs?) and the conversion rate is lower compared to electricity due to physical limits, and, and, and. Suggestion to delete the whole subpara 8.3.4.	Rejected - this comment so broad as to be unadressable, much of it is unrelated to this section..
34533	8	23	35	23	46	The title of section 8.3.4.1 is proposed to be changed to "Natural gas, LPG and LNG" from "Natural gas and LPG". A new paragraph is suggested to be added after the line 46 as follows: "The use of liquefied natural gas (LNG) by ships as a fuel can reduce CO2 emissions by around 29% (IMO, 2012b), some states such as China, European Union (EU) are seeking to develop LNG vessels and corresponding infrastructures, the study on an LNG infrastructure entitled the North European LNG Infrastructure Project, carried out by Belgium, Denmark, etc. (IMO, 2012c).". Fuel carbon intensity reduction for LNG used by ships and the future trend should be summarized. (Reference: IMO (2012b). LNG Markets Perspective. International Maritime Organization, 4 Albert Embankment, London SE1 7SR. Available at:http://www.imo.org/OurWork/Environment/pollutionprevention/airpollution/documents/air%20pollution/lng%20bunker%20perspectives%20feb%202012.pdf and: IMO (2012c). BLG 17/8/4 - Recommendations from the North European LNG Infrastructure Project. International Maritime Organization, 4 Albert Embankment, London SE1 7SR.)	Taken into account - not enough room for all that but a few words added

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
37051	8	23	35	23	35	Consider discussing HDV use and infrastructure development in OECD countries a bit more in this section	Taken into account - but no room for more on this…
27814	8	23	35	23	39	It might be interesting to follow up on LNG for maritime shipping.	Accepted, added a sentence…
37050	8	23	36	23	43	The current text incorrectly compares CNG vehicle tailpipe emissions, which misrepresents CNGVs as much cleaner than vehicles driven on petroleum. A lifecycle comparison, though subject to uncertainty, would almost certainly reduce the CO2 reduction.	Accepted, corrected.
24053	8	23	4			please insert empty space at USD 5000	Relevant sentence removed
37053	8	23	40	23	41	p.23, lines 40-41. GHG reduction of up to 25% by CNGVs vs. gasoline vehicles appears too optimistic. Studies in the past two years identified methane leakage of gas fields and gas pipelines can decrease CNGV benefits significantly. If there is no strong policy to control gas field methane leakage and no R&D efforts to develop engines to take advantage of high octane of NG, CNGVs will offer limited GHG benefits (~10%). See Burnham et al. (2012).	Accepted, addressed in text
37052	8	23	40	23	42	The statement "Though the energy consumption of driving on CNG or LPG is typically similar to that of gasoline in similar vehicles, a reduction of up to 25% in tailpipe CO2/km can be achieved because of differences in fuel carbon intensity" is not currently accurate. More recent analyses have changed those emissions estimates and lifecycle emissions are a much more accurate comparison than tailpipe. Recommend rewriting this sentence to say: "Because of differences in fuel carbon intensity from petroleum-based fuels, vehicles running on natural gas or LPG can achieve some reductions in greenhouse gases - 6-11% for natural gas and up to 10% for LPG." Recommend citing the latest version of the GREET Life-Cycle Model: Argonne National Laboratory. (2012). GREET Life-Cycle Model. http://greet.es.anl.gov/main	Accepted - good points, addressed in text
30325	8	23	42	23	43	I judge that long-term supply potential of biogas (produced from human excrement, animal manure, food waste, etc. using anaerobic digestion process) is rather small. For reasons see Takeshita (2009) (T. Takeshita , 2009. "A Strategy for Introducing Modern Bioenergy into Developing Asia to Avid Dangerous Climate Change." Applied Energy, Vol. 86, pp. S222-S232.). So, this sentence should be deleted. If you use the term "biogas" to refer to methane produced from biomass gasification, then I strongly recommend you to revise the term "biogas" to "bio-methane" in order not to confuse readers.	Accepted, corrected.
33244	8	23	9	23	10	does "to achieve commercial readiness" mean "be economically competitive"?	Taken into account - good question - no and will clarify
29858	8	23	24	23	25	The sentence relating to the use of wind energy in for ships should be developed, at least by listing the various technologies available more accurately. So far, no academic research explains how a transition towards using wind propulsion in international shipping can be promoted and accelerated. But a small niche market is developing around some pioneering initiatives such as that of a boat called the Tres Hombres trying to develop a luxury CO^2-free freight shipping hand in hand with small companies such as Transoceanic wind transport (TOWT url:http://www.towt.eu/en/) that is certainly worth mentioning On a much more important scale, companies like Skysails (for kites) Enercon, Magnuss, Windagain and Greenwave (for Flettner Rotors) are proposing commercial incentives to develop hybrid freight shipping.	Taken into account - but not enough room to add. This is an interesting elaboration on the use of wind power in maritime transport. If space permits, reference to technology could be expanded. We agree that there is a lack of literature on this subject.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
29879	8	23	24	23	25	Sailing in international freight has not been referenced. Three suggestions: Faber, J., H. Wang, D. Nelissen, B. Russell, D. St Amand (2011) Reduction of GHG Emissions from ships – Marginal abatement costs and cost effectiveness of energy efficiency measure. Document MEPC 62/INF.7. London UK: International Maritime Organization (IMO); Hobson, M., Pell, E., Surgand, M., Kollamthodi, S., Moloney, S., Mesbahi, E., Wright, P., Cabezas Basurko, O. and Pazouki, K. (2007) Low Carbon Commercial Shipping, Report prepared by AEA Transport for the UK Department for Transport, Didcot; Crist, P. (2009) Greenhouse Gas Emissions Reduction Potential from International Shipping, Discussion Paper No. 2009-11, Joint Transport Research Centre of the OECD and the International Transport Forum	Taken into account - but not enough room to add. Significant reference has been made to other publications by IMO and Crist. Additional reference will be made to these reports if it is felt that they strengthen the argument
24680	8	23	35	24	10	The Australian experience with gaseous fuels, LPG and CNG/LNG is that there is no guarantee of achieving GHG reductions from the use of these fuels compared with conventional diesel engines (Orbital Australia 2007). The current wording indicates a level of certainty about GHG reductions that is likely to mislead policy makers to overinvest in gaseous fuels in the belief that this is a simple and always less greenhouse intensive outcome. The Westport HPDI technology is the only technology that we are aware of that meets the 25% reduction at tailpipe outcome. Converted HDV CI engines to dual fuel i.e. diesel pilot dual fuel systems have demonstrated worse GHG outcomes than CI engines operating on diesel, partially due to the high level of unburnt CH4 found in the exhaust gas (Rare Consulting 2008). Converting HDV CI engines to LPG reduces the thermal efficiency of the engine such that the relatively lower carbon content/Mj of the fuel is outweighed by the reduction in thermal efficiency of moving to a SI engine. OEM LPG engines have demonstrated around a 14% reduction in CO2 CF petrol equivalent, however depending on the fuel taxation regime this may serve to reduce the running costs on larger vehicles (National Transport Commission 2013). Converted CNG vehicles that are not required to meet OEM THC or CH4 limits (US Department of Energy 2013)- i.e. India is more than likely to demonstrate inferior GHG outcomes to diesel vehicles. Citations: Orbital Australia (2007). An Investigation of Heavy-Duty Engine Efficiencies September 2007. Orbital Australia, GOV18. Report to the Australian Government. [The Australian Greenhouse Office ran the Alternative Fuel Conversion Program from 2000-2008. The original 4 year program was extended to 8 years mainly due to the lack of market ready CNG or LPG based engine platforms that would deliver a 5% GHG benefit over the equivalent diesel] Rare Consulting (2008), http://www.rareconsulting.com.au/images/uploads/resources/RWTA_Presentation_Sep_08.pdf; National Transport Commission (2013). CO2 Emissions from New Australian Vehicles 2012, March 2013. http://www.ntc.gov.au/filemedia/Reports/C02EmissionsNewAustVeh2012InfoPa.pdf (table 12) ; US Department of Energy (2013). Natural Gas Vehicle Emissions. U.S. Department of Energy's Clean Cities program, last updated 6 April 2013, http://www.afdc.energy.gov/vehicles/natural_gas_emissions.html	Taken into account - There is a lot of good stuff in this comment, will try to get these subtleties reflected within our severe word lilmits.
33246	8	24	1	24	2	add national shares of CNG cars in Pakistan and Argentina	Taken into account - but not enough room to say more
24520	8	24	10	24	16	Even though the report makes reference to LCA later (and explains very well their limitations), here the concept of well-to-wheel emissions is used. Make clear that such an approach covers only part of the picture and that LCA is more adequate.	Accepted, corrected.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
37056	8	24	10	24	16	Section 8.3.4.2 misrepresents electricity as a "dirty" fuel. The majority of the discussion uses coal-specific emissions data, even though many (though not all) grids are evolving to cleaner alternatives. The overarching sectional focus is "mitigation technology options, practices and behavioral aspects", implies to me that this discussion of electricity should at least couple options for greener electricity with a discussion of a worst-case coa scenario, which dominates the paragraph now.	Taken into account - but this is true only when running on pure coal power, this seems clear from the following sentence Indicating BEVs can be zero emission if running on nuclear/renewable electricity.
24056	8	24	10			Please begin this chapter with 'In the foreseeable future the overwhelming majority of global passenger transport based on electricity (i.e. electric mobility) will remain on rail' [for Germany see e.g. Elektromobilität vor allem auf der Schiene. Dynamik im Straßenverkehr setzt erst spät ein. Forum Umwelt&Entwicklung-Rundbrief 3/2009, S.33f, http://www.germanwatch.org/klima/mt09emob.pdf]	Rejected - disagree - LDVs could pass rail by 2025 if there is a big ramp-up
25884	8	24	11	24	14	Do the figures provided here also account for energy losses during the transportation of electricity and if they do please provided the figures.	Taken into account - all efficiency numbers are end-use, will clarify
30929	8	24	13	24	13	The text states 150 g CO2 / km typical for an efficient ICE or hybrid vehicle - does this include full well to wheels life-cycle emissions, similar to the comparison for BEV with energy derived from coal-based power plants? If it does not include full life-cycle emissions, then it is not an equal comparison between BEV and ICE vehicles.	Accepted - fair point, will address
26777	8	24	16			I feel this is an unfair comparison, do any countries have a completely coal based grid? It would be fairer to use an average fuel mix across the world, or an area such as the EU27.	Taken into account - we show the two end points, coal and renewables. This gives the reader a clear sense of the range.
37057	8	24	17	24	19	Emphasize that decarbonization of the grid and transport system over the longer term will require policy effort and sufficient incentives.	Taken into account - its more an issue for the electricity chapter, but will mention
32750	8	24	19	24	21	This point is valid assuming the majority of EV charging occurs during off-peak, overnight hours.	Relevant sentence eliminated
37054	8	24	2	24	2	p.24, line 2. Please add China to the list. It has large CNG car and bus fleets.	Relevant sentence eliminated
20400	8	24	23	24	27	define the following jargon: "range anxiety", "smart meters", "vehicle-to-grid"	Taken into account - good points, although two of three of these are eliminated sentences, but will define range anxiety.
21988	8	24	28	24	30	Refers to possibility of "valley filling" by vehicle to grid or bidirectional charging – evidence indicates that this is seriously reduces the useful lifetime of batteries and is generally considered unlikely for this reason (e.g. Weiller 2011, citing Peterson et al 2009).	Relevant section removed
37055	8	24	3	24	4	p.24. line 3-4. Aftermarket conversion for CNGVs has serious emission and efficiency problems.	Relevant section removed
27815	8	24	31	25	18	This chapter is an incomplete consideration of hydrogen since it does not reflect the energy balance and the energy conversion efficiency. In addition there seem to be significant technical limits for heavy vehicles. These elements should be included in the text.	Taken into account _ technical limits is a good point, need to consider
24057	8	24	31	24	39	please insert also an expectation on an optimistic time scale which is assumed to be implemented so that it is relevant for the transport emissions as a whole	Confusing - unclear what this refers to
37058	8	24	35	24	37	The sentence "In selected locations, hydrogen available as a byproduct..." is repeated almost word for word later on. I would recommend cutting it out here.	Taken into account - One removed
37059	8	24	37	24	37	There is no Deng 2010 in the citations. There is a Deng 2011, but it is about bus rapid transit, and a search for "hydrogen" in that article comes up empty.	Accept - corrected
20401	8	24	42	24	42	define "lighthouse cities"	Taken into account - the definition is implied by the previous sentence
33248	8	24	44	24	47	is that H2 infrastructure investment an initial investment or continual? How does this compare to the costs for current gasoline refueling stations? If it is much higher, why?	initial, cost discussions mainly removed from this section

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
24058	8	24	48			could something be said on the political process necessary and the dynamics (how fast this is possible to start) so that the 'USD 1 - 2 trillion' mentioned in 25/1 will be invested?	Relevant section removed
23405	8	24	7	24	7	Chech the reference cited here, I can not find the number of LNG buses(around 20000) operating in China. The reference tells us that 13077 LNG buses sold in China in 2011 and 11522 passenger vehicles sold in China in the first half year in 2012 and 71.22% of them are buses. The fact is that existing LNG buses stock in China increased about 21000 in 2011 and the first half year in 2012.	Relevant section removed
23413	8	24	10	24	16	Since this section intends to discuss about the carbon intensity reduction of fuels, for electricity part, it is better to compare the relative carbon intensity of electricity sources. According to CAERC(2012), the carbon intensity of ICE gasoline is around 268.9 g CO2/km, ICE discel is around 221.4g CO2/km,ICE LNG is 227.7g CO2/km,ICE-CNG is 224.3g CO2/km,ICE LNG is 226.7g CO2/km,Oil Electricity is 293.82g CO2/km,gas electricity is 157.89g CO2/km,, IGCC-CCS is 41.19g CO2/km	Rejected - true but too specific
29859	8	24	24	24	24	Spelling : « zBEVs »	Relevant sentence removed
23412	8	24	24	24	27	Suggestion:this part does not touch on the competition among various recharging mode. Home charging system is slow charging mode, public rehcarging station can provide fast recharging and battery swapping.the public recharging location, especially the one serve for pulic bus system need to compare the model choice Pls refer to: Wu(2010) .http://lcs-rnet.org/meetings/2011/10/pdf/PS3.2_S2_3.pdf	Rejected - too detailed
30326	8	24	9			I recommend you to mention that in terms of the life-cycle GHG emissions, producing the materials needed for BEVs has been estimated to emit larger GHG emissions than producing materials needed for comparable ICEVs For details see Weiss et al. (2000) (A. Weiss, et al., 2000. "On the Road in 2020: A Life-Cycle Analysis of New Automobile Technologies.")	Taken into account - though reference is quite old. No room for this topic, unfortunately.
29861	8	24	31	25	18	All this section on Hydrogen is very clear and well written. But the evaluation of the cost of the Fuel cells does not mention recent advances in alternates to platinum as catalist.	Taken into account - but cost info removed from 8.3
30328	8	24	31			I recommend you to mention the niche markets for H2 FCVs. It has often been indicated that buses and delivery vans are promising niche markets for H2 FCVs due to small requirements for hydrogen distribution and refueling infrastructure.	ACCEPTED, added
30329	8	24	31			I recommend you to mention that liquid hydrogen is an alternative fuel for aircraft (the so-called cryoplane).	Taken into account -, but challenges also indicated. Thank you; paragraph deleted due to requirements to smaller version (8.3.4)
29860	8	24	42	24	42	Too many words : « by and » (« and » should be deleted)	Accepted, corrected.
30327	8	25	13	25	15	The sentence "In selected locations …" is introduced twice here and on page 24, lines 35-37. Either of them should be deleted.	Accept One removed. delete occurrence on p. 25 since this interrupts the flow of decentralized / centralized comparison.
37061	8	25	13	25	15	This sentence is a repetition of the content from pp. 24 lines 34-37.	Accept One removed
26778	8	25	19			The point should be made that, unlike electric vehicles, biofuels would essentially use the exisiting refueling infrastructure set up for fossil fuels.	Taken into account _ covered in biofuels discussion. Really only true for bio-based "renewable" gasoline & diesel, for which the point is true by definition. Could add "and fueling infrastructure" at line 25, p. 25.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
19163	8	25	19	26	15	Biofuels. Very little if any mention is made of methanol (wood alcohol), which can be made by the dry distillation of biomass. It is much cheaper than trying to break down lignocellulose into simple sugars and then ferment them to ethanol. Also, waste biomass can be used without opening up new land to grow maize (corn) etc. Why is no attetion paid to methanol and gen-gas production?	Reject- methanol is not a serious fuel for most transport applications - highly toxic.
21989	8	25	20	25	22	Statement 'risen fairly rapidly' is ambiguous and needs a growth rate associated with it, or some context.	Relevant sentence removed. Agreed; statement of growth could just be cut.
26537	8	25	24			take out: including cars, trucks, ships and aircraft.	Just redundant? Seems worth emphasizing. Reject. "In certain forms" covers these cases.
30330	8	25	24	25	25	The phrase "compatible with all types of ICE vehicles …" should be revised to "compatible with all types of ICE vehicles, including cars, trucks, ships and aircraft and existing infrastructure used for petroleum fuels".	Accept, added but taken out due to a shorter version of 8.3.4
30331	8	25	26	25	27	I recommend you to mention that the use of ethanol as a lower percentage volumetric blend needs modification to fuel supply infrastructure.	Accept, True, but I wouldn't use our limited space to add this.
37062	8	25	29	25	30	Quantify "easily" and "cheaply." What is the cost to modify a traditional engine to a flex fuel engine? How much time/labor does it take?	Taken into account, good point, will add citation with $value if possible. I don't know of a peer-reviewed source, but this website (http://www.openfuelstandard.org/2011/05/inexpensive-solution-flex-fuel-cars.html) cites the GM vice chairman saying $70 incremental cost.
37060	8	25	3	25	6	P. 25. Cost of hydrogen Current: "The current cost of hydrogen production and delivery to vehicles is high compared with gasoline or diesel fuel, with steam reforming at point-of use estimated to be about USD 1 per liter gasoline equivalent (lge), and electrolysis at point of-use about USD1.50 /lge (IEA, 2012d)." Edited: "The current cost of hydrogen production and delivery to vehicles, with electrolysis at point of-use, is less than USD 1.75 per liter gasoline equivalent (lge), higher than gasoline or diesel in certain countries (e.g., U.S.) (http://www1.eere.energy.gov/hydrogenandfuelcells/mypp/pdfs/production.pdf). With steam reforming at point of"use, the estimated cost is USD 0.97-1.20/lge for a range of natural gas prices (http://www.hydrogen.energy.gov/pdfs/12024_h2_production_cost_natural_gas...)"	costs mostly removed from this section
37063	8	25	31	25	33	The sentence that states "Like natural gas, bio-methane from suitably purified biogas or landfill gas and compressed, can also be used in today's natural gas vehicles with only minor fuel system modifications" is incorrect because if it is purified enough to the standards of "renewable natural gas", biogas can be used in natural gas vehicles without any modifications. The cited paper does not seem to indicate any need for modifications, so I would recommend removing the phrase "with only minor fuel system modifications" and possibly changing the use of the word "bio-methane" to "renewable natural gas," as that indicates a slightly higher level of purity.	Accept, modifications made. Agreed, though the "and compressed" needs editing for clarity and grammar.
32751	8	25	33	25	35	This sentiment could be applied to many of solutions to the problems highlighted through the 5AR.	unclear what this refers to but true, and it's sort of an "if pigs had wings…" statement of something with low probability.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
37064	8	25	33	25	35	This sentence assumes that specialized engines/vehicles will be needed to accommodate high biofuel blends, but this may not be a barrier for drop-in biofuels such as renewable gasoline, renewable diesel, or bio-oil intermediates that are refined/upgraded at petroleum refineries to serve as direct displacements for petroleum fuels.	covered in following paragraph. We could move mention of drop-in fuels from subsequent paragraph to here, but leaving as is also seems ok.
37065	8	25	34	25	35	You may want to hedge on the statement that it "would not be difficult to accomplish if the policies to do so were in place."	Relevant sentence eliminated. see above
30332	8	25	36	25	42	I recommend you to include the references Takeshita and Yamaji (2008) and Takeshita (2011) in addition to "Caldecott and Tooze, 2009", "Shah, 2013", and "Sims et al., 2011" (T. Takeshita and K. Yamaji, 2008. "Important Roles of Fischer-Tropsch Synfuels in the Global Energy Future." Energy Policy, Vol. 36, pp. 2791-2802.)(T. Takeshita, 2011. "Competitiveness, Role, and Impact of Microalgal Biodiesel in the Global Energy Future." Applied Energy, Vol. 88, pp. 3481-3491.). This is because these literature used a sophisticated long-term global energy system model to prove that hydrotreated renewable jet (HRJ) fuel produced from biomass-derived FT synfuels and microalgal biodiesel is a very attractive alternative fuel for aircraft to decarbonize the aircraft sector and has a sufficient supply potential to meet the growing energy demand for aircraft.	Taken into account - good points, will try to squeeze in the additional refs. I'm not familiar with these papers, but presuming they are as described, citing seems appropriate. both references considered
37066	8	25	40	25	42	The phrase "and similar for other biofuel applications" is confusing. It's true that the challenge of sustainably producing large volumes of biofuels cost-effectively and sustainable is relevant not only for bio-jet fuel but also for LDV, HDV, and marine uses. The sentence should be clarified if that's the point it intends to get across. It's also worth mentioning that expanding the variety of feedstocks in the future to include cellulosic sources (such as energy crops and agricultural wastes) would increase the scale-up potential.	Taken into account -fair point - but it seems a good place to mention this since there is often a mis-perception that technical compatibility of fuels is the main issue for aircraft, when in fact they are pretty similar to other modes. Have tried to clarify this. Agreed; this needs editing for clarity
37067	8	25	43	25	45	The sentence appears to be a misinterpretation of the results from Wang 2011 study. Instead, refer to the following more recent Wang 2012 publication, which shows GHG emission reductions for the biofuels analyzed, even when land-use change emissions are included: Wang et al. 2012, "Well to Wheels Energy Use and Greenhouse Gas Emissions of Ethanol from Corn, Sugarcane, Corn Stover, Switchgrass, and Miscanthus," Environmental Research Letters, 7 (2012) 04905.	Taken into account -fair point, will address. Agreed, this citation doesn't support the entire sentence, just the first clause. Move the citation to before the comma, or simply delete that clause and add a citation to the subsequent sentence, which is somewhat redundant currently.
37068	8	25	45	25	45	p.25, line 45. Please cite Wang et al. (2012). Emissions for first generation biofuels are still lower than petroleum gasoline, even if LUC GHG emissions are included.	The reviewer takes one study as indicative when there are a wide range of results to choose from. I agree, however, that the sentence is flawed as written. It would be more correct to say that "some estimates of ILUC emissions suggest that increasing production of some land-based biofuels can result in a net increase in GHG emissions."

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
21990	8	25	46	25	1	No reference is made for the timeframes of the technologies discussed, giving the impression that they are all equally useful, whereas algae is unlikely to produce biofuels at scale for 20 years or so. See work by Tony Roskill for more information.	Taken into account -good point, will try to address - but more a matter for bioenergy chapter. though true, I don't think that point is necessary in this context.
21991	8	25	47	26	2	Although advanced biofuels do tend to offer larger savings, I disagree that all the feedstocks listed here potentially pose few problems from a direct or indirect land-use change side. Non-food crops do require land for their production and so land-use change impacts need to be better understood.	Taken into account -good point, will clarify. Agreed. P 26, line 1, insert "and in some cases, can avoid large direct and indirect…"
30333	8	25	47	26	2	I recommend you to include the references Takeshita and Yamaji (2008) and Takeshita (2011) after the sentence "Advanced biofuels produced from ...". (T. Takeshita and K. Yamaji, 2008. "Important Roles of Fischer-Tropsch Synfuels in the Global Energy Future." Energy Policy, Vol. 36, pp. 2791-2802.)(T. Takeshita, 2011. "Competitiveness, Role, and Impact of Microalgal Biodiesel in the Global Energy Future." Applied Energy, Vol. 88, pp. 3481-3491.). This is because these literature used a sophisticated long-term global energy system model to prove that even if biofuel development is limited to the level that can avoid causing GHG emissions from land-use change, 2nd and 3rd generation biofuels have a sufficient supply potential to meet the growing energy demand for transport and can make a large contribution to decarbonizing the transport sector.	Taken into account -will try but disagree with adding this here.
31250	8	25	7	25	7	The cost of H2 made from natural gas is irrelevant if one is interested in dramatically reducing emissions, and eventually to zero. What is very relevant is the cost of hydrogen from renewably-based electricity.	Taken into account -true but NG a transition fuel of interest
26696	8	25	19			The risks associated with biofuels should be mentioned here. For example see, Ashworth, K., Wild, O., and C.N. Hewitt. 2013. Impacts of biofuel cultivation on mortality and crop yields. Nature Climate Change doi: 10.1038/nclimate1788. and Tsao C.-C., J. E. Campbell, M. Mena-Carrasco, S. N. Spak, G. R. Carmichael, and Y. Chen (2012) Biofuels That Cause Land-Use Change May Have Much Larger Non-GHG Air Quality Emissions Than Fossil Fuels. Environmental Science & Technology, 46 (19), 10835-10841	Taken into account - Not appropriate for this section, but covered elsewhere (bioenergy chapter)
29408	8	25	33	25	35	This sentence makes a strong statement without justifying more fully, as it implies that policy drivers are the only impedment for the creation of a global fleet running on high biofuel blends. Delete or justify.	Accept - language adjusted
24681	8	25	33	25	35	This sentence makes a strong but not fully justified statement, as it implies that policy drivers are the only impediment for the creation of a global fleet running on high biofuel blends. Suggest paring back the strong message of the statement, and/or further substantiating with evidence. Suggest delete or further justify.	Accept - language adjusted
29409	8	25	43	25	48	It would be appropriate to mention near here that sustainably grown energy crops, grown on previously degraded areas or areas with low biomass levels, and which are continuously replanted after harvest, would result in significant GHG savings. (e.g. Davis, S, Robert M. Boddey, Bruno J. R. Alves, Annette L. Cowie, Brendan H. George, Stephen M. Ogle, Pete Smith, Meine van Noordwijk, Mark T. van Wijk. (2013) Management swing potential for bioenergy crops. Global Change Biology Bioenergy) . The current text ignores this scenario, and 8.3.4.4 overall presents an unjustifiably negative view of the use of biofuels.	Taken into account - Not appropriate for this section, but covered elsewhere

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
24682	8	25	43	25	48	Suggest include text here stating that sustainably grown energy crops, grown on previously degraded areas or areas with low biomass levels, and which are continuously replanted after harvest, would result in significant GHG savings. The current text ignores this scenario, and 8.3.4.4 overall presents an unjustifiably negative view of the use of biofuels. Citation: Davis, S, Robert M. Boddey, Bruno J. R. Alves, Annette L. Cowie, Brendan H. George, Stephen M. Ogle, Pete Smith, Meine van Noordwijk, Mark T. van Wijk. (2013) Management swing potential for bioenergy crops. Global Change Biology Bioenergy	Taken into account _ text adjusted, much eliminated
29738	8	25 of 11	47	26 of 11	2	PROPOSED TO DELETE: "Advanced biofuels produced from algae and ligno-cellulosic feedstocks such as grases, short rotation forests and crop residues offer potentially lower life-cycle emissions than grain or oil seed based biofuels, and with better opportunities to avoid large direct ad indirect land use change impacts." With regards to algae feedstocks, the best science review on the life-cycle impacts of algae production concludes that algae consumes more water and energy than other biofuel feedstocks like corn, canola and switchgrass and also has higher greenhouse gas emissions, largely due to the amount of fertilizer required to grow algae in ponds but also costs of moving water, harvesting and extraction. See Andres F Clarens, Eleazer P Resurreccion, Mark A White and Lisa M Colosi, "Environmental Life cycle Comparison of Algae to other Bioenergy Feedstocks," _Environmental Science and Technology_, 2010 100119091456057 DOI: 10.1021/es902838n. On ligno-cellulosic feedstocks' land-use change impacts such as deforestation in the case of woodchips or replacement of soil nutrients by fertilizer addition in the case of agriculture residues: A 2009 study shows, for example, that removing any level of corn stover (an agricultural residue most commonly targeted for cellulosic biofuels) would lower already low soil carbon levels and lead to reduced yields, neccesitating increased fertilizer use. See Humberto Blanco-Canqui and R. Lal, "Corn stover removal for expanded uses reduces soil fertility and structural stability," _Society of American Soil Science Journal_ 73:418-426 (2009), which documented the four-year impact of systemic removal of stover across three contrasting soils in Ohio (USA). Nitrogen was reduced on average by 820kg/ha in silt loams, phosphorous by 40% and K was also significantly decreased.	Accept but section cut
21992	8	26	1	26	2	They only avoid causing indirect land use change if they are not grown on land that is used for other productive purposes. Some of these energy crops would be grown on land with other uses.	text adjusted, to reflect this. Agreed, and addressed above.
26538	8	26	12			change to: (van der Voet et al., 2010; Delucchi, 2011; Malça and Freire, 2010; Wang et al., 2011; Johnson et al., 2011; Taheripour et al., 2011; Cherubini and Strømman, 2011; Njakou Djomo and Ceulemans, 2012) OR EVEN TAKE OUT MORE REFERENCES	Taken into account - generally will try to reduce references. This would be fine. The point was to demonstrate that it's a contentious topic and these references accomplish that.
26539	8	26	15			add: and one has to add the social impacts of increasing costs of staple food for fuel such as corn.	food availability mentioned. I don' see how this fits here.
37071	8	26	16	26	16	Consider adding a discussion in the comparative analysis regarding the production and production transport differences between energy sources.	Taken into account - but no room for more on this…
32752	8	26	2	26	4	Reference for claims on bioethanol from sugar cane.	good point, will add. agreed, though I see no need for the parenthetical comment about Brazil.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
23748	8	26	2	26	4	I am surprised with the very short comment about sugar cane derived ethanol as an alternative fuel. A report like the IPCC AR5 has as one of its purpose to suggest policy makers and society on potential CC mitigation options. Ethanol from sugar cane is already being used with technical success and in some regions with economic success. The technology is public available and there is enough know-how to help capacity building in countries interested in the product. Please, compare the 2 lines dedicated to this fuel with the full page dedicated to hydrogen, a solution that is still in the paper and that may become commercially available too late to constrain CO2 presence in the atmosphere at 450 ppm. In the last 20 years IPCC reports are promising to identify alternatives to oil use. Maybe this is the proper moment.	Taken into account - section restructured, much has been cut, the current balance is better, and biofuels still get almost a full page. Hard to justify more than 2 lines for any particular biofuel. There are also papers questioning the climate benefits of cane ethanol, relating to N2O emission rates, increased CO2 and N2O emissions from vinasse application, and black carbon emissions from trash burning. If we want to dedicate more space to cane ethanol, we should include these, too.
37072	8	26	21	26	23	The Hawkins study cited here is one of the studies addressing vehicle manufacturing and battery manufacturing. There are many other studies with updated data to especially address battery manufacturing, e.g. Elgowainy, A., J. Han, L. Poch, M. Wang, A. Vyas, M. Mahalik, and A. Rousseau. 2010. Well-to-Wheels Analysis of Energy Use and Greenhouse Gas Emissions of Plug-In Hybrid Electric Vehicles. Gaines, L., J. Sullivan, A. Burnham, and I. Belharouak. 2011. Lifecycle Analysis for Lithium-Ion Battery Production and Recycling. Argonne National Laboratory. Michalek, J.J., M. Chester, P. Jaramillo, C. Samaras, C.N. Shiau, and L.B. Lave. 2011. Valuation of Plug-In Vehicle Lifecycle Air Emissions and Oil Displacement Benefits. Proceedings of the National Academy of Science. Sullivan, J., A. Burnham, and M. Wang. 2010. Energy Consumption and Carbon Emission Analysis of Vehicle and Component Manufacturing.	Taken into account - will try to add more of these but we are actually cutting down on cites to save space. True, but the point of this sentence (and thus the citations) is that many factors are needed to make the comparison. The Hawkins paper in particular addresses the elements missing in most LCAs of EVs.
21994	8	26	24	26	29	"Taking LDVs as an example…"Suggests that fuel economy can be improved by 50% by 2030 against 2005 baseline. Conventional ICE vehicles are already widely available which achieve this level of fuel efficiency (and better) now, albeit under lab-test conditions.	Taken into account - text added to indicate that the average can be doubled
21993	8	26	24	26	34	Suggest removing paragraph as it adds to confusion and provides nothing for policymakers	Agreed that this is not terribly helpful. its an attempt to pull together all the technical efficiency estimates into one figure - will re-write
37073	8	26	24	26	28	Not clear why 2005 vehicle is taken as a baseline. Also it should be emphasized that the comparison is between 2005 vehicles and new vehicles produced in 2030. Also not consistent with the use of 2007 as a basis for comparison in Figure 8.3.1.	Taken into account - base of 2007 corrected, we may try to update this to a more recent year
26540	8	26	27			take out: that is, energy consumption per km cut by half	Rejected - we need to be clear on units
26541	8	26	34			add: customers' willingness to pay.	Accepted

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
34534	8	26	4	26	4	After the word "contexts", a new sentence is suggested to be added: "However it is pointed out that air-pollutant emissions from biofuel production and combustion may have significant impacts on climate and air quality, and the change in vehicle emissions that would result from a large-scale conversion from gasoline to E85 (a blend of up to 85% ethanol with gasoline or another hydrocarbon) in the United States could have significant health consequences, by increasing tropospheric ozone concentrations. (Tsao et al., 2011). ". The reason is that not only pros but also cons need to be identified. (Reference: Tsao, C.-C., Campbell, J.E., Mena-Carrasco. M., Spak, S.N., Carmichael, G.R. and Chen, Y. (2011). Increased estimates of air-pollution emissions from Brazilian sugar-cane ethanol. Nature Climate Change 2: 53-57)	Taken into account - fair point but very complex topic - ethanol increases some emissions, lowers others. Not enough room to address this topic
30334	8	26	4	26	5	The use of biomass resources grown in excess cropland can also avoid GHG emissions from land-use change and therefore result in very low net GHG emissions. This is proven by the above-mentioned literature, Takeshita and Yamaji (2008) and Takeshita (2011).	Taken into account - addressed in Annex II. "Proven"? I'm not familiar with these papers.
37069	8	26	6	26	7	p.26, lines 6-7. Can you provide examples of carbon being sequestered by waste that could be used for biofuel production?	Relevant sentence removed. organic material in any dry landfill is sequestered carbon, at least for decades.
34535	8	26	8	26	8	Before "The production of land", a new sentence is suggested to be added: "Direct and/or indirect land-use changes for biofuel production can cause emissions due to carbon losses in soils and biomass and could negate any eventual greenhouses gas reduction benefit (Achten and Verchot, 2011).". The reason is that comprehensive assessment of biofuel should be taken into account. (Reference: Achten, W.M.J. and Verchot, L.V. (2011). Implications of biodiesel-induced land-use changes for CO2 emissions: Case studies in tropical America, Africa, and Southeast Asia. Ecology and Society 16: 10.5751/ES-04403-160414.)	Taken into account - concept covered in revised text - point is already adequately made.
37070	8	26	8	26	10	This sentence is an over-simplification; impacts on biodiversity, water, and food availability are highly dependent on the context and management practices used, and this sentence neglects examples of improved food security and improved ag/forestry management that can come from bioenergy production. For example, reports from FAO BEFS and the Global Bioenergy Partnership (GBEP) illustrate examples of bioenergy improving food security for smallholder farmers in developing countries when implemented in a rational and sustainable manner.	Taken into account - but no room for more on this…just flagging these issues. Annex II and bioenergy chapters elaborate. This is true, virtually every statement about biofuels depends on context. That said, would hesitate to cite the Global Bioenergy Partnership about biofuel benefits.
25423	8	26		26		COMMENT: When you talk about CO2 impact for land-use change, quantitative and scientific estimation should be described.	Taken into account -we have a large section on this but may appear elsewhere than 8.3
29410	8	26	1	26	15	Here include mention of LCA as an appropriate tool for assessing the impacts of the production and use of different fuels - refer the reader to next section and Annex II.	Taken into account - agree that Annex II should be mentioned but disagree… Attributional LCA is not designed to assess impacts.
24683	8	26	1	26	15	Suggest include at line 15: "Life cycle assessment (LCA) is an appropriate tool for assessing the impacts of the production and use of different fuels (see section 8.3.5 and Annex II)."	Taken into account - agree that Annex II should be mentioned

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
29862	8	26	8	26	10	About the production of land-competitive biofuels, a statement about the fact that one billion peoples are starving worldwide would be appropriate. This is the core of the public debate on biofuels, a policy maker would certainly need more guidance about this aspect of the controversial status of biofuels.	food availability mentioned Though true, I think the statement about food availability is adequate in this context.
20402	8	26		29		recommend deleting section 8.3.5, this is not really needed. Figure 8.3.2 has too many notes. If you keep any of this information it must be summarized much more concisely.	Taken into account - interesting position - will consider
29863	8	26	31	26	31	Too many words : « as this » should be deleted	Taken into account - interesting position - will consider
32439	8	27		29		The use of the GREET model does not add to the storyline, as it just complicates the issues with the seven pages of explanations and the use of error bars etc.	Accepted but most of relevant bits removed
21995	8	27				The gasoline and diesel improvements seem quite pessimistic when compared to US and EU requirmeents for LDV emissions in the period 2020 to 2025, and which are not near the end of achievable reductions.	Agree, will update figure - new NRC study support this point
27816	8	27				The figure is not necessarily from the physical perspective fully correct. The energy requirement to transport a mass A from point B to C remains the same. The question is to take another figure with another y-axis to show the differences in CO2 emissions or a related component.	Disagree - the energy required to move a given mass a given distance varies with the efficiency of the propulsion system, aerodynamics, etc. And changing mass is also an important strategy. This approach is widely accepted and we will stick with it. We show CO2 reduction potential separately.
21996	8	27	1	27	18	Suggest removing paragraph as it adds to confusion and provides nothing for policymakers	Taken into account - kept but clarified
37075	8	27	11	27	11	The studies cited here are not balanced regarding this complicated issue. This section should also cite (Cai et al. 2011, Dunn et al. 2013, Gelfang et al. 2013, Kim and Dale 2011, Tyner 2012, Scown et al. 2012).	Taken into account - much of it has been removed but will check. The suggested references don't support the claim in this sentence.
26542	8	27	12			change to: (Fingerman et al., 2010; Hertel et al., 2010; McKone et al., 2011).	Taken into account - will check. The two deleted references are well-known LCA papers highlighting the limitations of the method. If the section is left intact, I see no reason to delete these. Actually, I think the Fingerman and Hertel references are misplaced here.
37076	8	27	13	27	18	p.27, lines 13-18. Fig.8.3.2. shows an example of technical potentials of GHG reductions of various vehicle/fuel systems. It provides useful information for individual countries as they design vehicle efficiency and fuel policies. The current statement does not state this usefulness in the context of tailpipe emissions only policies. Instead, the statement implicitly gets into discussion of economic modeling of indirect, secondary effects of technology regulations. The statement needs to be revised to emphasize the importance of considering both fuel production and vehicle operation in vehicle/fuel GHG emission regulations. The last statement in the paragraph regarding the vagueness of the error bars in Fig. 8.3.2 is a valid one. A new US Department of Energy effort under way will remedy this problem.	Taken into account - figure may be removed but otherwise these comments will be considered.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
30550	8	27	18			Authors of this reference used may be contacted to explain this	True, but the point is that even 7 pages of explanation weren't adequate for a full understanding of the figure.
37074	8	27	7	29	10	Economic approach with the so-called consequential LCA (the paragraph on p.27, lines 7-18, the bullet on p.28, lines 12-15, the bullet on p.29, lines 1-10). Relative to consideration of tailpipe emissions only, LCA is a step forward to address both vehicle tailpipe emissions and fuel production emissions. This advance in examining vehicle/fuel system potentials is especially important and timely as vehicle propulsion systems are designed with new transport fuels (such as electricity, hydrogen, and biofuels). LCA emissions, in place of tailpipe emissions, give a more complete understanding of vehicle/fuel systems for their emission reduction potentials. Indeed, recent vehicle and fuels regulations in the U.S. and in European Union have been based on LCA emissions. Such regulations include the EU Renewable Energy Directive, the US federal Renewable Fuel Standard, and California's low-carbon fuel standard. By doing so, these regulations attempt to address GHG leakage issues related to upstream fuel production activities. Admittedly, these transport sector-focused regulations may result in potential indirect, secondary effects mainly from price changes in fuels and vehicles. To assess the magnitude of these effects in comparison of direct GHG effects of transport regulations, a system approach (such as the integrated assessment approach as discussed later in the chapter) may be taken so that sectorial regulations can be put into economy-wide, global perspective. Furthermore, such assessment could help identify risks and opportunities in other sectors so that preventive measures could be taken to ensure transport regulations achieve their intended objectives. Only within this context, the consequential LCA approach that is advocated in this chapter may serve a helpful role. In practice, the critical linkages among sectors and activities in consequential LCAs are based on prices and environmental co-efficiencies related to economic indicators (e.g., GDP). Advocacy of consequential LCAs for regulation designs in fact begin to mix direct effects that are measurable and traceable together with simulated, speculative correlations, These undoubtfully increase complexity and uncertainty of regulation design and implementation. In fact, confused (sometimes misleading) results from economic modeling in the past several years have created an environmental regulation stalemate in some parts of the world. Thus, sectorial policies targeting on vehicle efficiency, fuel carbon intensity, and travel demand, with preventive measures to deal with leakage issues, should continue to play important roles to reduce transport GHG emissions. Within this context, conventional LCA plays a critical role to identify vehicle/fuel systems with potential GHG reductions. The authors may wish to reflect some of this in this section.	The reviewer is about much of this.Taken into account - no room for more detail - some removed unfortunately.
29808	8	27	8			There is no Annex II in the write up	separate doc
19996	8	27	13	27	18	Are there any authoritative research results other than GREET model? If so, pls add them. If not, pls add other different scenarios of GREET model.	Accepted - fair point, will address
23406	8	27	13	27	18	Are there any authoritative research results other than GREET model? If so, pls add them. If not, pls add other different scenarios of GREET model.	same as above, i.e. comment no 19996
24684	8	27	14	28	18	These appear to be notes for the authors. If the material is not comprehensible or verifiable, it should be deleted.	Relevant section removed

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
23407	8	27	7	27	18	Whether one analysis result is a little inconvincible and unable to show the differences among each other for ther are many methods of LCA for vehicles, including GREET, abiotic depletion potential (ADP), nonrenewable cumulated energy demand (CED), global warming potential (GWP), and Ecoindicator 99 H/A (EI99 H/A). Ref: Contribution of Li-Ion Batteries to the Environmental Impact of Electric Vehicles, DOMINICA NOTTER et al., Environ. Sci. Technol. 2010, 44, 6550–6556.	unclear what this refers to
23408	8	27	7	27	18	Though it is widely well known that the LCA analysis results should be treated careflly, what detailed limitations and outputs should be used to clarify and to value different LCA methods need further study. Because BEV and ICEVs having a similar global warming potential during the manufacturing phase around 2.5 MT CO2e, not considering the battery production, so the main difference of LCAs results depends on the comparision of ICE efficiency and the "battery cost+electricity prod cost". Ref: A sustainability assessment of electric vehicles as a personal mobility system, Ricardo Faria et al., Energy Conversion and Management 61 (2012) 19–30.	Taken into account - we do mention short comings of LCA but See the cited Hawkins study for a different opinion.
23409	8	27	7	27	18	It is estimated that using renewable energy such as hydropower electricity for the BEV can reduce the share of operation on total environmental burden of transport to 9.6%. And the share of the total environmental impact of electric mobility caused by the battery is 15%. Ref: Contribution of li–ion batteries to the environmental impact of electric vehicles, Notter DA et al., Environ. Sci. Technol. 2010, 44, 6550–6556.	Rejedcted - too specific to address. this comment suggests that one power source can be routed to a specific end use. Recommend no change.
23410	8	27	7	27	18	So if there are no differences between ICEV and BEV with respect to the environmental burden related to road use (infrastructure, maintenance, and disposal) and the glider. Small differences are related to the drivetrain, maintenance, and disposal of the car. The main difference is reflected in the operation phase, which rises far above the impact of the battery. Operation obviously dominates the LCA of both E-mobility and mobility with an ICEV, while it is distinctly higher for mobility with an ICEV.	Taken into account - vehicle production would be good to address if room
23411	8	27	7	27	18	And the infrastructure emission and energy analysis should never be neglected for EV supply infrastructures are more carbon and energetic intensive. Ref: Life cycle analysis of energy supply infrastructure for conventional and electricvehicles, Alexandre Lucas, CarlaAlexandraSilva and RuiCostaNeto, Energy Policy41(2012)537–547.	Taken into account - but infrastructure addressed in separate section
26543	8	28				take out since too complex as mentioned in graph.	Figure removed
27817	8	28				The graph and its description might be exemplary for the situation in the US - but this is not the case for Germany and Europe. Additionally, the comparison is strongly misleading, e. g. some options include sequestration which could be done with all CO2 emitting options in theory. The graph is a comparison of apples with pies. Any comparison has to have the same assumptions. The graph and text can therefore NOT deliver any statement about the comparison of the options. In particular, it is not acceptable that one country should deliver the information for all other regions. As stated, the situation in Germany and EU is different. It is suggested to replace the graph and make a thorough comparison. The explaining text is thus not necessary.	Figure removed
26544	8	28	1		36	take out notes	Accepted, done
37077	8	28	1			This figure notes are cumbersome and too detailed for this document. Consider refining the description and deleting the figure notes. A better title for the y-axis may be "Decrease in energy use per vehicle-km" instead of "Change in energy use per vehicle km". The figure needs to be cleaned up as well so it is a bit easier to read-consistent fonts, etc.	Figure removed
37078	8	28	1			Carbon intensity for the ultra-low carbon renewable case is shown as zero. The text should clarify if vehicle manufacture and infrastructure emissions are included in the analysis.	Figure removed
21997	8	28	22	28	28	An additional challenge is the time frame over which one off changes in emissions such as from land conversion are spread. For example this is usually 20 years in the EU and 30 years in the US. However, it can be questioned whether these periods are short enough to ensure significant climate benefit from biofuels by 2050.	Rejected - too detailed, maybe in the bioenergy chapter

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
29864	8	28	6	29	10	These precisions about LCAs don't seem appropriate here. To reduce the length of the document it would seem appropriate to sum up the content of this paragraph in a list of recommendations for the interpretation of the LCA graph: 4/5 points with appropriate academic references but without explanations and developments about interpretation methodology.	Figure removed
26545	8	29	1		10	take out	LCA removed
29411	8	29	10	29	10	Insert comment on the use of consequential LCA to provide predictive capacity, and provide examples.	LCA removed but A reasonable request, space allowing.
24685	8	29	10	29	10	Suggest insert comment on the use of consequential LCA to provide predictive capacity, and provide examples. Suggested citations: Reinhard J, Zah R (2011). Consequential life cycle assessment of the environmental impacts of an increased rapemethylester (RME) production in Switzerland, Biomass and Bioenergy (2011) Tonini D, Hamelin L, Wenzel H, Astrup T. (2012). Bioenergy production from perennial energy crops: a consequential LCA of 12 bioenergy scenarios including land use changes. Environ Sci Technol. 2012 Dec 18;46(24):13521-30. doi: 10.1021/es3024435. Epub 2012 Nov 30.	LCA removed
21998	8	29	11	29	50	These behavioural aspects miss out broader social aspects such as practices and habits. Suggest a wider use of the social sciences literature here.	travel - related behaviour is in section 8.4 and elsewhere
37079	8	29	11	29	11	Consider a broader discussion of behavioral aspects to further emphasize travel demand management and operational solutions for HDV - such as off hours delivery	TDM would best be in 8.10 on policies
37080	8	29	16	29	17	To the statement --> "There are a range of behavioral aspects related to the successful uptake of more efficient vehicles, new vehicle technologies and fuels; and the use of these vehicles in "real life" conditions" (and section 8.3.6 in general) Consider expanding upon behavioral aspects to include those associated with new technology vehicles like EVs. For example, much lower maintenance costs, greater potential for automation, the potential ability to upgrade batteries for extended range within the same vehicle over time (as a proxy for ICE engines which have less potential to be swapped out for increased fuel economy over time within the same vehicle).	Taken into account - but this is not really about behaviour, just technology/cost advantages. Would be worth a mention in 8.3.2 if room
37081	8	29	18	29	20	The consumer valuation of fuel economy is still very much under investigation. A broader discussion of available studies on this issue should be presented, and is suggested to include for example: Meghan R. Busse, Christopher R. Knittel and Florian Zettelmeyer. (2013). Are Consumers Myopic? Evidence from New and Used Car Purchases. American Economic Review, 103(1), 1-42.	Taken into account - Will check the reference
32753	8	29	23	29	24	The average age of vehicles in Europe is 8 years. The author's point holds with regard to large discount rates used by vehicle owners when assessing fuel efficiency premiums.	Noted. no action required
21999	8	29	24	29	31	The set of constraints on interest in purchasing fuel efficient vehicles takes a very narrow behavioural economics perspective, where criteria are presented as related to money only. Other literature should be considered here that explores non behavioural economics explanations - e.g. practices literature or social physcology.	Taken into account - but no suggested references, and several of the aspects mentioned in the text do relate to psychology
32754	8	29	28	29	31	Can the authors discuss the benefits of feebates which have been used in various countries around the world? This would be helpful in demonstrating the effectiveness or difficulty that policies have in changing consumer behaviour.	Taken into account - good point but belongs in section 8.10 on policies
26546	8	29	28			ADD and customer preference linked to life phases, income level	Taken into account - will consider how to add with space constraints
26547	8	29	31			ADD the French government offers a feebate (rebate below x CO^2 emissions level, but penalty for over the limit which becomes more stringent year after year).	Taken into account - possibly good for 8.10
26548	8	29	38			take out: The recent slow market introduction of BEVs even in countries with generous incentives suggests this is the case (Gallagher and Muehlegger, 2011).	Relevant sentence removed

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
32755	8	29	41	29	46	There is an element of 'cycle beating' here where manufacturers tune vehicle performance to yield the best performance on the legislated driving cycle. This may cause the vehicle to be even more inefficient in the real-world.	Taken into account
22000	8	29	44			I would suggest adding reference to the Commission study illustrating the scale of contribution of these test procedure inadequacies: http://ec.europa.eu/clima/policies/transport/vehicles/cars/docs/report_2012_en.pdf	Taken into account- will check into it
34266	8	29	44	29	45	"This gap reflects a combination of factors including […] driver behavior […]." FGA has introduced since 2009 on the FIAT brand models the software eco:Drive™ to help, support, encourage, challenge the FIAT drivers to do their best to reduce fuel consumption.	Taken into account - have added mention of on-board indicators and aids
25447	8	29	47	29	50	KEEP these sentences as it is important to indicate about integrated approach.(The gap between 5-10% improvement in on-road fuel economy can be achieved through efforts to promote “eco-driving” (IEA, 2012d). Another 5-10% may be achievable by an “integrated approach” including better traffic management, intelligent transport systems and better vehicle and road maintenance.)	Accepted
25424	8	29	47	29	50	"The gap between 5-10% improvement in on-road fuel economy can be achieved through efforts to promote “eco-driving” (IEA, 2012d). Another 5-10% may be achievable by an “integrated approach” including better traffic management , intelligent transport systems and better vehicle and road maintenance." COMMENT: These sentences should be kept. Above explanation is providing well underatanding that eco-driving and traffic management, etc (i.e. integrated approach) help to improve the gap between lavel and actual fuel economy.	Accepted
34267	8	29	47	29	48	"The gap between 5-10% improvement in on-road FE can be achieved through efforts to promote “eco-driving”." The eco:Drive™ DB results relative to the 1st year of introduction did show a 6% average reduction on the "educated" drivers fuel consumption figures in few weeks. A review of the DB is ongoing with the implementation of the new "real time" version on the 5ooL. Figures will soon be available.	Accepted - have added mention of on-board indicators and aids
37082	8	29	47	29	47	May be worth noting that the upper end of this range is presumed to require consistent driver feedback associated with in-vehicle instrumentation. A source is P. Crist, Transport Demand Management: Insights from Eco-Driving and Corporate Mobility Management. Also worth noting that benefits of driver education initiatives (without reinforcement) decline over time as typical driving patterns invariably return.	Accepted - have added mention of on-board indicators and aids
37083	8	29	50	29	50	Vehicle maintenance is commonly calculated as an element of eco-driving, mentioned in the previous sentence. Suggest dropping the reference here and scaling back the estimated benefits if appropriate.	Taken into account - there is overlap between on-road fuel economy and eco-driving bullets, but if we mention maintenance we need to mention 10 other aspects of ecodriving, not enough room
20403	8	29		30		This section should be shortened - some of this seems repetitious of previous sections (8.2.2)	Accepted, done
19997	8	29	18	29	50	Pls add a subsection of scrapping the old vehicles. In the context of 2008 financial crisis, many countries launched some programs to accelerate the scrapping of the old vehicles by updating current fleet.	Taken into account - good point, but no room
26638	8	29	18		19	Especially Purchase behavior is very important. This is why IPCC or similar action is required. However, is this section need to be in Chapter 8? This is common and can be independent section.	unclear comment - the section seems well placed in 8.3

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
23414	8	29	18	29	50	Pls add a subsection of scrapping the old vehicles. In the context of 2008 financial crisis, many countries launched some programs to accelerate the scrapping of the old vehicles by updating current fleet.	Taken into account - accelerated scrappage is a policy not so much a behaviour, though perhaps something could be said about early scrappage behaviours
25442	8	29		29		Are status motives for buying cars also considered (if not here, then in another section)? Iin particular, is it considered that changing perception of car ownership (declining status-component) in some Western countries might lead to less car use?	Taken into account - not for 8.3 but will check
32756	8	30	18	30	24	Quantify the other rebound effects mentioned here in this bullet point.	Not enough evidence to quantify
22002	8	30	18	30	24	"these rebound effects have been estimated to be modest" refers to only part of the problem. The abstraction of traffic from competing modes with lower GHG emissions eg rail and IWW can be more significant and will add to the rebound problem. See e.g. http://www.isi.fraunhofer.de/isi-en/service/presseinfos/2009/pri09-06.php	Agree, statement that rebounds do not negate benefits removed
26550	8	30	20		24	TAKE OUT	Agree, statement that rebounds do not negate benefits removed
37087	8	30	26	30	27	This first sentence does not add substance and can be deleted.	It is an important framing sentence. The following sentences would be incomprehensible without this sentence. Hence, we decided to leave the sentence here.
37088	8	30	26	35	12	There is little to no discussion on carpooling / rideshare here. Nor is there a discussion of the potential of driverless cars. Driverless cars have many advantages, including increased fuel economy from drafting, increased speeds, increased roadway capacity due to decreased following distances, increased safety, decreased parking scarcity and fuel consumption looking for parking, etc.	Driverless cars might be discussed in 8.3. Carpooling where?
22004	8	30	34			Most technological changes in vehicles won't require systemic change. The vehicles can be made much more efficeint within the existing system.	That is true. These technological changes are adressed in 8.3. 8.4 focuses on systemic changes which might also, in addition to technological changes, be needed.
20110	8	30	40	30	40	The chapter as a 8.4.4.1 but no other 8.4.4.X !	Thanks. But that is not a formal problem.
22005	8	30	41	31	11	This was explored extensively in the 'EU transport GHG: Routes to 2050' project. See: http://www.eutransportghg2050.eu/cms/assets/Uploads/Reports/EU-Transport-GHG-2050-II-Task-2-FINAL-30Apr12.pdf The discussion here also explores the likley scale of land use cahnge GHG emissions as a share of the lifetime emissions.	Thanks. Will be read.
27148	8	30	42	30	44	Sentence implies that infrastructure emissions are "missed" in normal production based emissions accounting. This is not the case - they are attributed to other sectors. See comment 16.	Thanks. Has been clarified in the text.
20735	8	30	6	30	17	Among several interesting studies, Michael Sivak: "Effects of Vehicle Fuel Economy: Distance Travelled … in the US: 1970-2010", UMITRI, Michigan, February, 2013, is interesting and rather discouraging. The 'rebound' effect is real - but complex. Vehicle load decrease is an important factor in this study.	Accept. Point made in text
22001	8	30	6	30	11	Isn't it that rather than 'changes in reaction to lowering the cost of travel' that is a rebound effect, it is an increased use of something that has been made more efficient? E.g. driving more to work as a new car purchased is perceived as more efficient and cheaper than a previous vehicle, so the train is less attractive?	Accept - covered in other chapters

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
26549	8	30	6		17	change to: Driving rebound effects: Changes in reaction to lowering the cost of travel is commonly called the (direct) “rebound effect” (Greene et al., 1999). In North America this has been found to be in the range of -0.05 to -0.30 fuel cost elasticity (e.g. a 50% cut in the fuel cost of driving results in a 2.5% to 15% increase in driving) with some studies finding it is declining and may be at the low end of this range (Small and van Dender, 2007; EPA, 2012). The rebound effect may be higher in countries with more modal choice options or where price sensitivity is higher, but research is poor for most countries and regions outside the OECD. The rebound can be addressed by fuel taxes or road pricing that offset the lower travel cost (Rajagopal et al., 2011; Chen and Khanna, 2012).	Reworded
37084	8	30	6	30	17	Recommend adding current research directly evaluating and reviewing the Rebound Effect for heavy-duty vehicles. Winebrake, J. J.; Green, E. H.; Comer, B.; Corbett, J. J.; Froman, S., Estimating the direct rebound effect for on-road freight transportation. Energy Policy 2012, 48, (0), 252-259.	Agreed. There is a need for more discussion of the rebound issue with respect to freight . Reference will be made to this and other relevant papers.
37085	8	30	6	30	17	p. 30, lines 6-17, especially "The rebound effect may be higher in countries where there are more modal choice options or where price sensitivity is higher" This section cites Small and Van Dender, but doesn't appear to recognize the significance of their findings. Small & Van Dender assert that the rebound effect is larger when the marginal cost of driving (mostly gasoline) is a high share of household income, and low when the cost of driving is low share of income. For non-OECD countries, the implication is that the price elasticity of demand for vehicle travel will be a function of household income vs. retail fuel prices for those portions of the population that are wealthy enough to own vehicles.	Reworded
37086	8	30	6	30	17	Could be useful in this section to address induced demand (the change in travel behavior associated with improved travel conditions, especially those resulting from infrastructure and service investments). An alternative would be to address this phenomenon separately in section 8.4. Either way, it is worth recognizing, especially since related impacts are discussed.	Discussed partly in 8.3
22003	8	30	all	30	all	This section only discusses passenger cars which is an omission and a partial take no behavioural issues. Work by Randles and Mander on aviation could inform thinking here in relation to aviation-related behaviours for example. Randles and Mander regading air transport demand and consumer behaviour, e.g. Aviation consumption and the Climate Change debate, Technology Analysis and Strategic Management, 21, No1, Jan 2009, 93-113).	Agreed. These behavioral issues are discussed in 8.3. reference included. See more on behavioural issues at 8.3.6
23369	8	30	6	30	6	Specific: for completeness it could also be mentioned that some econometric studies (for private transport sector) in Germany find direct rebound effects of up to 60%; see a) Frondel, M., Peters, J. and Vance, C. (2008) Identifying the Rebound: Evidence from a German Household Panel, The Energy Journal 29(4), 154–163. b) Frondel, M., Ritter, N. and Vance, C. (2012) Heterogeneity in the Rebound Effect – Further Evidence for Germany, Energy Economics34, 461–467. c) Frondel, M. and Vance, C. (2009) Do High Oil Prices Matter? Evidence on the Mobility Behavior of German Households, Environmental and Resource Economics 32 (1), 102–109. d) Frondel, M. and Vance, C. (2013) Re-Identifying the Rebound: What About Asymmetry? The EnergyJournal, forthcoming.	Taken into account - will check into these

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
25425	8	30		31		COMMENT: When modal sift is discussed, passenger's occupancy numbers (occupancy rate) in public transportation should be described and latest automotive technologies such as Electric Vehicle, Plug-in Hibrid Vehicle and Fuel Cell Vehicle should also be described as reference.	The ridership is indeed very important. It is now pointed out in the caption of Table 8.4.2. Vehicle technologies are discussed in 8.3. We unfortunately don't have space do discuss related modal shift options here (we did so before but were forced to delete that section).
20404	8	30		31		The discussion of infrastructure is unbalanced focusing only on rail construction LCA. There is a lot of new work on pavement LCA (see work of Horvath at UC Berkeley). I would actually recommend that this section be deleted; much of the LCA work in this area is new and has a high degree of uncertainty, whether for rail or pavements.	LCA of infrastructures is conceptually important. We include reference also to pavement LCA and highlight the preliminary nature of the findings.
29865	8	30	42	30	43	The acronym "LCA" was used, few pages upward, to designate Life Cycle Assessment. Taking non-expert readers into account, it might be wise to use the same denomination throughout the document	Agreed and changed accordingly.
29810	8	31	10			The table heading is rail but what is described is mainly w.r.t High Speed Rail therefore table heading needs to be amended. The comments column has given some assumptions however the assumptions provided are not consistent in coverage across the 5 studies and therefore confuses the reader. Lastly it is not clear the difference between second study (Emissions 1 g CO2/p km) and the first one with 5.1 gCo2 /p km	Accept. Constrained by what is reported in the references.
37089	8	31	10			p.31, Table 8.4.1. Lifetime assumption for rail systems is a critical factor to determine per p-km results. It is not clear if the assumption is consistent among the cited studies. If not, the numerical results in the table could be misleading.	Note added accordingly as LCA assmumptions vary
22006	8	31	12			A lot of changes in vehicles can happen in any case. The vehicles can be made much more efficient within the existing system. This argument applies more for changes in means of transport.	Agreed. That is clear from 8.3. There is still a lock-in effect from a transport-km demand perspective.
37090	8	31	12	31	24	This paragraph should mention not only the driving infrastructure, but also the extensive fueling infrastructure needed for vehicles. One of the major barriers to switching away from petroleum-based fuels in OECD countries is the existing fueling infrastructure and lack of stations for alternative fuels.	Agreed and added.
32757	8	31	14	31	14	Reference for infrastructure economic life-cycle ranges. What infrastructures lie at the limits of the range?	Clarified.
22007	8	31	21	31	32	high speed rail infrastructure in china - modal shift has a road focus but this could be from air too. Or, perhaps this is relative to air transport, but is unclear from the text.	Clarified.Thanks!
22008	8	31	25	31	33	Again, there is limited appreciation here of non environmental economic drivers of consumer decisions. The shifting norms in terms of air travel, from luxury to regular, creates new practices that lead to cost being only one factor in a decision on air travel. See Randles and Mander, TASM, papers. Randles and Mander regading air transport demand and consumer behaviour, e.g. Aviation consumption and the Climate Change debate, Technology Analysis and Strategic Management, 21, No1, Jan 2009, 93-113).	Thanks. Has been added.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
37091	8	31	25	31	26	p. 31, lines 25-26. "Aviation and shipping require point infrastructures but no line infrastructures" The concept of point and line infrastructures is introduced here without prior explanation. Anyway, both aviation and shipping do have "line infrastructures." High density aviation requires a network of airways, en route radars, and air traffic control. Marine navigation requires aids to navigation, dredging, search and rescue, and safety regulation. Suggest: "Aviation and shipping tend to require less fixed infrastructure, and hence have a lower share of infrastructure emissions to total emissions than land-based transport modes (Source)."	Thanks a lot for this comment. The sentence has been changed accordingly.
27149	8	31	29	31	31	Why is there a discussion of aviation demand elasticities here - not clear what the relevance is to infrastructure.	Agreed. This text is moved to 8.9
37092	8	31	29	31	31	It is unclear from this sentence why the elasticities have strong regional differences. Providing some explanation such as having available alternatives - will provide much more insight than just the statement alone.	Clarified.Thanks!
37093	8	31	32	31	34	p.31, lines 32-34. Congestion has a large cost in terms of increased travel time.	Agreed. The sentence structure has beed changed accordingly.
29809	8	31	6			modal shift from only LDV within road as bus emissions are not worse than rail (See line 1 & 2 and table 8.4.1)	Agreed but not clear how to accomodate the comment here.
26551	8	31	6			ADD but also facility by individuals to engage in multimodality (shift from car to train, for example and Park and Ride).	Agreed, but unclear where to add this.
37096	8	32	11	32	11	Similar to previous comments: "Sustainable urban planning offers tremendous opportunities" is not a universally true statement regarding the potential to significantly reduce GHG emissions. Some areas of this document make the distinction between developing and developed countries; suggest consistency and the appropriate caveats when these broad statements are being made.	We clarified with using the Asian example. Thanks.
37097	8	32	11	32	26	State: "Sustainable urban planning offers tremendous opportunities." Not only is "sustainable urban planning" not defined, but the opportunities it represents are never mentioned. The discussion on urban density correlations need to mention self-selection bias.	The opportunities are now pointed out. Sustainable urban planning is described in Chapter 12 and is now cross-referenced. Self-selection is pointed out.
26552	8	32	15		26	Change to : Urban population density correlates with GHG emissions from land transport (Kennedy et al., 2011; Rickwood et al., 2011) and enables nonmotorised modes to be more viable. Both aggregated and disaggregated studies that analyse individual transport use confirm the relationship between landuse and travel (Weisz and Steinberger, 2010; Kahn Ribeiro et al., 2012). Land use, employment density, street design and connectivity, and high transit accessibility also contribute to reducing car dependence and use (Olaru et al., 2011). The built environment impacts travel behaviour and residential choice (Ewing and Cervero, 2010), but self-selection (residential choice) plays a substantial role that is not easy to quantify. In the US population density and job density had surprisingly little effect on journey distance once controlled for accessibility of destinations and street network design (Ewing and Cervero, 2010).	I couldn't figure out the difference to the existing text.
32186	8	32	15	32	15	inversely correlates	thanks. Modified accordingly
37098	8	32	15	32	15	Do you mean to say that urban population density is *inversely* correlated with GHG emissions *per capita* from land transport? Otherwise, this seems at odds with pp. 32 lines 27-30.	Agreed. Thanks.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
25448	8	32	24	32	24	ADD following sentences after (Ewing and Cervero, 2010) on line 24 of Page 32. "Based on comprehensive real-time traffic data, sufficient information should be provided for travelers so that multimodal options of transportation shelled be made available. Once traffic information platforms with roadside sensor data and probe car data become operational, the volume of CO2 emissions can be easily and reliably estimated."(Okazaki et al. 2012) For Reference; Okazaki, T., Yamaguchi, M. Watanabe, H. Ohata, A., Inoue, H. and Amano, H., Technology Diffusion and Development, In: Climate Change Mitigation, A Balanced Approach to Climate Change. M. Yamaguchi, (ed.), Springer Publishing Company, London, UK 2012 pp.179-221 (Available at: http://www.springer.com/engineering/energy+technology/book/978 -1-4471-4227-0.)	Useful point - will include if space permits
37099	8	32	27	32	30	Is there a graph for this non-linear relationship? That might be good to include here. If there is such a graph, it might be possible to eliminate a lot of the description text in the paragraph between lines 27 through 36.	That is a good idea.
37100	8	32	30	32	36	Because this section is about public transit and the potential for mode switching, it seems like it should be in the next section (8.4.2.1 Modal shift opportunities for passengers) instead.	That is true. But it is also related to urban form. Hence we leave it here.
26553	8	32	33			take out Diana et al., 2007	not clear why.
20405	8	32	34	32	34	"car sharing" is not para-transit, context is not correct for this sentence.	Agreed. Has been clarified.
37094	8	32	4	37	47	On p. 32, urban planning is discussed some and on p. 37 evidence from Ewing 2007 is used to cite a 9-16% reduction in transport GHG from urban form changes 50 years hence. Note that the evidence in NRC 2009 (Driving and Built Environment) generally agrees with the Ewing magnitudes. Also see detailed reviews of the impact of several policies on GHG done for the California Air Resources Board (ARB), here: http://arb.ca.gov/cc/sb375/policies/policies.htm. Land use/urban form (e.g. density, mix, street connectivity) and policies (e.g. road pricing, parking pricing, telecommuting) are reviewed. Each brief includes an estimate of the impact, often measured in ways that can be related to an elasticity. The evidence at the above ARB web page has been published in a refereed journal, at: D. Salon, M. Boarnet, S. Handy, S. Spears, G. Tal, "How Do Local Actions Affect VMT? A Critical Review of the Empirical Evidence," Transportation Research Part D, volume 17, issue 7, October, 2012, pp. 495-508. Again, the magnitudes there will provide some additional evidence that bolsters the magnitude on p. 37, and more generally the magnitudes at the ARB page and in Salon et al. go beyond density and so can add importantly to the evidence base for this chapter.	Thanks. Will be included.
37101	8	32	42	32	45	p. 32, lines 44-45. "Small but significant modal shifts have been observed as they can offer similar benefits as metro systems at much lower costs." This sentence should be broken into two, and some indication of where these modal shifts occurred would be helpful. Suggest: Small but significant modal shifts from LDVs to BRT have been observed in locations where new BRT systems have been implemented. BRT systems can offer..."	Agreed and changed.
37095	8	32	9	32	10	The terms cooperative behavior and non-cooperative behavior have connotations associated with these terms. Is use of these terms required? Do they add or distract to the rest of the text?	These terms contain valuable context.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
24686	8	32	3	32	5	For cycling, range could be increased by revising standards and regulations for electric bicycles to enable higher average speeds and improved hill-climbing ability. Bicycles offer many of the benefits of LDVs in terms of independence, flexibility of routes and scheduling freedom. Following the reference to Naes 2006 on line 8, suggest add: 'Revising electric bicycle standards such as EN15194 to enable higher performance could increase the feasible commuting range and encourage this low emissions personal transport mode. Electric bicycles offer many of the benefits of LDVs in terms of independence, flexibility of routes and scheduling freedom, with much lower emissions and health benefits.'	The content is very valuable and has beed added in section 8.2.1.2
25426	8	32		33		COMMENT: There is a description in line 7-8, page 33 that "Increases in cycling and walking now appear to be happening in many cities though accurate data is scarce". The data would be "Scarce" acually , description hereafter in this section can be regarded as not so credible and those contens should be reconsidered. If cycling and walking is considered to have potential of GHG reduction, it is preferable that the quantitative reduction value is described.	The data is describend in the following sentences.
23416	8	33	19	33	21	It is an objective observation that "Many Indian and Chinese cities with traditionally high levels of walking are now reporting dramatic decreases' made by Leather et al. (2011). However, in the context of its paragraph, it is easy to mislead the readers that such trend of moves are all negative. Suggestion is to clarify the reasons behind such observation, such as i) some share of the shrinked walking trips shift to public transit, which can be interpreted as the possible trend (it realizes both motorization=economic&social and environmental sustainable purpose); ii) in city's early development stage (e.g. in most LDCs), certain level of motorization (NMT to both PT and private cars) is an essential route, which can not be intrepreted as a wrong move.	A very important point. The current modal shift is both sign and metric of both desirable and harmful developments. That is now pointed out by two additional sentences that try to reflect the possible interpretations.
24521	8	33	26	33	26	Would recommend to check literature again concerning link of NMT to PT trips in Germany - how do the remaining 30 percent of PT passengers get to the public transport stop? Is it cycling, park&ride…? If so, the number may be realistic and this comment can be disregarded.	Thanks. Checked.
37102	8	33	3			To be complete the table should also list CO2 intensity of LDVs.	Rail only was the objective. This covered in 8.6
26554	8	33	30			ADD the efficiency of which is increased by diverse forms of constraints on cars (reduced number of lanes, parking restrictions), limited access (La Branche, 2011)	Has been added.
24522	8	33	35	33	35	Can be up to 1500km, cp example of train Beijing-Shanghai	Thanks. Is added.
37103	8	33	6	33	6	NMT presumably is "non-motorized transport." This acronym has not been defined earlier. Please spell out.	Is done.
23415	8	33	6	33	24	It is inappropriate to compare NMT share between Netherlands (and other developed countries) and Asian (and African) cities, because they are in very different development stage (esp in terms of motorization). There might be totally different reasons behind the NMT shares. For example, 50% share of NMT in Netherlands might because of the deliverate policies on low-carbon transport, however 50% NMT share in developing countires might means they are just in the very early stage of motorization when many OECD countries have already went through.	Good point. There is a new sentence explaining this situation.
37104	8	33	7	33	8	Is the sentence "However, increases in cycling and walking now appear to be happening in many cities though accurate data is scarce" only apply to OECD countries or are there other countries to which this is true as well? It just seems to conflict with the sentence in lines 19-20 that says "Many Indian and Chinese cities with traditionally high levels of walking are now reporting dramatic decreases."	It has been added: "in mostly OECD countries", because it is not only OECD countries but the point is well taken!

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
24687	8	33	15	33	16	Unable to verify statement that approximately 10% of daily trips are by walking and cycling in Australia. The Census of Population and Housing collects method of travel to work data, attributing 5.1% of trips to work in Australian cities by walking and cycling only in 2011. Referenced research papers may have modelled an approximate proportion of all trips that are walking and cycling, but the only accurate data on mode share in Australia relates to journey to work. Suggest remove the existing reference and replace with: "Walking and cycling combined account for only 5 per cent of all journeys to work in the capital cities of Australia." Suggested citation: Mees, P. and Groenhart, L. (2012) Transport Policy at the Crossroads: Travel to work in Australian capital cities, RMIT University, Melbourne, p. 10. Available at: http://mams.rmit.edu.au/ov14prh13lps1.pdf	Thanks. Has beend modified.
29867	8	33	36	33	36	Spelling : replace «) » by « ; »	Thanks. Changed.
29866	8	33	6	33	6	The acronym « NMT » is used without any explanation as to what this acronym refers to. I personally guess it must refer to Non Motorized Transportation. But, again, non specialists readers may wonder what it means.	Thanks. Abbrevation is now explained.
22009	8	34	12	34	13	It could be noted here that as water and rail based freight networks have become less used in OECD nations, developments on, for instance, wharfs, will now limit their reuse in future.	Good point. This is a form of 'lock-in' which is discussed in the chapter (8.4.1.1). Reference may be made to this loss of rail and water terminal capacity through change of land use.
37106	8	34	17	34	17	Consider a discussion of the differences in oppert. between bulk and high velocity or high value goods. In addition consider a discussion of the impact labor and touching the goods has on cost structures.	Considered but space constrained
22010	8	34	22	34	37	General point about consumption patterns being a key driver here	Considered but space contrained and no references
37107	8	34	22	34	24	This sentence appears to be misleading. The entire freight system is claimed elsewhere here to have to handle at least double the freight traffic - under NO modal shift assumptions. Clearly, some expansion in the rail network infrastructure will be attributed to this growth - without modal shift to rail. Do the authors really suggest that the network must double beyond this anticipated growth to also capture and serve cargo that may shift from more costly or energy-intensive modes like onroad HDVs? If so, the claim must be associated with more literature than provided. Recommend modifying this statement to allow for and acknowledge that rail utilization can be improved without doubling the network entirely. This claim seems overstated and might undermine the credibility of this section.	Interesting point. The example give relates to the EU's plans to achieve a substantial freight modal shift to rail by 2030 and may not be generalisable to other regions and countries. The reference given is to a reputable source and only one that specifically addresses this capacity issue.
33254	8	34	24	34	29	Yes, HDV might become more efficient a bit faster than trains, but if you start of with a factor of 10-20 between the emissions per tkm, efficiency gains of 30-50% for HDV don't make much difference, it would still be better to shift to rail. Please make this clear - the current text can easily be misunderstood as "HDV and rail actually might have quite similar emission intensities soon"	Reject. Disagree - 30-40% for HDV make a HUGE difference, and much of this is not going to be shifted to rail. We do separately show very clearly that rail is a very low CO2 mode, on average, compared to trucks.
37108	8	34	26	34	29	These two sentences need a citation.	To be reworded

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
37109	8	34	30	34	30	page 34, line 30. "intraurban rail freight movements are possible" They are possible, but the economics are likely to be very bad. In the United States, the pre-1950 network of feeder lines and individual sidings for particular facilities has mostly withered because the maintenance costs of the lines and the opportunity cost of the right-of-way are far in excess of the value of the low volumes of freight that move across these feeder lines.	This point in the text could be illustrated with a reference to the French supermarket chain, Monoprix, which distributes by rail to its shops in Paris. It could also be qualified by referring to the constraints outlined in this comment.
32759	8	34	34	34	36	Quantify the large amounts of freight travelled by LDV for the last mile. Reference required.	It is self-evident that consumers transport large quantities of retail purchases in their cars, though this is seldom considered to be freight. We are not aware of any hard data on the scale of this freight movement. We could rephrase the text to say 'seldom if ever appears in freight transport statistics'
37110	8	34	34	34	34	The sentence on "last mile" is a bit confusing and somewhat misleading. It is true that there is a rapid growth in commercial delivery to homes due to e-commerce however it is not clear that this is leading to a reduction in total trips. It would also be worthwhile to consider differentiating "last mile" to commercial establishments and residential - these are two different structures	We are not saying the there is a net reduction in total traffic, merely that substitution of vans for cars is possible and when it occurs there can be a carbon saving. The term 'last mile' is now in very common useage and little would be gained from trying to distinguish two types of last mile delivery.
37105	8	34	4	35	12	On page 34, in the section entitled "Modal shift opportunities for freight" (Section 8.4.2.2), we suggest referencing a study by Nealer, R. "Assessing the energy and greenhouse gas emissions mitigation effectiveness of potential US modal freight policies." Transportation Research Journal Part A, 2012, vol. 46, issue 3, pages 588-601, be added. The paper estimates freight mode changes from truck to rail and water transportation can optimistically reduce GHG emissions in the freight sector by up to 7% in the short term.	This is an important publication which will be referred to in the next draft of the chapter.
32758	8	34	5	34	6	How many is a “few” decades? Is this market share re-distribution global?	Accept to be reworded
27818	8	34	6	34	6	I assume that in that case "waterborne transport" refers to "inland waterborne t." and maybe also short-sea shipping? But not including deep-sea transport? I would recommend adding detailed information what is included in "waterborne transport".	Waterborne is to include all boats.
33253	8	34	7	34	12	What is the share of freight that is transported <50km, <200km, <500km? From my current knowledge, long-distance makes up a large share of freight transport, and for this a shift to rail should be easy - if rail infrastructure would be improved and cross-border coordination between rail companies would improve	On the contrary, within European most freight moves over relatively short distances. The length of haul profile for freight varies by continent and country, however. If space permits, we could make this point and incorporate some statistics to back it up.
29868	8	34	29	34	29	Too many words : « uptake »	Thanks. Is changed.
37111	8	35	10	35	12	Can you please be more quantitative than the use of the word "substantial."	Taken into account. Text revised.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
34536	8	35	36	35	36	After "climate forcing (Corbett et al., 2010).", a new sentence is suggested to be added: "Regarding the impact on the Arctic of black carbon emission from international shipping in the Arctic, since there are various definitions of black carbon, technical definition of black carbon is required to be defined firstly, associated measurement methods and additional work for evaluating the impact on the Arctic of black carbon emission from international shipping in the Arctic before possible control measures are investigated now are dealt with by IMO and the work with the target year of 2014 (IMO, 2013).". The reason is that the suggested definition of black carbon used in waterborne transport may be different even conflict with the defection used by other international bodies, such as ISO, Convention on Long-Range Transboundary Air Pollution (CLRTAP) and the Climate and Clean Air Coalition (CCAC), etc., this may cause confusion and further work should be notified here. (Reference: IMO (2013). BLG 17/18 - Report To The Maritime Safety Committee And The Marine Environment Protection Committee. International Maritime Organization, 4 Albert Embankment, London SE1 7SR.)	Taken into account. Text revised.
27819	8	35	38	35	40	We recommended to add two literature citations: Görgen, K. et al. (2010); Nilson, E. et al. (2012) Görgen, K., Beersma, J., Brahmer, G., Buiteveld, H., Carambia, M., de Keizer, O., Krahe, P., Nilson, E., Lammersen, R., Perrin, C. & D. Volken (2010) Assessment of climate change impacts on discharge in the Rhine River Basin: Results of the RheinBlick2050 Project. CHR Report No. I-23. 229 pp.. Lelystad. Available at: http://www.chr-khr.org/files/CHR_I-23.pdf. Nilson, E., Lingemann, I., Klein, B. und P. Krahe (2012): Impact of hydrological change on navigation conditions. ECCONET-Report 1.4. 34 pp.. Bruxelles. Available at: http://www.ecconet.eu/deliverables/ECCONET_D1.4_final.pdf.	Accepted. Text revised.
32760	8	35	6	35	8	References for such real-world slow steaming policies.	Taken into account. Text revised.
20406	8	35		37		Recommend that section 8.5 by deleted. Interactions with adaptation is highly speculative and in any event likely to be minor.	Rejected. Mandatory section.
29869	8	35	29	35	29	Misplaced reference: « It has been estimated that the annual fuel cost of a container ... (Xu et al., 2012) »	Editorial.
29870	8	35	38	35	38	Repetition : « (Jonkeren et al. 2007) »	Editorial.
19571	8	35	18			This section on the Arctic sea routes only identifies the ecological potential impacts as a problem. There are several existing documents, such as the Nunavut Atlas (1999), and on-going efforts (within the Arctic Council) to document and investigate Indigenous marine uses along these shipping lines. So in addition to environmental concerns, the Indigenous land and marine uses, rights, subsistence economies and dependencies on healthy ecosystems need to be referred to here.	Taken into account. Text revised.
22011	8	36	13	36	41	Work has been done in this area on the climate impacts of shipping by Robert Nicholls in Southampton but is not included here. However, I believe that this work has not considered very high end emission scenarios.	Noted.
37112	8	36	13	36	41	The section is titled: Urban form and infrastructure, but only the first two sentences are on urban form. The next three paragraphs speak exclusively about infrastructure. The urban form section should be expanded or removed entirely.	Accepted. Text revised.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
34427	8	36	29	36	31	This sentence is misleading, because it does not specify whether you talk about technical or economic mitigation potential and about net social cost of mitigation or the specific (unit) cost of individual mitigation measures. Technical potentials for mitigation, which should mainly be discussed in this section, are largely independent of climate change policies and targets. The share of technical potentials that becomes economic, the economic potential, increases with increasing stabilization targets due to increasing carbon prices. The same is true for the social cost of mitigation, which increase the lower the stabilization level. But the current specific (unit) cost of individual mitigation measures in terms of USD/tCO2e, which should be the second main focus of this section, are largely independent from the stabilization level.	Accepted. Text revised.
34428	8	36	34	36	40	This paragraph seems to fit better into the co-benefits section.	Accepted. Text moved.
37113	8	36	43	36	45	The sentence says "Increased ambient temperatures and humidity levels are likely to affect ... emissions from ICEs..." As stated, it sounds like the change in temperature and humidity level affects how the vehicles produce emissions, not how those emissions interact with the atmosphere, which appears more relevant. Please clarify this sentence.	Taken into account. Text revised.
26555	8	36	45			change go : (Motallebi et al., 2008) (Pidolal. 2012)	Taken into account. Text revised.
37114	8	36	48	37	2	What are the regional conditions referenced at the end of the sentence on line one? Could these conditions be explained here? Or examples given for context?	Taken into account. Text revised.
32761	8	36	6	36	7	References for extensive logistical disruption by natural events	Taken into account. References added.
27150	8	36	9	36	11	Need a source/reference for these statements - not clear that localised sourcing or relaxation of JIT would actually lead to reduced emissions (either from transport or overall).	Taken into account. This is not a description of a mitigation measure, it only identifies a relationship, which can be positive or negative.
29871	8	36	35	36	36	"sensitive" should be replaced by a synonym ("responsive" or "reactive")	Editorial.
29872	8	36	46	36	46	Spelling : replace «) » by « ; »	Editorial.
22012	8	37	117			To what extent is the conclusion that climate change is a minor part of transport externalities robust against variations in the carbon price? If it is, cost-effectiveness figures should consistently take into account health benefits (or at least mention them) throughout this chapter, as they would otherwise give a misleading impression of the full social cost-effectiveness. Also,there are differences in the valuation of external costs. In particular the damage costs of climate change cannot be known with any certainty. In addition there are major disputes over the degree to which discounting these costs is appropriate. Is it possible to provide numbers?	Rejected - due to space limitation a lenghty discussion on externalites is not possible here. Some considerations are made in 8.7 and 8.8 though.
23418	8	37	13			i) Item 18 (maritime): add port item- such as shore power (cold ironing) and e-handlers (e.g. eRTGs) ## ii) Item 19 (logistics): add LLR, aerodynamic tech, DPF, drop-and-hook operation, overload reduction, etc. ### iii) Item 21 (behavioural change): in addition to economic-TDMs (e.g. pricing policies), some regulatory TDMs are needed (e.g. vehicle restriction, low-emission zone, etc.), or combined measures. ###	Rejected - table, which will be revised, because of space limitation will not be able to provide information at this level of detail.
37115	8	37	21	39	4	Consider combining sections 8.6.1 and 8.6.2, especially given the interdependency of activity demand reduction and modal shift.	Rejected- we are trying to follow the ASIF logic, where "A" stands for Activity, "S" for Structure, "I" for Intensity and "F" for fuel. But text will be improved to better address this proper comment made by the reviewer.
26556	8	37	22		23	change to: (Delucchi and McCubbin, 2011; Friedrich and Quinet, 2011; (Proost, 2011).	Accepted - references will be modified.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
37116	8	37	28	37	29	It is unlikely there is a city for which there is a 0% potential of reduction in transport activity.	Accepted - text will be revised.
29811	8	37	29	37	31	Cost benefit evaluations for congestion charges demonstrate even positive costs. Therefore include literature from the other side.	Rejected - text already makes clear that positive costs are possible. But the emphasis here is on the possibility of negative costs as well, which may be more surprising and more relevant to the discussion.
24524	8	37	38	37	38	Is it an alternative, or is it complimentary? (revise wording)	Accepted - text for revised aiming at more clarity on the ideas conveyed.
26557	8	37	39			add: in France, all cities over 50 000 have to include such measures in their Urban Mobility Plans.	Accepted - text will be modified.
34268	8	37	5	37	7	"In a passenger LDV, A/C can increase FC by around 3-5% [...]." According to the FGA experience and previous investigations, for a small diesel DI engine this kind of figure is true in “cold latitudes”; the figure can be quite larger in the same latitudes for a gasoline engine and it may reach 17% in very hot latitudes, for gasoline engines [SAE paper 2013-01-2013].	Accept but too detailed given space constraints
27820	8	37	9	37	11	The sentence should be changed to "Extremes in temperature (both high and low) negatively impact the driving range of electric vehicles due to greater use of on-board heating and air conditioning and a reduced efficiency of the battery at low operating temperatures, and so will require more frequent recharging."	Accept

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
23417	8	37				The following items should be added in Section 8.6 and summarized into Tabel 8.6.1: i) Natural gas vehicles: The potential GHG emission reduction range is 10%-25% for natural gas. The population of nature gas vehicle in China has reached 1 million, and the usage of nature gas vehicle in road trasportation is encouraged by MOT. The direct cost of nature gas is 30% less than that of diesel or gasoline, but the cost of the vehicle should increase 50-100 thousand RMB. So for a heavy duty truck, the life cycle cost of reducing 1 ton CO2 emissions is 50 USD.(source: Wang xiaohua.A Review of Natural Gas Vehicle and Possible Future Development, Commercial Vehicle, 2012.9) ii) Port shore power (cold ironing): Potential emission reduction (upto 95% hotelling emissions will be reduced from auxiliary engines, if all ships are cold ironed) (CARB, 2006). Example "cold ironed dry bulk vessel in China reduce 850 tons of CO2, 21.4 tons of SO2, and 24.1 tons of NOx". Direct cost "3-6 million CNY" (MOT, 2012. website: http://www.moc.gov.cn/2006/jiaotongjj/07jiaotjnw/shifangdx/201208/t20120827_1291436.html). Annual emission reduction 54ton per berth (Yuan, et al., 2010). iii) electric Rubber tired gantry (eRTG) on port: Example "RTG applied in Yantai Port in China"; GHG emission reduction "more than 40%"; cost "CNY600,000 per RTG retrofit" (MOT, 2010. website: http://www.moc.gov.cn/2006/jiaotongjj/07jiaotjnw/shifangdx/201006/t20100608_693164.html) iv) Drop-and-hook (tractor-trailer) operation: Example “Notice on Promoting Drop-and-Hook Development” (MOT 808, December 2009) (http://www.moc.gov.cn/zhuzhan/zhengwugonggao/jiaotongbu/daoluyunshu/201001/t20100115_652056.html#) v) Eco-driving practices: Example "Jiangsu eco-driving practice"; GHG reduction "30%" (MOT, 2011. Web: http://www.mot.gov.cn/st2010/jiangsu/js_jiaotongxw/jtxw_wenzibd/201106/t20110615_954856.html; http://www.moc.gov.cn/2006/jiaotongjj/07jiaotjnw/jienengxcz/201106/t20110601_950237.html) vi) Ministry of Transport issued the mandatory fuel consumption limits and measures for both commercial bus and trucks (JT711-2008, and JT719-2008) (MOT, 2008) (web: http://www.moc.gov.cn/zhuzhan/zhengcejiedu/zhengcewenjian_JD/cheliangranliaoxhljcjd/zhengcefagui/200909/t20090902_616335.html; and http://www.moc.gov.cn/zhuzhan/zhengcejiedu/zhengcewenjian_JD/gonglushuilujiaotong_JYNYFJD/xiangguanzhengcefagui/200808/t20080801_511310.html), as well as the "recommendatory" for fuel consumption and CO2 emission limits for vessels for commercial use (JT/T 826-2012, and JT/T 827-2012) (MOT, 2012) (Web: http://www.moc.gov.cn/zizhan/siju/kejisi/kejifazhan/tongzhigonggao/201207/t20120711_1269552.html) vii) Oil-gas recovery system on ports and gas stations: MOT has wrote to promote the oil-gas recovery system in port in the 12the FYP for waterway transport emission reduction (MOT, 2011) (web: http://www.moc.gov.cn/zizhan/siju/shuiyunsi/gongchengjianshe/jishubiaozhun/guanliwenjian/201109/t20110908_1051453.html)	Rejected - table, which will be revised, because of space limitation will not be able to provide information at this level of detail.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
35270	8	37	13			Cases used in Section 8.6 and Table 8.6.1 are mainly from developed countries. To provide a holistic view of good practices, it is suggested to add successful cases from developing countries as well. A few examples are listed below: (1) Natural gas vehicles: The potential GHG emission reduction range is 10%-25% for natural gas. The number of natural gas vehicles in China has reached 1 million, and the usage of natural gas vehicles in road transportation is highly promoted by the Chinese government. The direct cost of natural gas is 30% less than that of diesel or gasoline, while the cost of the vehicle is 50-100 thousand RMBhigher. Overall, for a heavy duty truck, the life cycle cost of reducing 1t CO2 emissions is 50 USD. (Source: Wang Xiaohua. A Review of Natural Gas Vehicle and Possible Future Development, Commercial Vehicle, 2012.9) (2) Fuel tax and vehicle and vessel tax are introduced to reduce fuel carbon intensity in China. (Cai et al. 2011; Yang et al. 2010; Feng et al.,2012) (3) The Chinese government issued the mandatory fuel consumption standards and measures for both commercial buses and trucks (JT711-2008, and JT719-2008) (MOT, 2008), and voluntary standards of fuel consumption and CO2 emissions for commercial vessels (JT/T 826-2012, and JT/T 827-2012) (MOT, 2012) (4) The policies towards accelerating the utilization of EVs have already been implemented in China. China has started the "10 cities 1000 EVs" initiative, and cities including Beijing, Shanghai and Shenzhen have implemented various market-based or command-and- control policies on EV development. (Cai et al. 2011; Yang et al. 2010; Feng et al. 2012)	Rejected - table, which will be revised, because of space limitation will not be able to provide information at this level of detail.
20407	8	37	13	37	13	I'm not sure what is meant by "potentials".	Rejected - this wording has been approved by the governments that proposed the itemization of this IPCC report and as such cannot be modified without prior authorization of the parties. But for clarification "Potentials" here stand for "Mitigation Potentials".
24523	8	37	13			As general principles, it is recommended to 1) cover the interal costs of transportation to the maximum extent possible, and 2) to internalise external costs. Those two principles may be included in Chapter 8.6. Also, both numbers (monetary) and details on methodologies for calculating incremental costs are lacking in Chapter 8.6. Bongardt et al. 2013 could be checked for further information on these methodologies and the issues with these.	Accepted - text will be improved. But space limitation do not allow authors to go deep into these issues. Because of that, part of the discussions on externalities belong to 8.7 and 8.8.
20408	8	37	20	38	19	This section is very repetitious of 8.2.2 and 8.3.6. It also says nothing about the costs which is presumably what this section is about.	Accepted - text will be revised.
29873	8	37	22	37	22	Spelling : « (» should be deleted	Editorial - this will be fixed later on by a professional editor.
29874	8	37	36	37	37	Repetition : « Prud'homme and Bocarejo, 2005 »	Editorial - this will be fixed later on by a professional editor.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
24688	8	37	38	37	39	Road pricing works by inducing a modal shift, which can only work if there are viable alternative modes. Therefore facilitating these mode shifts is essential for mitigation, i.e. more than just complementary. Suggest Append to line 37: 'Congestion charges are most effective when alternative transport modes such as public transport systems are available.' Change lines 38-39 to read: 'A complementary adjunct to road pricing could be to provide more street space for pedestrians, cyclists and public transit (Gehl, 2011).'	Accepted - text will be amended.
24525	8	38	1	38	9	The aspect of outdated design norms for roads in many emerging economies (wide, car-oriented) is a major barrier for implementing the policies mentioned here	Accepted - text will be adapted.
22013	8	38	10	38	19	greater deployment of computerised vehicle routing systems could partly offset this [increasing total t-km] trend. Modal shift could play a role here, particularly relating to co2, but is not mentioned.	Accepted - text will be amended. But with respect to modal shift, as suggested by the reviewer, this does not belong to here, as the activity effect is, indeed, what is being discussed in that section.
30534	8	38	10	38	18	The activity reduction addressed in this paragraph seems to necessarily have to mention financial instruments: in line 14 to 16, the sentence "However, it could be achieved by returning to more localised sourcing, manufacture and storage of products, thereby shortening supply chains, or by the routing of freight more efficiently across these supply chains." could be complemented by a follow-up sentence like: "Financial instruments such as area-wide truck road pricing could supply a relevant incentive to that end (Steininger et al. 2012)". Reference: Steininger, K.W., Schmid, C., Tobin, A. (2012), Regional and climate mitigation impacts of expanding the heavy duty vehicle charge to the secondary road network: A quantitative analysis for Austria, Empirica, 39(2): 261-278 doi: 10.1007/s10663-012-9184-9	Accepted - text will be amended.This section and paragraph is not arguing for a reversal of wider sourcing / globalisation trends. Rather it is highlighting the fact that long supply lines will be more vulnerable to adverse climate impacts. Nevertheless, the publication cited is an interesting one which we may be able to mention elsewhere in the chapter.
32762	8	38	18	38	19	Reference for partial offsetting of growing emissions associated with logistical hubs	Accepted - we will try to add a reference. It is unlikely that the concentration of inventory and handling in these hubs (rather than their dispersal to smaller, decentralised facilities) will result in a net increase in emissions. Possible references here would be Kohn and Huge-Brodin and Baker.
22014	8	38	21	38	22	The comment regarding 'relative to baseline growth' needs to be more explicit, as it is not obvious a) what the growth in passenger-km would be and b) what improvements are necessary for this baseline growth to ensure that energy and co2 intensity improve at a higher rate than currently (which is presumably the case??)	Accepted - text will be amended.
33255	8	38	21	38	24	I don't get this sentence - if you reduce passenger travel by 25%, why do emissions only go down by 20% if you furthermore use less emission-intense modes?!	Accepted - text will be revised to clarify that.
37118	8	38	21	38	21	Does the 25% reduction value refer specifically to light-duty travel?	Accepted - text will be revised to clarify that.
37119	8	38	23	38	23	Should this statement indicate that this is a modal shift "away from" LDVs? "half of this from modal shifts to rail, bus, and non-motorised travel""	Accepted - text will be revised to clarify that.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
37117	8	38	3	38	3	Please define the term polycentric, as it is a term not known to the general public and those consulting this paper outside of urban planning may not be familiar with it.	Accepted - text will be modified.
30551	8	38	31			add reference	Accepted - text will be modified and we will try to find a reference for this part or delete the text.
33256	8	38	33	38	39	So all the costs were negative, you had only savings on each individual item? If yes, please state so clearly. Why was there "USD 250,000 over 50 years for public and private transport savings" if you build a non-car-dependent suburb? If it was such a sucess, why hasn't this been applied in many places?	Accepted - text will be modified and we will try to clarify this part or delete the text.
20409	8	38	34	38	38	No references given for cost numbers.	Accepted - text will be modified and we will try to find a reference for this part or delete the text.
32763	8	38	40	38	42	The sentiment expressed here is a repeat of that on p 35.	Accepted - text will be modified and we will try to improve this part to avoid repetition or delete the text.
22015	8	38	40	38	49	Discussion here omits earlier points regarding more local manufacture and sourcing which could impact on modal shift, ie from air to rail/road/inland waterway, if goods are no longer sourced from greater distances.	Accepted - text will be modified and we will try to improve this part or delete the text.
20410	8	38	40	38	49	Be specific about the potential for freight shifting to rail. This is unlikely on a large scale. I suspect these are European estimates and would not apply elsewhere. The text reads as if this is happening worldwide.	Accepted - text will be modified and we will try to improve this part or delete the text. We are not aware of any global assessments for the potential for freight modal shifts towards rail and water. The opportunities for modal shift clearly vary by region and country making it difficult to generalise.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
37120	8	38	40	38	45	This reference to just-in-time (JIT) sourcing is typical and intuitive given the several decades where optimizing the supply chain drove inventory down consistently. However, it misunderstands the fundamentals of JIT. JIT uses inventory, and other controllable elements, for competitive advantage through supply chain management. When interest rates and financing inventory were very costly, AND when fuel was much less costly than this decade's prices, JIT algorithms consistently favored reductions in inventories. A reapplication of JIT fundamentals today would indicate that competitive advantage in the supply chain is affected by high energy prices and carbon reduction goals (not clearly in policy yet, but discussed and researched). This is NOT a relaxation of JIT, but a reapplication of JIT within the larger (and century-old) study of material resource planning (MRP). Please revise. Also, the statement that the markets are "discrete and offer little opportunity for mode switching" is overstated. See previous comments in this context. Please revise, perhaps with this suggested text and cite something like the following: JIT algorithms essentially optimize profitable operations by balancing the ordering, transportation, and other costs to obtain shipped material and products with costs of carrying material and products in inventories; the rule of thumb that JIT minimized inventories is currently being revisited by business given increased energy costs and reduced costs of inventory financing. Warkentin, M. E. In MRP and JIT: Teaching the Dynamics of Information Flows and Material Flows with System Dynamics Modeling, Proceedings of The 1985 International Conference of the Systems Dynamics Society, 1985; 1985; pp 1017-1028.	Accepted - text will be modified and we will try to improve this part or delete the text.
23419	8	38	49	39	4	It is quite controversial to incorporate a relatively high carbon price in the transport sector. Firstly, it is difficult to measure the environmental costs of freight transport. Secondly, transport is a trade-derived services which means the transport activity would probably remains high even with a high carbon price particularly in economy boom. Thirdly, any additional costs would generally be passed on to the end consumers or producers, the impacts of high carbon price on LDCs and SIDCs would be significant and should also be taken into accound. Therefore, this sentence is suggested to be deleted.	Accepted - text will be modified and we will try to improve this part or delete the text.
29812	8	38	7			"maintain high density" is a very debatable as densities in all the cities in developed countries have declined. Kindly look at the following study http://www.alnap.org/pool/files/1834-1085-angel-final-1.pdf. The high densities in many Asian cities are at a cost to health and quality of life for the inhabitants.	Accepted - text will be modified and we will try to improve this part or delete the text.
22016	8	39	1	39	4	The term 'relatively high' carbon price is somewhat meaningless. There are studies that indicate that for passenger air travel, prices of >300Euro/tonne are the size required for a shift towards a stringent mitigation pathway (Bows, et al., Aviation in a low carbon EU, Tyndall Working paper and report, and book chapter) other work on carbon prices for aviation has been done by Anger et al.,) A range of values needs to be given here for the reader to understand the implciations.	Reference included, thanbk you; text smaller now, and could not be addedd anything erlated;

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
37121	8	39	10	39	18	Calculation of costs in $/tCO2 for PHEVs and FCVs requires many assumptions regarding fuel efficiency gains of vehicles, fuel prices, allocation of costs to co-benefits (criteria air pollution reduction, GHG reduction, etc.). It is not clear the IEA (2010d) is an original study or a study summarizing results in other studies. The U.S. Department of Energy releases many of the assumptions we use in such analyses in modeling and simulation reports at Argonne National Laboratory: Moawad, A. and Rousseau, A. "Impact of Electric Drive Vehicle Technologies on Fuel Efficiency", August 2012. Moawad, A., Sharer P., Rousseau, A., "Light-Duty Vehicle Fuel Consumption Displacement Potential up to 2045," Report to the U.S. Department of Energy, Contract ANL-ESD-11-4, July 2011. And maintains a "transparent cost database" http://en.openei.org/apps/TCDB/transparent%20cost%20database	Accepted - text will be modified and we will try to improve this part of the text.
37122	8	39	10	39	18	It is unclear if the cost statements per GHG emissions reduction in this section include the costs of new fueling infrastructure for PEVs and fuel cell vehicles. Please clarify.	Accepted - text will be modified and we will try to improve and clarify this part of the text.
26344	8	39	11	39	18	Section 8.6.3 is called Energy intensity, however the first paragraph in this section starting from line 10 describes mitigation costs of plug-in hybrid electric vehicles (PHEV), electric vehicles (EV) and fuel cell vehicles (FCV), which belong to a group of measures that reduce fuel carbon intensity via fuel switch from (mostly) petrolium products to electricity and hydrogen. Therefore, it is recommended to move this paragraph to the next section 8.6.4 Fuel carbon intensity.	Accepted - text will be modified and we will try to improve and clarify this part of the text.
22019	8	39	19	39	20	EU analysis sshows comparable potential with a large amount available at net negative cost. See: http://ec.europa.eu/clima/policies/transport/vehicles/heavy/docs/hdv_2012_co2_abatement_cost_curves_en.pdf	Accepted - text will be revised.
37123	8	39	19	39	24	p.39, lines 19-24. To be consistent with the paragraph above, costs in $/tCO2 should be provided for HDVs.	Accepted - text will be revised.
22020	8	39	20	39	21	Similarly, 50% improvement in ICE vehicle energy intensity by 2050 is suggested – assuming same baseline as above, this is woefully unambitious.	Accepted - text will be revised.
23420	8	39	20	39	21	The 50% reduction from the largest tractor-trailers is high. There is not source to support this number. Source can be found from EPA SmartWay#	Accepted - text will be revised.
30930	8	39	26	39	26	Should it read "increasing" the ratio of t-km to vehicle-km, not "reducing"?	Accepted - text will be revised.
37124	8	39	26	39	26	Instead of "reducing the ratio of t-km" you must mean "increasing the ratio of t-km"	Accepted - text will be revised.
37125	8	39	31	39	31	Drop sentence, especially reference to competition law, because 1) it implies implausible wholescale changing of economic systems; 2) represents excessive intrusion of government into private sector; and 3) this strategy is already available to corporations.	Accepted - text will be revised.
22021	8	39	33	39	36	"Efforts to reduce the carbon dioxide intensity of transport have been largely unsuccessful…" – this doesn't really capture it, and paints a somewhat fatalistic picture. Increasing diesel penetration would effectively reduce fleet mean emissions (it's essentially just another fuel economy measure) were it not routinely undermined / offset by increasing vehicle power and weight. Also, this doesn't appear to be true for the EU.	Accepted - text will be revised.
22022	8	39	41	39	43	It needs to reflect that the costs of advanced biofuels are more likely to go down in the future as their technologies are more developed than those from conventional biofuels. This is because the major cost component of food-based biofuels, the feedstock price, may continue to increase with increased food/feed demand as population will increase. Advanced biofuels rely on the contrary on lower cost feedstocks.	Accepted - text will be revised.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
22017	8	39	6	39	8	I'd suggest adding references to EU analysis for the 2020 targets which suggests that more than 50% improvement is possible already by then: http://ec.europa.eu/clima/policies/transport/vehicles/cars/docs/study_car_2011_en.pdf and http://ec.europa.eu/clima/policies/transport/vehicles/vans/docs/report_co2_lcv_en.pdf as In addition the recent NAS study: https://download.nap.edu/catalog.php?record_id=18264 reaches comparable conclusions	Accepted - text will be revised.
22018	8	39	8	39	10	EU analysis suggests that net mitigation costs are substantially negative taking account of avoided fuel costs in the near term.	Accepted - text will be revised.
24689	8	39	25	39	29	This fundamental point could be better emphasised. Better data collection and data analysis is essential for businesses to optimise freight loading and minimise empty running, which is where energy management becomes important. Energy auditing standards for transport are currently in their infancy but can assist businesses to identify energy saving and emissions mitigation potential.	Accepted - text will be modified and we will try to improve this part of the text. This is a good point, though it is perhaps an overstatement to say that energy auditing in the freight transport sector is in its 'infancy' - at least in the developed world. Smartway, Clean Cargo Working Group, CEN, Ecotransit etc have made good progress in recent years. The next draft will say more about this.
30299	8	4	1	7	2	The summary only mentions cycling very briefly, despite the increases in cycling that have been seen in some contexts and the growing evidence that decisive city-level action can impact levels of cycling.	Accept but is a small share of total transport
27791	8	4	1	7	2	Please discuss more on warming effects of contrails and cirrus clouds in the Executive Summary of Chapter 8 e.g. from Lee, D. et al (2010): Transport impacts on atmosphere and climate: Aviation; Atmospheric Environment 44 (2010) 4678–4734.	Reject - too detailed for Exec Summary - mentioned once. Lee ref used in 8.2 already
25954	8	4	1	7	2	There is nothing in the summary on cycling. It is indirectly referred to but that is not what is needed. Cycling has the potential to replace a large proportion of car trips (depending on distance split) and bring substantial co-benefits. It should be mentioned specifically and treated seriously as a mode of transport, with the same seriousness given to car, train or RBT systems. Since the last report public cycle hire schemes have expanded consdierbly. Whilst these are unlkely to have yet led to major reductions in emissions they shold be mentioned here and indicate the growing move to treat cycling as a transport system with appropriate resource on infrastructure (as it is treated in the Netherlands) not just an individual life style choice. Consider Aldred "Governing transport from welfare state to hollow state: The case of cycling in the UK"	Accept. Words added and to 8.1 and also rference to be used in 8.10.
25955	8	4	11	4	21	Stressing the difficulty of emission reductions is not in itself very helpful. If is of course necessary to highlight the negative trends & major barriers, but the question of difficulty can also be reframed as how difficult would it be to actually operate a decarbonised transport system if societies were serious about decarbonisation. I would suggest the difficulty here (at least for personal land travel), not everyone would agree but the framing of the question is important. I also think the issue of co-benefits should be brought up at this point.	Accept- point incorporated
34859	8	4	11	4	21	Content/Important: Here only options are listed but they are not contextualized. Please develop a set of key strategies/storylines and associate options with those. Just listing options does not say anything about their possible contribution to mitigation goals.	Accept
20253	8	4	12	4	12	Modify the wordings - decarbonization is difficult in ALL sector, not transport sector.	Accept- amended

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
36936	8	4	12	4	12	"Demand" is actually a technical term, used by economists, referring to a schedule of the quantities that an individual or an entire economy would be willing to purchase at various prices. When an economist says "demand is increasing," she usually means that the party doing the demanding is willing to purchase more of a particular commodity at any given price today than yesterday. The problem is that shifts in demand curves are hard to observe directly. What the authors probably mean is "ever increasing consumption" which is likely true on a global scale, though a reference would be useful. Measuring consumption of "transport" is a problem, and "ever increasing" is vague. Suggest rephrase along the lines of: "Transportation greenhouse gas emissions have risen XX percent since 2007, and YY percent since 1992" See p. 8, lines 1-13 for relevant stats. This mis-use of the term "demand" occurs throughout. If the authors mean "consumption," they should say so.	Reject. Not sure you can "consume" transport services but there is a demand for them. The term "demand" commonly used in the energy literature. Refs not used in Exec summary.
21917	8	4	13			This could be nuanced by indicating specific sectors where stock turnover is slow. The turnover of stock is quicker than, for e.g., for buildings. Since the stock has major improvement potential, this is quite important. infrastructure is slower. Also, aren't "slow turnover of infrastructure" and "huge sunk costs in the present system" largely the same thing?	Accept - too detailed for exec summary but is in main text and also sunk costs reworded
21918	8	4	13			This could be nuanced by indicating specific sectors where stock turnover is slow. Furthermore, aren't "slow turnover of infrastructure" and "huge sunk costs in the present system" largely the same things?	As above (i.e. comment no 21917)
21919	8	4	13	4	14	While emissions are still growing, I disagree that there has been a "lack of progress in slowing growth of emissions to date". The EU CO2 and Cars legislation is clearly progress. But even if the benefits thereof lie in the future, surely national taxation and excise systems in the EU have already contributed to making EU LDV transport more efficient than US LDV transport.	Reject - globally emissions keep rising - see 8.1
36938	8	4	13	4	13	P. 4, line 13 "..huge sunk costs in the present system" Sunk costs, by definition, have been expended in the past, and don't influence anybody. What does influence people is the prospect of incurring huge future costs to build a different system. Suggest changing to "huge future costs to build a low-emissions transport system"	Accept
36937	8	4	13	4	14	Reword this "the sizeable sunk costs in the present system, and the lack of progress in slowing growth of emissions to date, despite new technological development..."	Accept
32728	8	4	14	4	14	The lack of slowing growth in emissions to date is not a challenge to decarbonizing transport – it is a symptom of it.	Accept
31247	8	4	15	4	16	The potential reduction from BAU by 2050 is much greater than 20-40%. My own recently published analysis ("Global climate-oriented transportation scenarios", Energy Policy 54, 87-103, 2013), which is based on a very detailed integration of all available technology, fuel switching and bevaioural options (the later assumed to be quite modest) combined with drivers of increasing population and per capita income in 10 different socio-economic regions, spaniing th entire globe, shows potential reductions in fossil fuel energy demand for transportation from abut 80 EJ/yr in 2005 to 10-50 EJ/yr by 2050 (this takes into acocunt the lead times required to develop new technologies and normal rates of vehicla stock turnover) (see Fig 10a and12a). This translates into a 70-95% reduction compared to BAU if BAU would have risen to 160 EJ/yr by 2050.	Accept-will amend and maybe use the ref in 8.9

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
31248	8	4	15	4	21	The statement that a mere 20-40% reduction [which you call "deep"] of transport emissions below BAU by 2050 would be sufficient to stabilize atmospheric CO2 at 450 eqCO2 or less is surely not correct. Stabilization at even 450 actual CO2 requires that emissions be reduced to 50-80% below 2000 or 2010 levels by 2050, based on recently-published papers that will surely be cited in WG1. As you are saying that transport emissions could double by 2035 (liine 8), that means that they could triple by 2050 (ignoring the near-certainty of peak oil long before then, which the text seems to be doing). 20% or even 40% below that will not come close to stabilizing or returning CO2 to < 450 ppm by 2100 (Fig 1c of Joegel et al 2011 (Nature Climate Change 1, 413) shows that total fossil fuel emissions need to be 60% below the 2010 level to have a 66% chance of staying below 2 C warming, which is roughly the same as 450 ppmv CO2. Are you arguing for much weaker targets for the transpor sector?).. This text has to be altered to be consistent with what WG1 says (assuming that they summarize studies on emission trajectories consistent with different concentration pathways).	Accept - but statement is based on the IAM model outputs - transport may not be so easy to reduce emissions by 2050 as other sectors. So will "contribute to" the 450 goal.
32432	8	4	16			This is ambiguous “around 20-40% below projected levels of GHG emissions by 2050” – need to be specific. Transport is likely to account for 50% of CO2 global emissions in 2050 if major intervention does not take place (ADB, 2012 has suggested even higher levels of 80% in 2050). The exact figure relates to the achievement of different global targets, but it would really raise the importance of transport if a clear set of figures could be given here – this is the headline figure and the clear need for substantial and immediate action.	Accept but the literature and the IAMs don't give a clear number. Ranges are given in 8.9
27128	8	4	16	4	16	Make clear what level 20-40% reduction is. I assume globally, but at country level there is potential for 100% reduction in (surface) transport emissions by 2050 (e.g. See Committee on Climate Change (2012) "The 2050 Target - achieving an 80% reduction including emissions from international aviation and shipping")	Accept - amended and ref used.
32729	8	4	16	4	16	What are the projected levels? These should be quantified to avoid ambiguity.	Accept - Details can be found in 8.9 - too detailed here.
20788	8	4	16			The potential to reduce GHGs by 20-40% should be more carefully cited, as such numbers are oftern taken up by the mass media and the public. The following additional explanations are recommended: (1) providing rationales of the numbers (e.g. based on various simulation models or something like that); (2) providing the section numbers where those reduction potentials are discussed; (3) clearly add a phrase regarding uncertainties, as uncertainties are one of the major popics of this working group report.	Accept - rewritten
33227	8	4	16			20-60% - if I look at figure 8.9.1 and the green vs. The red scenario, the reductions seem >50% in 2050. (lower level of 25percentile in red >10GtCO2, agains 4.2GtCO2 in green)	Accept - amended
34860	8	4	16			Content/Important: "20-40%": Looking at Section 8.9.1 the median reduction for the lower to ranges seems to be going well up to 50%. Please check this number. In order to substantiate this number a rewrite of section 8.9.2 is needed that assesses bottom-up the validity of what comes out of the global integrated assessment models. Please discuss with other sectoral chapters and Ch.6 how you provide reduction potential. Ch.6 is mostly using 2010 as reference rather than baseline cases as this is more informative to policy makers.	Accept amended
21920	8	4	18	4	19	Make a separate sentence that "the potential reductions found in AR5 are greater than those found in AR4", as it should be clear that the AR5 findings supercede the AR4 findings. The current formulation implies a conflict without indicating the superiority of AR5. The reductions are furthermore not "deep" compared to other sectors.	Accept

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
24662	8	4	2	4	10	Suggest using an approach similar to that in the buildings chapter - breaking down CO2 emissions from transport into an equation with all of the relevant factors. This can provide a useful framing for the discussion, highlight the range of different influences and the uncertainty of the outcomes and emphasise the significance of effective policies and actions and further research. There may be value in linking the sections of this chapter relating to urban structure to the settlements chapter (this may also reduce the size of this chapter.)	Accept. As is the structure of the chapter - as in 8.1. Is covered in 3rd paragraph.
30300	8	4	22	4	48	There is no mention of behavioural shifts that have already been identified and which could play a role, if encouraged, in longer-term more profound changes in travel behaviour. I am here thinking of the evidence of falling levels of car use among young men in particular in countries including Germany and the US.	Accept - amended.
20101	8	4	22	4	49	This list of bullet points would be better if sorted, starting from emissions, fuels, infrastructure and then policies. Here it is a bit messy !	Accept - section amended
20789	8	4	22	4	48	This section is very difficult to follow because the order of the topics seems to be random. The first para discusses about development related to fuel types, then following ones touches upon fuel economy, logistics, infrastructure development, public transport, vehicle fleet, and access and intrastructure. The order should be reexamined and sorted out. An option is to follow the structure of Figure 8.1.2. and first discuss about development related to infrastructure (including vehicle fleet and public transport), fuel intensity second, energy intensity the third. An alternative is to follow the order of the next page's first section. In any case, it might be helpful to clarify the key words of each paragraph under dots.	Accept - section amended
25871	8	4	23	4	25	Also mention averse effects on biodiversity, water and food availability (see Bioenergy Annex in Chapter 11).	Reject - source and impacts of biomass covered in the Annex.
36939	8	4	23	4	26	Suggest moving low carbon fuels bullet point to lower position in bulleted list because of the present relative unimportance of low carbon fuels compared with other mitigation measures.	Accept- order amended
20100	8	4	24	4	24	The demand of biofuel is not growing for aviation, since to date there have been only experimental flights using biofuels : no commercial flights. SO far the demand from aviation is potentially. Say "potentially for aviation" ?	Reject for example KLM have been using biofuels for some time and Boeing deliver with a blend
36940	8	4	24	4	24	P. 4, line 24. "Demand for biofuels is growing, including aviation." Mis-use of "demand." Should be "Consumption." The reference to "including aviation" is wrong because as far as I am aware, there is no commercial or non-experimental use of aviation biofuels at present anywhere by anyone. Suggest rephrase as: "Report global consumption of biofuels has grown XX percent since 2007, but with concerns." Biofuels statistic can be drawn from OECD Energy Statistics.	Reject. KLM flights as an example. Accept the biofuel data. Text modified
26254	8	4	27	4	28	8.9.3 Sustainable development, and regional and national implications for developing countries could be shortened to 8.9.3 Regional and national implications for developing countries	Titles changed in the rewrite
34861	8	4	28			Content: There is a redundancy in the 2nd and 4th bullet about HDVs/trucks.	Accept - amended
32727	8	4	3	4	8	A percentage should be given instead of “about one quarter.” Also, the “low base,” rate of movement increases and “next few decades” should be quantified to avoid ambiguity. What are the “current rates” of growth? Emissions double from what number to what number?	Amended
19990	8	4	3	4	3	7.0 Gt should be modified as "nearly 7.0 Gt" according to the data (6.7558 Gt)of (IEA 2012b), or this figure will not match with that in Line 11 page 14.	Accept. Now 6.9 in 2011. (IEA)
21916	8	4	3			Around 15% extra emissions associated with the production of fuel should be added to these emissions to give the full picture of transport GHG emissions.	Accept-reworded - and covered later in text too.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
27792	8	4	3	4	3	The data should be checked for consistency: The value of direct GHG emissions from transport is inconsistent between the transport chapter and the TS. A value of 7.0 Gt CO_2eq is given at page 4 line 3, page 8 line 7 and page 8 line 13, whereas a value of 6.8 Gt CO_2eq is given at page 14 line 11. However, in the TS a calculation of the direct GHG-emission of the transport sector yields a value of about 6.8 Gt CO_2eq using 13,5 percent of 50,1 Gt CO_2-eq.	Accept- using 6.9 in 2011. (IEA)
27793	8	4	3	4	3	In the Technical Summary the share of the global GHG emissions of the transport sector is indicated with about 13 % in 2010 (TS page 28, line 4 & figure TS.17). Whereas in chapter 8 the share of the global GHG emissions of the transport sector is about one quarter in 2010. Why is there a difference?	Reject - one is CO_2 the other CO_2-eq but will check it.
23384	8	4	3	4	3	7.0 Gt should be modified as "nearly 7.0 Gt" according to the data (6.7558 Gt)of (IEA 2012b), or this figure will not match with that in Line 11 page 14.	Using 6.9 in 2011 (IEA)
30439	8	4	30			Add' hybrid-electric" vehicles to list of mass-produced vehicles that have entered the market	Reject - available well before 2007
24512	8	4	30	4	31	Electric vehicles may have entered the market, but with few exceptions the market (customers) does not yet accept them.	Reject - statement is correct
34522	8	4	32	4	33	"and energy efficiency design standards have been established for new ships" should be amended as follows: ", energy efficiency design index (EEDI) standards for new ships and Ship Energy Efficiency Management Plan (SEEMP) for all ships are mandatory energy efficiency measures from 1 January 2013 [8.3, 8.10] , using LNG as fuel are already used by many ships[8.3] ". Reason for amendment: Resolution MEPC.203(62) was adopted by IMO on 15 July 2011 which explicitly stipulates the EEDI and SEEMP as mandatory requirements; in addition, the fact is that LNG are already used onboard the ship and it is needed to conclude here, consequently the descriptions contained in section 8.3 and 8.10 need to be amended, please see my comments on section 8.3 and 8.10.	Accept - amended but without details as is a summary
27794	8	4	32	4	32	Slow steaming has become widespread practice. Please add: due to temporarily decreasing transport demand during and after the world economic crisis.	Accept
36941	8	4	33	4	34	The sentence "Fuel economy standards have been introduced for trucks (8.10)" is redundant. The concept is covered in the preceding bullet which discuss fuel economy standards for HDVs.	Accept
27129	8	4	34	4	35	Logistics example is different from shipping example - perhaps should be separate bullet with other sectoral agreeements (e.g. Aviation). Should also mention extent to which these are binding.	Accept
34862	8	4	34			Content: Please consider how reliable it is to refer to pledges of logistic companies.	Reject - taken from literature
36942	8	4	36	4	36	Is the reference here solely to transportation infrastructure or a broader set of strategies affecting behavior? Suggest using a different term, such as transportation planning and policy, in addition to infrastructure.	Accept
36934	8	4	4	4	7	In the sentence "Global demands for passenger mobility and freight movements by road, rail, aviation and waterborne transport systems are projected to continue to increase in the next few decades..." it is unclear who is making those projections. If it is the IPCC's project, please state that; if not, cite it.	Reject- no refs used in Exec summary and text now removed due to shortening. IPCC is merely reporting prevailing view that these trends will continue - references will be added to reflect this view.
25872	8	4	40	4	42	Please specify the region and timeframe in which these 100 systems have been implemented	Reject- too detailed for summary
30301	8	4	41	4	48	Mobility access' sounds like a conflation of mobility and access. Surely what is important is increasing levels of access to necessary resources/services etc., and the equitable distribution of such access. Access to mobility resources is not necessarily the problem.	Accept
20383	8	4	46	4	47	I would disagree that local transport management policies have been "widely" implemented. Please provide a reference or revise.	Reject- see 8.10. no refs used in Exec summary
24513	8	4	46	4	48	"widely implemented" is by far too optimistic - in most cities in dev countries/emerging economies there is no such trend recognizable. What sources is this judgement thus based on?	Reject- see 8.10.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
25956	8	4	46	4	48	The term 'mobilty access' is to me unclear. Mobilty is generally going up (though very unequally) in developing countries. Access is not necessarily improving. Yes measures have been taken to reduce pollution and congestion but on average have things got better or worse?	Accept- reworded
32433	8	4	48			One other innovation in transport since AR4 has been the e-bike; there are now (2013) about 150 million of these in China alone	Reject- covered under "electric vehicles" and dsicussed in text
34519	8	4	6	4	6	Since aviation is one kind of transport means for passenger and freight movements, "freight" cannot be compared with "aviation", the terms of "particularly for freight and aviation" makes confusion and needs to be amended.	Accept- reworded. Good point - it is not logical to combine aviation and freight in this section. To be amended.
34520	8	4	6	4	7	", and mainly in non-OECD nations but starting from a low base." should be replaced by ", and are caused by the strong growth of freight and air travelled kilometers worldwide, particularly in non-OECD countries it is started at a very low base [FAQ 8.1]". The updated text is the correct and comprehensive meaning extracted from Section 8 and FAQ 8.1.	Accept - Not clear what the benefit would be from this proposed redraft.
30309	8	4	6	4	6	The phrase "particularly for freight and aviation" should be deleted because the demand for transport by light-duty vehicles is also projected to grow significantly in the future.	Accept - the list of transport sectors likely to experience high growth could be extended.
36935	8	4	6	4	7	Unclear what "mainly in non-OECD nations but starting from a low base" means. Please make this sentence clearer.	Accept- amended in part but common terminology
23385	8	4	6	4	6	Since aviation is one kind of transport means for passenger and freight movements, "freight" cannot be compared with "aviation", the terms of "particularly for freight and aviation" makes confusion and needs to be amended.	Agreed - see comment 360
34521	8	4	8	4	10	The data cited therein is conflicted with other data used by UN, i.e. "transport-related CO2 emissions are expected to increase 57 per cent worldwide in the period 2005-2030 if nothing is done (please see my comment on FAQ 8.1 of Chapter 8)", furthermore, in section 8.3.2.5 of chapter 8, it is stated that "GHG emissions from ships are projected to increase by 50% or more between 2008 and 2050 (IEA, 2010b)". It is suggested to replace "emissions could double by 2035" by "transport-related CO2 emissions are expected to increase 57 per cent by 2030 compared to 2005", otherwise the conclusion of "high agreement" is doubted. (Reference: UN (2009b). New Partnership Calls for Copenhagen Climate Agreement to Tackle Growing Transport Emissions. Available at: http://www.un.org/News/Press/docs/2009/envdev1080.doc.htm)	Accept- amended - but not just based on one reference - and 2009 references are fairly out of date
30917	8	4	1	7	2	The style of this executive summary (using questions as headers) is substantially different from other chapters. Consistency in formatting should be maintained throughout the document. Looking at this section alone, it moves from questions as headers to statements. Overall this style for an executive summary is confusing and bears rethinking.	Based on earlier IPCC reports.
30918	8	4	13			Suggest clarifying what is meant by "sunk costs".	Will add to glossary
30919	8	4	40	4	42	This very specific example of new innovations in the transport sector could bear reference to where in the world this is happening.	Worldwide- but section since amended

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
24663	8	4	12	4	21	Transport modes can be highly substitutable, particularly for passenger transport. Suggest this should be reflected in this summary and the chapter content. Where effective public transport is provided it can reduce consumer costs and enables a very rapid transition to a transport mode with much lower emissions and low sunk costs (people do not buy cars just to commute). Congestion charges and parking fees can be used to encourage use of transport networks where they are functional. In an urban and commuting context, it should be noted that there is a low cost form of personal transport with close to zero emissions and extremely high efficiency - the bicycle - and that provision of cycle paths can enable consumers to take advantage of this transport mode. This reduces vehicle and fuel costs, embodied energy, parking and congestion costs. Suggest reword to: 'Decarbonizing transport through vehicle replacement will be very challenging given the ever-increasing demand, the slow turnover of stock and infrastructure, the huge sunk costs in the present system and the lack of progress in slowing growth of emissions to date, in spite of new technological developments and the various transport policies implemented since the AR4. The potential exists to make reductions of around 20-40% below projected levels of GHG emissions by 2050 through such actions as shifting modes, reducing demand for journeys, improving vehicle efficiencies, developing appropriate infrastructure and fuel switching. Such deep reductions, which are beyond the levels found possible in the AR4, would enable the transport sector to contribute to a trajectory towards 450 20 ppm CO2eq atmospheric concentrations or below by 2100 [8.2, 8.3, 8.9].'	Accept
24664	8	4	34	4	35	Suggest rephrase to 'Some major logistics companies have opted to reduce the carbon intensity of their operations by 2015-2020.' The original sentence was written as though all major logistics companies have done so, which is highly unlikely.	Accept - but section moved to 8.1
23050	8	4	10	4	10	In using thephrase " dangerous climate change", does it mean that climate change is not dangerous in general given the havoc it is creating particulaly in developing countries?	Phrase used in the convention
29875	8	40		43		This table is very clear, congratulations. Such a summary of costs and potentials for various mitigation options in various sectors is of much more use to policy makers than plain text. More especially, presenting illustrative examples for each mitigation options is really helpful, it is unfortunate that some squares in this column are left blank and that some others are not depicting precise examples but rather broad perspectives. Sugestion if possible, fill the blanks and give more references in this column (as it is done at line 5 for LDV efficiency). Furthermore, the last section of this table (Activity: demand reduction) really needs to be completed: the references are here but most squares are left empty.	Accepted - table 8.6.1 will be entirely revised.
22024	8	40				ROW 1-3 biofuels may have no cost effectiveness since when ILUC is taken into account, many do not reduce GHG emissions.	Rejected - table, which will be revised, already makes clear that land-use changes may be a problem.
22028	8	40				ROW 5 EU assessment to reach 95g/km shows a negative cost between minus€80 to minus €230 per tonne of CO2 avoided. Similarly for light commerncial vehicles it shows a negative cost between minus€170 to minus €296 per tonne of CO2 depending on oil price. It shows that cost effectiveness reaches zero when emissions reduce by other 50%.	Accepted - figures will be revised.
22023	8	40				Can the column in the table on cost-effectiveness be amended to take into account/mention co-benefits whenever these are large/significant?	Rejected - although table will be completely revised, because of its logic co-benefits will not be included.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
22025	8	40				Row 1: completely disagree with the formulation in the second column of row 1 which gets away with ignoring ILUC. http://ec.europa.eu/energy/renewables/biofuels/doc/biofuels/swd_2012_0343_ia_en.pdf contains a table (Annex XVI) of estimated ILUC impacts using modelling described in the footnotes on page 87 (151 Bouët, A., Dimaranan, B. V. and Valin, H. (2010), Modeling the global trade and environmental impacts of biofuel policies, IFPRI Discussion Paper (01018), International Food Policy Research Institute. 152 Al-Riffai, P., Dimaranan, B. and Laborde, D. (2010), Global Trade and Environmental Impact Study of the EU Biofuels Mandate, Final Report for the Directorate General for Trade of the European Commission, International Food Policy Research Institute.)	Rejected - Table will be revised, but iLUC issues, which are not specific of the Transport chapter, will be discussed somewhere else in the Report, probably in Chapter 11 or in na Annex to it.
22026	8	40				This table should include the potential ILUC impacts much more explicitly, i.e. rather than say 0-100% CO2 savings, it should say 0% if ILUC included and 100% if not. The reason is that giving a single range is misleading because the range does not describe a variation, it describes binary differences in assumptions. Check Annex XVI of the above paper for the EU estimates of ILUC.	Accepted - Table will be entirely revised and this suggestion will be considered.
22027	8	40				Row 5: What do you mean by the cost-effectiveness number for LDVs? Is it negative or $150/tonne?	Accepted - table 8.6.1 will be entirely revised.
22029	8	40				Row 6: According to CE Delft: http://ec.europa.eu/clima/policies/transport/vehicles/heavy/docs/hdv_2012_co2_abatement_cost_curves_en.pdf. Costs for HDV are breakeven for a reduction of around 30% for an average truck and around 36% for an average bus.	Accepted - table 8.6.1 will be entirely revised.
22032	8	40		43		A number of other options seem to be overlooked. For example speed enforcement, lower speed limits.	Accepted - table 8.6.1 will be entirely revised.
22743	8	40				"Summary of Costs and Potentials" - this table may be too ambitious. 1) Either it needs to be significantly more comprehensive OR it should be deleted or chopped into several small (and corrected) tables. What's wrong? Fuel Swithcing section only has 3 biofuels and electricity. What about CNG, hydrogen, etc. Additionally, the electricy fails to note a possible increase in emissions if grid is predominatly from coal. The Energy Intensity Section is misleading - the efficiency estimates and costs assume (I think) no increase in comfort taking (size/weight, etc.). How is non-specialist to understand row 5 that indicates a negative cost to increasing LDV efficiency. As specialists we understand the issues of risk aversion/prospect theory. I cannot speak to all the modes (maritime, etc.) but I am guessing this same concern arises there. Thus, an uninformed reader may not understand what it efficiency costs tradeoffs really mean. I would consider whether it is helpful to provide information in such a compressed manner that it will likely be mis-understood and/mis-used. Take for example the appropriate page of notes following Figure 8.3.2. These notes are essential to understanding that figure.	Accepted - table 8.6.1 will be entirely revised.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
27821	8	40				Biofuels can even lead to significantly higher CO2-emissions. In addition, there will never be 100 % reduction. This is factually impossible. What are the system boundaries for this calculation and have they been set reasonably? In addition 2nd generation biofuels could be overestimated. Only very limited information is currently available.	Accepted - table 8.6.1 will be entirely revised. But one comment worth mentioning: it is not true that 100% reduction is not possible. Depending upon how carbon uptake by soil formation, or CO2 recovery in the fermentation process of some biofuels production, even negative emissions are possible, as some real-world experiences are already showing.
19743	8	40		43		Please rearrange the table in order to include the mitigation options in the order of the ASIF approach: First 'activity', then 'infrastructure', then 'energy intensity' and finally 'fuel carbon intensity'. This will also be consistent with the order of sections 8.6.1-8.6.4.	Accepted - table 8.6.1 will be entirely revised, although a different logic will apply now.
25885	8	40	1			for "implementation lag" or "turnover time" in this table as this also has a major effect on the potentials of the different technologies.	Accepted - table 8.6.1 will be entirely revised, although a different logic will apply now.
22529	8	40	1			There are some boxes under the different columns of the table with no date references (target date and base date). It would be helpful to have that dates such as it is shown in row number 5 (LDV efficiency), "Potential GHG emission reduction (range)" column.	Accepted - table 8.6.1 will be entirely revised, although a different logic will apply now.
37126	8	40	1			The large range of potential ghg emission reductions in Table 8.6.1 (e.g. 0-100%) are not helpful. Recognizing that the potential emission reduction depends on input assumptions, boundaries, etc., the large range suggest to the non-technical reader that there are too many unknowns or uncertainties with the mitigation option and therefore, other options have more promise/validity. Can some of the wide ranges be narrowed by some limiting parameters or other means?	Accepted - table will be completely revised.
37127	8	40	1			It is unclear why values are missing from many of these boxes, especially the costs. Some explanation of why some are information and others are blank would be helpful.	Accepted - table will be completely revised.
37128	8	40	1			P. 40, Table 8.6.1: No hydrogen example? Please add a row for hydrogen as a fuel.	Accepted - table 8.6.1 will be entirely revised.
37129	8	40	1			p.40, Table 8.6.1. The table is informative. However, caution must be taken when citing numbers from different studies which may have fundamental differences. Below are specific comments. 1. Why the low end of GHG reduction is 0% for sugarcane ethanol? 2. Why the low end of GHG reduction is 0% for cellulosic ethanol? Statement of "Possibly no savings if large land use change impacts" is speculative. Please cite studies on cellulosic ethanol LUC emissions, which show that cellulosic ethanol has minimal, or positive, LUC GHG effects. 3. Need to add cost effectiveness numbers for HDV efficiency.	Accepted - table 8.6.1 will be entirely revised, although a different logic will apply now.
37130	8	40	1			The units in the "cost effectiveness" column are inconsistent. Sometimes they are $/t, sometimes $/tonne, sometime $/t-CO2. Also be careful about CO2 vs. CO2-eq	Accepted - table 8.6.1 will be entirely revised.
37131	8	40	1			Is this table complete? Several fields are blank for the "4. Electricity" mitigation option, and hydrogen doesn't even appear?	Accepted - table 8.6.1 will be entirely revised.
37132	8	40	1			The 0% and 100% potential reduction numbers would be a red-flag to any policy maker.	Accepted - table 8.6.1 will be entirely revised.
37133	8	40	1			Proper formatting of this table could save a page or more. The first column should be much narrower, the third much wider.	Accepted - table 8.6.1 will be entirely revised.
37134	8	40	1			If you do your citations as they are done in Table 8.6.2 (superscripts in the table, actual citations as a footnote below the table) you would save a lot of space.	Accepted - table 8.6.1 will be entirely revised.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
37135	8	40	1			There is inconsistency in the citations. Some cells have citations in them (c.f. row: Maritime (operational) column: Potential GHG emission reduction), while others have no citations within them and make effective use of the "Key references" column (c.f. Ships efficiency). I prefer the latter, but it should be consistent either way.	Accepted - table 8.6.1 will be entirely revised.
37136	8	40	1			Why is there no illustrative example for #4 (electricity)? Also, perhaps there should be an option for telecommuting and other virtual travel? Perhaps virtual travel can fit into either option 21 or 22, or both?	Accepted - table 8.6.1 will be entirely revised.
34269	8	40	16	42	16	"Information/education: Potential GHGE reduction (range) = 5-20% (HDV driver education 5-15%; LDV eco-driving 5-10%)"	Accepted - table 8.6.1 will be entirely revised.
24690	8	40		43		Suggest entries are ordered from lowest cost to highest cost, with unproven technologies last	Rejected - Table will be revised but a different logic will be used for ordering the different possibilities.
22030	8	41				ROW 14 The references to bus fuel reductions and New york City transit should be in ROW 6 or a separate row on Buses. They do not relate to infrastructure.	Accepted - table 8.6.1 will be entirely revised.
22031	8	41				ROW 15 Why are there no cost effectiveness numbers. There has been analysis that shows these are highly cost effective because they bring multiple benefits.	Accepted - table 8.6.1 will be entirely revised.
33257	8	41				Why is there no exemplary % emission reduction stated for the items 11-15 that would occur if you did mode-switching, e.g. from HDV to freight trains, or LDV to BRT? From the cost-effectiveness side it would have negative costs, but one would have to add "different level of satisfaction"	Accepted - table will be completely revised.
30535	8	41				The line "15. Non-motorized transit infrastructure" could be supplemented by a quantification of the reduction potential: "up to 6% of regional passenger transport GHG" and the corresponding reference then be given in the right column: Wolkinger et al, 2012. Reference: Wolkinger, B., Steininger, K.W., Damm, A., Schleicher, S., Grossmann, W., Türk, A., Tatzber, F., Steiner, D. (2012), Implementing Europe's climate targets at the regional level, Climate Policy 12: 667-689, http://dx.doi.org/10.1080/14693062.2012.669096	Accepted - table 8.6.1 will be entirely revised and we will try to incorporate this new reference, although the logic of this revised table will be slightly different.
27822	8	41				Referring to point 7, ship efficiency: Which info is from which literature? It might not be possible to combine everything. The most encompassing study is IMO 2009.	Accepted - table 8.6.1 will be entirely revised.
27823	8	41				The energy efficiency potentials for ships and aircrafts are overestimated. Please take a broader source than only industry sources (e. g. IATA). This information is driven from the fear of a MBM.	Accepted - table 8.6.1 will be entirely revised. And new sources added
37137	8	41	1			Where are the costs associated with the fueling infrastructure represented? (Especially relevant for the "alternative propulsion" row of the table. The row in the table requires references. The row on electricity needs more information. Remove reference to specific make/models of vehicles in table.	Accepted - table 8.6.1 will be entirely revised.
27824	8	42				Referring to point 18, maritime (operational): Contrarily to the logic of the whole table (separating between efficiency in technical way and operational measures) this part deals with combined technical and operational measures (the heading only reads operational though). Please check again consistency with IMO 2009. It is not possible to combine all possible measure. So, it is also not possible to just list best off´s of various sources.	Accepted - table 8.6.1 will be entirely revised.
23421	8	42				Maritime (operational) should not be under "Structure: system infrastructure efficiency".	Accepted - table 8.6.1 will be entirely revised.
20411	8	43				row 20 of table 8.6.1. 20-50% reduction does not match what recent work in the literature suggests, see Ewing & Cervero (2010) which you cite. Also, don't just focus on density. There are a range of urban design policies that may have more impact than density alone, especially on walkability. This is an important distinction.	Accepted - table 8.6.1 will be entirely revised.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
22744	8	43				Continuing with my previous comment, row 20 (activity demand reduction: densification of auto-dependent suburbs) lists a 20% - 50% decrease in driving. This is misleading - how much densification? Why does the range start at 20%? The references supporting these figures are weak: Newman et al. 2009 is a lightly reviewed book by Island press - not an academic journal article. The review process by Island Press does not have the statistics and data available for reviewers to examine methodology. The other reference, Ewing 2007, is a non-external peer review publication from the Urban Land Institute. These references are not sufficient to support the claims noted above. What this table does wrong is mix highly certain results and consequences with more speculative work. A non-specialist would not be able to understand the differrence. At the very least - a new column should be added to rank the certainty of results similar to the Exutive Summary that lists concensus opinion, re: Robust evidence; high agreement or medium evidence; medium agreement, etc.	Accepted - table 8.6.1 will be entirely revised.
22033	8	43	1	43	1	In the table under 'demand reduction' there is no discussion of a) changes in demand for aviation and b) changes in demand for freight. Both are important to consider and will have an impact on emissions. Here the limited coverage of just road passenger transport misses a large potential.	Accepted - table will be completely revised. Point accepted. Reference to demand reduction opportunities will be broadened.
37138	8	43	1			Should reference land use strategies generally, not just the densification of suburbs.	Accepted - table 8.6.1 will be entirely revised.
29876	8	44		44		This table is a bit harder to read than 8,6,1. Maybe make it more readable would be to let the lines of the column visible within the table. Again I think there should be more of these in the document because these formats are really useful for NGOs or public advisors as a mean to influence policy makers (without wasting time making a fastidious compilation of the whole chapter).	Editorial
22034	8	44				ROW1. Biofuels do not necessarily improve energy security. In any case this is a complex issue. See e.g.: Task 1 paper of "EU transport GHG: Routes to 2050 II". The substantial risks associated with biofuels such as not actually reducing GHG emisisons , competition for land, social consequences, other environmental damage are not given adequate prominence.	Taken into account. Revised to incorporate this.
22035	8	44				ROW 3 & 4. noise is overlooked as a co-benefit.	Rejected - too repetitie to mention noise in all areas. Focus here is on the most relevant.
26558	8	44				add risk: diesel fuel increases health hazards.	Accept - Text amended
27825	8	44				Line "Journey reduction and avoidance", column "Environmental" reads: "Potential risk of damages to vulnerable ecosystems from shifts to new and shorter routes". This seems highly speculative, the opposite could be true as well.	Taken into account - referes to section 8.5 and the literature used there
25967	8	44				I would separate out health and enviornment. Health is currently subsumed under environment. I think this is a legacy of a focus on air pollution and health but if considering physical activity it is an unhelpful combination of two different policy goals.	Taken into account - Categories clarified. Health included into Environment to avoid repititons. Accepted - Point and reference added
25886	8	44	1			In the first line containing biofuels, also mention averse effects on biodiversity, water and food availability (see Bioenergy Annex in Chapter 11).	Taken into account. Revised to incorporate this.
25887	8	44	1			The item "health and ecosystem benefits are uncertain" should not been in green. I propose to put it in grey colour to indicate that it might be a co-benefit or a risk.	Accepted - colour changed
22036	8	44	1	44	1	under 'social' regarding journey avoidance, this could lead to more leisure time and therefore better health and wellbeing, given the time penatly incurred when travelling. Also, in relation to modal shifts from air to rail travel, a social benefit could be less disruption to working practices, as well as a resulting decision to travel less (see Anderson, K., Final Musings: Slow and Low – the way to go, Tyndall Centre, http://www.tyndall.ac.uk/online-tools/personal-blog/kevin-anderson-2	Taken into account - text revised

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
37139	8	44	1			Land use (food vs. fuel, eminent domain), water use, nitrification should be shown as negatives in the "Reducing fuel carbon intensity" row, in the "Environmental" column.	Accepted - text added
37140	8	44	1			Why is "increase travel costs for the consumer" green ("Reduction of energy intensity," "social").	Taken into account - sentense deleted
37141	8	44	1			This table seems more applicable following section 8.7. Consider adding statement about rebound effect in the reduction of energy intensity row. It could have implication for social (traffic fatalities, congestions, e.g.) and environmental (people drive more - less GHG and other emissions impact)	Accepted - table belongs to 8.7
37142	8	44	1			Consider if a potential increase in accidents due to electric cars being silent at low speeds should be added as a negative in the table. This should probably go into the "Social" column of the "Reducing fuel carbon intensity" row. Consider as citation R. Hanna (2009) Incidence of Pedestrian and Bicyclists Crashes by Hybrid Electric Passenger Vehicles, Report No. DOT HS 811 204. U.S. Dept. of Transportation, Washington, DC Available at http://www-nrd.nhtsa.dot.gov/Pubs/811204.PDf	Accepted - added
37143	8	44	1			Consider whether or not there will be a net impact on the number of jobs. (Reduction of jobs in the automotive industry may be a negative in the "modal shifts" row, "social" column as well as the "journey reduction and avoidance" column.)	Taken into account. Revised to incorporate this.
37144	8	44	1			In general, this table is too optimistic (too green). If I were a policy maker, this would raise an immediate red-flag for author/community bias.	Taken into account - more examples added
34372	8	44	1			Please make an attempt to adapt the discussed policy objectives to the wording used in other chapters (such as 'productivity', 'employment creation', 'technology transfer' etc. in place of similar objectives but different wording) to support the effort to facilitate greater synthesis across sectoral assessments in section 6.6.	Taken into account - text revised
24691	8	44		44		Suggest entries are ordered from lowest cost to highest cost, with unproven technologies last	Rejected. Current order of sorting was seen as adventagous by writing team. Information on costs can still be inferred.
22037	8	45				A major assessment of co-benefits was carried out in Task 1 of the "EU transport GHG: Routes to 2050 II" project. See: http://www.eutransportghg2050.eu/cms/assets/Uploads/Reports/EU-Transport-GHG-2050-II-Task-1-FINAL-12Jul12.pdf	Accepted - text revised
34337	8	45				Please consider replacing the first sentence with an introductory paragraph with the following wording which will be suggested to each sector chapter to increase consistency and help the reader understand the underlying idea of this section and the links to other parts of the report: "Besides economic cost aspects, the final deployment of mitigation measures will depend on a variety of additional factors, including synergies and trade-offs across mitigation and other policy objectives. Co-benefits, risks and uncertainties associated with alternative mitigation measures and their reliability (8.7.2-8.7.3) as well as public perception thereof (8.7.4) can affect investment decisions, individual behavior as well as priority setting of policymakers. (footnote: Please refer to the respective sections in the framing chapters as well as to the glossary in Annex I for concepts and definitions – particularly 2.2, 3.5.3, and 4.8.) The extent to which co-benefits and risks actually materialize and their net effect on welfare will differ greatly across regions, and depend on local circumstances, implementation practices as well as the scale and pace of the deployment of the different measures. Table 8.6.2 provides an overview of the potential co-benefits and risks of the main mitigation measures that are assessed in this section, classified into economic, social (incl equity), and environmental (incl health) effects according to the three sustainable development pillars described in chapter 4."	Accepted - text revised
37147	8	45	17	45	18	p.45, Section 8.7.1. is missing.	Accepted - text revised

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
34339	8	45	23			Please replace 'social costs and co-benefits' with "the associated welfare effects" which is better in line with the AR5 definition of co-benefits.	Accepted - text revised
22038	8	45	28	45	39	Energy Security is more complex than beign about oil. A multi-factor approach to assessing energy security was developed in Task 1 of the "EU transport GHG: Routes to 2050 II" project. See: http://www.eutransportghg2050.eu/cms/assets/Uploads/Reports/EU-Transport-GHG-2050-II-Task-1-FINAL-12Jul12.pdf	Accepted - text revised
34340	8	45	28	45	43	Please liaise with chapter 6.6 and chapter 8 LAs to agree on a common definition for energy security. The lack of a shared definition does not contribute to clarity across the different chapters' assessment. The aim of this paragraph should be to understand the varying impact of different mitigation measures in the transport sector on energy security. At the moment, it only links to energy efficiency gains although the table reports energy efficiency gains for all mitigation strategies.	Accepted - text revised
26559	8	45	30			take out: No other energy consuming sector is less diversified than transport (Sorrell and Speirs, 2009) (8.2).	Accepted - text revised
37148	8	45	30	45	38	Two sentences in this section say similar things and should be combined: "No other energy consuming sector is less diversified than transport (Sorrell and Speirs, 2009) (8.2)." and "The transport sector is also especially vulnerable from the resilience perspective because there are no easily available substitutes to oil and oil products in case of their potential disruption."	Accepted - text revised
32764	8	45	40	45	40	Reference for perception of global oil resources as scarce. The concerns of robustness are valid, but can be influenced by short term changes in prices and production constraints, rather than a dwindling resource.	Accepted - text revised
32765	8	45	44	45	46	Reference for the impact of multi-modal mitigation strategies for poorest/most vulnerable of coeity	Accepted - text revised
22039	8	45	44	45	47	Access, mobility and affordability is described in relation to land-transport only, this should be discussed in relation to air travel too (see Randles/Mander papers mentioned previously).	Accepted - text revised
34338	8	45	7			Please consider replacing 'crucial co-dimensions' with 'among others, additional policy objectives' to stay as close to the definitions of co-benefits and adverse side-effects, respectively, as possible. The same goes for line 26. Plese also replace the term 'trade-off' with 'risk' if it is not actually about trading off different objectives (e.g. page 47, lines 26 and 29).	Accepted - text revised.
37146	8	45	9	45	17	This FAQ 8.3 is a complete repetition of the paragraph that precedes it. It can be deleted.	Reject. FAQs are imposed requirements. Now moved to end as for all chapters
37145	8	45	1	48	3	p.45, Section 8.7. In this section, the benefit of individualized mobility (especially in LDCs) needs to be mentioned	Accepted - text revised
20224	8	45		48		In addition to the mentioned co-benefits and risks, add spillover related to trade such the impacts of taxing international transport emissions on food and tourism sectors in developing countries (cite ICTSD (2010) study).	Thanks, we will include.
25441	8	45	1	45	1	Is coherency to the general framework on co-benefits in Section 3.5. ensured? Maybe the presentation here could explicitly refer to it and/or make clearer the general framework is applied to transportation	Accepted - text revised. We will assure consistency.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
24692	8	45	28	45	43	Co-benefits from energy security are defined as improving disposable income, terms of trade and cost of fuel. Terms of trade is not disputed, however the other two benefits are not guaranteed. If, for example, a country switches to producing a lot of biofuel as a substitute it is not likely that this will be in volumes that reduce the international price of oil. Consequently the biofuel selling price will be only a little below the petroleum energy equivalent price given their high substitutability at low blend rates in modern vehicles. More broadly, any alternative fuel that is moderately substitutable for oil in a modern vehicle (i.e. requiring minimal modification) is likely to be priced at close to the oil price equivalent otherwise suppliers would be foregoing profits. Consequently, in general there will be little reduction in costs from producing alternative fuels domestically nor improvement in disposable income - only a terms of trade benefit. The only exception to this rule would be electricity as a transport fuel. Electricity is not easily substitutable for oil and in many countries is produced from fuels that are not very substitutable with oil. It is therefore likely that the price of electricity will not be co-integrated with the price of oil.Suggest that the stronger energy security benefits of electricity as an alternative transport fuel compared to other alternatives should be noted on this page.	Accepted - text revised
20413	8	46	11	46	20	Estimates of the cost of congestion are very hypothetical and are based on estimates of delay over a hypothesized free flowing system. No consideration is taken of behavioral adaptation in these estimates. I would recommend deleting this paragraph. Relevance to climate change policies is limited.	Accepted - text revised
34341	8	46	11	46	20	Please consider moving this paragraph up to show directly after the 'traffic congestion' header or moving it to a footnote.	Accepted - text revised
22041	8	46	21	46	21	Again this section focuses on land-based transport, despite aircraft noise and local airport pollution (and port pollution for ships) having been a concern for human health for many years.	Accepted - text revised
34342	8	46	21	46	45	From these interesting paragraphs, it is not clear how different fuel switch options (to electricity, hydrogen and biofuels, respectively) lead to different outcomes with respect to air quality and related health effects. This would, however, be one of the central questions for this paragraphs. The same goes for noise effects.	Accepted - text revised
20793	8	46	28	46	29	The citation to the study on Beijing seems irrelevant as the focus of the paragraph is "physical" effects of air pollution. The cited ones goes over to "the social costs" without mentioning what are included in such social costs. Rather, it is recommended to cite a health study on the impacts of air pollution. For example, consider citing "A comparative risk assessment of burden of disease and injury attributable to 67 risk factors and risk factor clusters in 21 regions, 1990–2010: a systematic analysis for the Global Burden of Disease Study 2010" in Lancet 2012; 380: 2224–60. It discusses "ambient particulate matter pollution accounted for 3·1 million (2·7 million to 3·5 million) deaths and 3·1% (2·7–3·4) of global DALYs."(p2240)	Accepted - text revised
30122	8	46	30			I'm not sure that inactivity can be labelled as "transport-related". I think it stems from a number of lifestyle factors, not just transport habits, and I don't think you can distinguish between transport and other factors in relating inactivity to chronic diseases. I would just say "Physical inactivity…"	Accepted - text revised

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
25965	8	46	30	46	42	It is important to distinguish between marginal and total gains from mode shift to active travel (and to consider individual vs societal impacts). Marginal gains can even be negative if road danger is high and the people shifting are previously relatively active and healthy. But as more people shift so road danger and pollution falls and both the marginal risk changes and the rest of the population also benefit. Roja-Rueda et al are dealing with marginal changes, in the next paragraph Woodcock et al is dealing with total changes. I would also suggest 3 new references (my own work) here, Woodcock et al 2013 Health Impact Modelling of Active Travel Visions for England and Wales Using an Integrated Transport and Health Impact Modelling Tool (ITHIM); Maizlish et al 2013 Health Cobenefits and Transportation-Related Reductions in Greenhouse Gas Emissions in the San Francisco Bay Area; and on the health service costs savings, Jarrett et al 2012 Effect of increasing active travel in urban England and Wales on costs to the National Health Service.	Accepted - text revised
20414	8	46	35	46	35	"highly contested area" - this needs more explanation if left in text	Accepted - text revised
20415	8	46	35	46	45	Recommend deleting these two paragraphs.	Accepted - text revised
30552	8	46	36			why is it a contested area? Woodcock et al. show these numbers which may change with improved data, however, direction is not likely to change	Accepted - text revised
26560	8	46	39			change to (Woodcock…, et al., 2009).	Accepted - text revised
23422	8	46	43	46	45	Strategies that target local air pollution also show potential to reduce GHG emissions (Yedla et al., 2005) and black carbon emissions (UNEP and WMO, 2011). In designing mitigation measures to 45 reduce specific pollutants, GHG emissions reductions can also occur (8.2). It looks like a truth, but this is not the case. If we use electricity generated from coal insteading of fuel used by vessel at berth, it will reduce air polution dramatically, but can not reduce CO2e emission.	Accepted - text revised
22040	8	46	5	46	10	A major review of the interaction of CO2 and congestion policies was carried out in appendix 9 of the "EU transport GHG: Routes to 2050 II" project. See: http://www.eutransportghg2050.eu/cms/assets/Uploads/Reports/EU-Transport-GHG-2050-II-Task-11-Paper-1-FINAL-25May12.pdf. Contrary to the statement, while some congestion reduction options may increase GHG emissions, the converse is not true.	Accepted - text revised
20412	8	46	5	46	10	Modal shifts do not reduce congestion as new travel will be induced. Only congestion pricing can reduce congestion.	Rejected - not supported by the peer-reviewed published literature
25963	8	46	5	46	20	I would be careful in dealing with these so called costs of congestion. They are usually based on a comparison with a completely unrealistic (and socially undesireable) situation of no other traffic on the roads, "The costs of congestion reappraised February 2013. NZ Transport Agency research report 489". It is unsurprising that such comparisons produce large numbers but they are not necessarily helpful in decison making. They also are based on values of time that are at best controversial, e.g. Metz 2008 "The Myth of Travel Time Saving" and the literature that has followed this. In fact much of the idea of constant travel time comes up in 8.2.2.1 Drivers-travel time budget but the relevance here should be brought out.	Accepted - text revised
37149	8	46	8	46	9	For the "Traffic Congestion" section This section should include the benefits of virtual travel for addressing traffic congestion.	Accepted - text revised
27152	8	47	1	47	7	This paragraph feels like a stretch and not really relevant.	Accepted - text revised
20416	8	47	1	47	7	The link to GHG reduction policies is not clear in this paragraph. Safety linkages are related to two areas: impact of weight and size reductions or variability in vehicle sizes and how this affects risk (either positively or negatively); and, changes in urban design to slow traffic and enhance walkability.	Accepted - text revised

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
30123	8	47	1	47	7	Perhaps you should also acknowledge a conflict here: increased "safety" measures in cars (i.e. making them bigger and stronger) resulted in increased fuel consumption over the last few decades, so you need to explain why you think this trend could now be reversed! I think the potential to reduce accidents by reducing motorised journeys is far more significant than the potential for incorporating safety measures with efficiency measures.	Accepted - text revised
37150	8	47	1	47	26	FMCSA (Federal Motor Carrier Safety Administration, US Department of Transportation) has research it uses to calculate the emissions prevented and fuel saved by preventing commercial motor vehicle crashes. The chapter should reference the research or EAs FMCSA has published and indicate that an added safety benefit is the prevention of congestion and other emissions (such as detour) from crashes.	Accepted - text revised
34343	8	47	1	47	7	The table reports reduced risk of accidents through modal shift options which is, however, not reflected in this paragraph.	Accepted - text revised
25966	8	47	1	47	7	I think this is inadequate. To link up the goals of injury and sustainabilty it's a question of reducing motor vehicle traffic volume, speed, and the mass of motor vehicles. These measures can reduce danger and reduce emissions. See WHO work on road traffic injury prevention.	Accepted - text revised
37151	8	47	14	47	22	This discussion of biofuels is vague (avoiding potentially controversial statements) to the point of incomprehensibility. There are several issues with biofuels as mitigation options, which are succinctly stated. Relatively low cost biofuels are based on fermenting corn, beets, or (especially) sugar, all of which are high value, high calorie agricultural products with substantial opportunity costs. In addition, the production of biofuels from these high-value feedstocks may entail substantial upstream fuel-cycle emissions, particularly if the agricultural stimulus from biofuels markets induces deforestation. The climate change benefits from biofuels are therefore uncertain and variable.	Accepted - text revised. This issue is comprehensively addressed somewhere else.
34906	8	47	14	47	22	Link: Please refer to Bioenergy Appendix and please avoid citing a subset of studies cited in the appendix but build upon the annex adding the transport specifics here not covered there and link the rest.	Accepted - text revised
22043	8	47	21	47	23	The statement that freight transport 'typically accounts for only a small share of total transport emissions' is a misleading statement. Globally, whilst the share is smaller than for passenger transport, it is not a 'small' share.	Point accepted. This statement is erroneous and will be corrected.
37152	8	47	25	47	26	The last sentence of this paragraph should be explained more fully. What negative air quality effects can arise from use of more efficient vehicles?	Accepted - text revised
37153	8	47	25	47	26	The citation (Kirchstetter et al 2008) seems to say the exact opposite of what you claim. They state that more efficient vehicles decreased black-carbon emissions. In the abstract they state "Reductions in the BC emission factor reflect improved engine technology, emission controls and changes in diesel fuel composition." There is nothing about trade offs in that paper.	Accepted - text revised
22042	8	47	27	47	40	In 'social acceptablity' aviation should be considered - see again Randles and Mander, TASM, 2009 article	reference included
26561	8	47	33			add : but these campaigns by themselves do not lead to changes in behaviours. These must be accompanied by both restrictions on cars and better access to efficient, fast, on time, alternative modes of transports (La Branche, 2011).	Accepted - text revised
30125	8	47	35	47	37	"alternatives to investments…" - what do you mean? Are you talking about providing better infrastructure for walking and cycling, better public transport, research into alternative-fuelled vehicles...? Please make clear.	Accepted - text revised

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
22044	8	47	38	47	40	These 2 sentences seem rather out of place, but are very important. There has already been considerable work pointing out that the aviation emissions have the potential to swamp all others, given limitations in technological advances. Suggested authors that have worked in this area are: Bows, Anderson, Peeters, Cairns, Lee. Also, Bows, AUGUST 2010 VOLUME 114 NO 1158, Aviation and Climate Change, confronting the challenge, highlights this issue by reviewing various aviation emission scenarios. Similarly, analysis recently published by Anderson and Bows, in Carbon Management, Dec 2012, Executing a Scharnov turn reconciling shipping emissions with international commitments on climate change, 3(6), 615–628, also presents similar analysis for the shipping sector.	Many thanks. Reference considered.
34270	8	47	38	47	12	check for typo: double spacing in “shipping and aviation”	Thank you; text not anylonger, due to shorter version
37155	8	47	38	47	38	Consider a discussion of port hot spots and concentration around port facilities	Accepted - text revised
37154	8	47	38	47	40	The passage on these lines conflates multiple issues at an industry level to suggest controversy. This seems too speculative for this type of assessment. At a minimum, provide primary source data on air pollution impacts from shipping and aviation, and suggest geographic areas where this may become a problem. The sentences are: "The continuing growth of shipping and aviation with related air pollution indicates that these sectors may increasingly become areas of future scrutiny (Morton et al., 2011). Proposals to build new airports are already becoming controversial (May and Hill, 2006)."	Agrre; paragraph taken out in the new version
23423	8	47	43	47	46	Electrification of the commercial LDV fleet is regarded as one of carbon reduction measures and pointed it has high social acceptability here. The fact is that this is not the case in China. The reason is that electric LDV can not reduce CO2e according to data from the attached reference and can not be accepted by customers in China. See reference: Robert E., Liping K.,Feng A. and Lucia G.W.(2011).Electric Vehicles in the context of sustainable Development in China. http://www.icet.org.cn/adminis/uploadfile/2011611417323026.pdf or http://www.un.org/esa/dsd/resources/res_pdfs/csd-19/Background-Paper-9-China.pdf	Accepted - text revised
30126	8	47	46	48	2	Increasing HGV sizes can carry social, economic and environmental costs: roads and bridges may have to be widened and strengthened, which can result in the loss of older bridges of cultural or architectural significance; there can also be increased wear and tear on roads, noise and vibration.	Accepted - text revised
30553	8	47	5			bicycle and public transport users (Elvik,2009)(full citation: The handbook of Road Safety measures, Rune Elvik, Elena Hoye, Truls Vaa, and Michael Sorensen,Emerald Group Publishing, U.K. second edition 2009.	Accepted - text revised
20417	8	47	8	47	26	This section does not fit the discussion of co-benefits, recommend it be deleted.	Rejected - Section is "Technological risks and uncertainties"
34382	8	47	8			Please delete 'tradeoffs' from the section title according to decisions made in Wellington and Vigo.	Accepted - done
30536	8	47	27			For social acceptability the distributional implications of measures are crucial, and should at least be mentioned in this section 8.7.4. For example, on p. 47 in line 35-37, it could be added (see *text* in the following): "Acceptability depends upon the introduction of pricing measures (most typically road pricing) *and the specific implementation determining their distributional implications (Kalinowska and Steininger, 2009)*, alternatives to investments for car-based passenger transport, new technologies and fuels (Pridmore and Miola, 2011) and regulations." Reference: Kalinowska, D. and K.W. Steininger, Distributional impacts of car road pricing: Settlement structures determine divergence across countries, Ecological Economics , 68 (2009): 2890-2896 http://dx.doi.org/10.1016/j.ecolecon.2009.07.004	Accepted - text revised
34344	8	47	27			According to decisions reached in Wellington, this sub-sections is supposed to be called 'public perception' and 'acceptability' is not to be used (lines 34, 35, 45 and page 54, line 16).	Accepted - text revised

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
23424	8	48				In the "Barriers" column of item 12 in table 8.8.1, the following is proposed to be added after "competitiveness.": "no specific policy or incentive strategy to encourage modal shift from high CO2 emission transport sub-sector to waterborne transport, espeically for freight movements". This is the reason that more and more freight movements used by road rather than ships, it is also mentioned in section 8.1 of chapter 8, i.e., over three quarters of GHG increase has come from road vehicles.	There are examples of specific public policy initiatives to promote a modal shift to waterborne transport e.g. EU Marco Polo / motorways of the sea initiative - UK government - freight facilities grant programme
22045	8	48	22	48	29	There are schools of thought regarding behviour relating to psychological perspectives (individual) and social perspectives (collective), yet the social perspectives are not present here, where some discussion would be helpful.	Agree - added elsewhere
37158	8	48	22	48	22	The term psychological barriers seems inappropriate, bordering on a pathologically diagnostic about i) the inability to admit the existence of a motivation for change; ii) perceptions (internal to the individual or corporation) that interfere with initial attempts to change behavior; and/or iii) perceptions that that make long-term change difficult. I think the paragraph can rephrase the term psychological to use something that is less pejorative. I would suggest "change limiting perceptions and shared beliefs".	Disagree - psychological does not mean all negative
34346	8	48	22	48	29	This paragraph is not related to transport and is likely to be redundant with discussions in chapter 2.	Disagree - all relevant to this chapter
26562	8	48	29			(La Branche, 2011) also found that daily routines and constraints (i.e., number and age of children) tend to preclude the idea of modifying mobility behaviours.	Agree - but others show families are the easiest to influence
37156	8	48	4	54	6	p.48, Section 8.8. This section lacks a main focus.	Disagree - barriers and opportunities
34345	8	48	5			Why is the term 'conditions' (according to decisions reached in Wellington) replaced by 'processes' here?	Shall try and find out.
37157	8	48	8	48	9	Specify and provide citation for statement that there are "first signs of decoupling fossil fuel-based mobility from wealth in OECD countries."	Many now throughout text.
25444	8	48	16	48	29	A further important psychological barrier seems time-inconsistent behavior (here relevant concerning search costs involved in exploring alternative transportation options).	Agree - in text
20863	8	49				In this table, electricity which PEV and PHEV use is described as renewable one. But, not only renewables but also nuclear is important. "PEV and PHEV based on renewable electricity" should be amended into "PEV and PHEV based on low carbon electricity". Following this, expressions which restrict renewables should add nuclear.	Agree
29877	8	49		52		Congrats for this very nice table, dense and highly comprehensive. Such a tool could be used directly by policy makers.	Agreed!
25738	8	49				The name of first item should be changed from "PEVs and PHEVs based on renewable electricity" to "PEVs and PHEVs based on low carbon electricity" because the content of the first item includes "decarbonised electricity" such as nuclear power.	Agree
22046	8	49				ROW 3. Land constraints should be included as a barrier. For a wide ranging look at the challenges of biofuels as a GHG reduction policy see section 3 of: http://www.eutransportghg2050.eu/cms/assets/Uploads/Reports/EU-Transport-GHG-2050-II-Task-5-FINAL-28May12.pdf	Disagree - same as what is said.
20792	8	49				In the "long-term possibilities", the following point from IEA 2011b might be summarised and added: "By 2050, biofuels could provide 27% of total transport fuel and contribute in particular to the replacement of diesel, kerosene and jet fuel. The projected use of biofuels could avoid around 2.1 gigatonnes (Gt) of CO2 emissions per year when produced sustainably." (IEA 2011b, page5)	Disagree - Potentials section not here.
29910	8	49				The table could be improved and become more coherent, for instance the co-benefits are missing as opportunities regarding no. 1) PEV and PHEV (they appear in no. 2)). No. 4) should include weight reduction and new materials, etc.	Disagree - too much already here

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
22047	8	49	1	49	1	In the fuel carbon intensity, there is no discussion of shipping. It is known that there is some shift to Marine Diese Oil due to new sulphur regulations, as well as a partial shift towards LNG, with future potential for 3rd gen biofuels.	Discussed in text
37159	8	49	1			Transport technology or practice "2. CNG, LNG..." should be noted as offering only limited GHG reduction opportunity. The longer-term benefits of other options in the table (PEVs, biofuels, etc.) should be made to stand out.	Disagree - short term CNG very important as diesel replacement
37160	8	49	1			p.49, Table 8.8.1. See the specific comments below. 1. Advanced and drop-in biofuels are not only for aviation, but also for road transport. 2. EV subsidies should be stated as being for short term and transitional. 3. The statement "cause inequalities by impacting on food prices" for biofuel barriers is controversial. There are heated debates about this. Either to drop this simple statement or to indicate the ongoing debate.	Debate is in text.
37161	8	49	1			There should be a row on increased efficiency of road construction and maintenance / increased lifespan of infrastructure components, probably after #13 on the table. But it is important the people know there are opportunities there.	Agree - added
37162	8	49	1			Under barriers for "PEVs and PHEVs based on renewable electricity," it is unclear what is meant by "vehicle range perceptions between recharging." It appears to refer to the idea of "range anxiety," but should be stated more clearly if so.	Agree - changed
37163	8	49	1			P. 49, Table 8.8.1: Please add a row for FCVs. Also, mention in the new row that the driving range for FCVs is not a factor limiting consumer choice, if fueling infrastructure development is properly timed and coordinated.	Not sure the literature supports this.
37164	8	49	1			Table appears to be missing some HDV demand reduction strategies	Yes but no obvious literature to support
37165	8	49	1			This table seems less well thought-out than other parts of the report. Might be worth cutting if space is a concern; otherwise it should be revisited.	Disagree - best table in the report!
37166	8	49	1			Add consumer undervaluation of energy efficiency as a barrier to increased fuel efficiency. Add institutional barriers as a barrier to urban planning (#8), in that transportation policy and land use policy are typically handled by different agencies and jurisdictional levels. In addition, it may be useful to beef up the barriers column, especially as another table in the chapter shows significant co-benefits of transport mitigation policies, making one wonder why these policies have not been implemented already.	Agreed - changed
37167	8	49	1			There is no sense of magnitude in the descriptors in this table. How is "significant" being defined?	Broadly as combining literatures
27826	8	49	1	49	1	In Table 8.8.1 in the first row PEV and PHEV are named. As PHEV are a subgroup of PEV only the former or "BEV and PHEV" should be given.	Disagree - Just being consistent with rest of chapter.
22048	8	49	3	49	3	Under barriers to biofuels there should be a reference to the limited availability of biomass globally, and the land and water constraints. This is important when we consider the potential of biofuels to replace energy demand.	In text a lot.
24693	8	49		52		Suggest entries should be ordered from lowest cost to highest cost, with unproven technologies last	Comment as comment no 24691, see answer to that one.
30302	8	5	1	5	37	Document needs to recognise tensions between different policies. For example, reducing the number of journeys might result in it being more difficult to make those journeys by sustainable modes (e.g. if trips are combined).	Reject- too detailed for summary and needs refs.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
30303	8	5	1	5	37	Behavioural changes can be cost-effective' - but surely behavioural changes is what is aimed at with a whole variety of policy measures. If this means 'soft measures'/promotion etc., this should be specified. Building walking and cycling infrastructure or banning/restricting motor vehicle use can generate behaviour change, too, but it's not the 'behaviour change' that is cost-effective, it's the measure/policy/programme. I also don't understand this sentence 'Regulations and/or education such as when promoting the benefits of carbon reducing measures to 37 freight companies, may also be needed to give a value proposition'	Accept- reworded. latter point about 37 freight companies needs to be checked and clarified.
20102	8	5	1	5	1	Sorry again to talk about structure, but Ch8 summary starts with 3 questions "what is new since A4, etc", and goes on with 6 paragraphs (in bold) not as questions. Instead of following the chapter 11 subsection structure, this summary would gain being presented with series of 5-6 efficient questions, as it starts	Accept- Ch 8 was following the TSU guidelines for Exec Summaries.
33228	8	5	1	5	20	I would propose to change the order to better reflect the causality: first reduce activity, then increase efficiency, and finally switch fuels. I am also missing an explicit statement of "modal shift", instead "reducing activity" is split into two points. I would say "changing urban form & infrastructure" is a measure towards the two levers "reducing total travel" and "changing modal split". I would maybe propose to make this distinction more explicit.	Accept
24517	8	5	1	5	20	The section could be restructured along the A-S-I principles - currently it completely lacks the aspect of e.g. od mode shift	Accept
25957	8	5	1	5	20	The issue of feedbacks (rebounds) should be introduced at this point. More generally feedbacks are not solved just by a mix of policies but actually require planning to avoid them. The potential for one technology (e.g. lower emisssion cars) to block uptake of a better one (e.g. electric cars) should also be considered. Clearly a combination of policies is required but just doing a bit of everything is unlikely to be sufficient.	Accept- considered in later sections especilly 8.5
34865	8	5	1			Content: "dramatic changes" - please consider being explicit about whether you are referring to the short or long run.	Reject- short and long term in next paras.
24515	8	5	14	5	14	Changing urban form is one of the most difficult tasks imginable - rather mitigation can be achieved by preserving traditionally dense urban forms and applying respective principles for growing cities	Accept
36945	8	5	14	5	14	The bullet point says "changing urban form and developing new infrastructure such as electrification." The term "electrification" appears to refer to infrastructure for plug-in electric vehicles. If this is the case, it should not be in this bullet (which is about land-use change) and should be in the first bullet on this page about reducing carbon intensity of fuels.	Accept
27796	8	5	14	5	14	This is especially important for the last part of the freight transport chain - the so-called "light heavy-duty vehicles". Hybridizing/electrifying propulsion here can significantly help decarbonize urban transport as freight transport is still expected to increase.	Disagree with terminology (light HDVs) but agree that hybridisation has a role indecarbonising smaller vehicles making multiple drop / colletction roads.
34866	8	5	14			Content: "developing new": this is only new to some contries, in others it is rather about "mass deployment".	Accept
27130	8	5	16	5	16	Low-carbon not low-C.	Accept editorial.
27131	8	5	18	5	18	Sourcing more localised products des not necessarily reduce emissions (either from transport or the system as a whole).	Accept
27132	8	5	21	5	21	Cost-effective is mentioned as a criteria for short-term but not long-term. In what sense is it cost-effective - against fuel prices, or against carbon prices?	Accept- amended

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
20790	8	5	21	5	37	This whole section seems to focus largely to consumer behavior due to the way it is written in line 28. (Seeking to change consumer behavior by…). In fact, the sentences below include not only consumer behavior but also other matters as freight. Examination of wordings is recommended.	Agreed - behaviour should not simply be equated with personal travel behaviour - the ttransport decision-making behaviour of businesses also needs to be given greater attention - many in the freight / logistics area but also as it relates to business travel. choice of freight mode is behaviour.
20384	8	5	21	5	27	Contrail reduction/avoidance is another way to prevent short-term warming effects. See e.g. Williams, Victoria and Robert B. Noland, "Variability of Contrail Formation Conditions and the Implications for Policies to Reduce the Climate Impacts of Aviation", Transportation Research D (Transport and Environment), 10(4), (2005), 269-280. Also new evidence on impacts of Black Carbon and artic flights: Jacobson, Mark Z., Jordan T. Wilkerson, Sathya Balasubramanian, Wayne W. Cooper Jr., and Nina Mohleji, 2012, The effects of rerouting aircraft around the arctic circle on arctic and global climate, Climatic Change, 115: 709-724.	Accept. Refs added.
33229	8	5	21	5	23	I would add "increasing non-LDV modal shares in urban areas" to the list - often, the economic benefit of reductions in air pollution largely outweigh the direct costs of increased expenses for public transport (e.g., in Creutzig 2009 and Creutzig 2012)	Accept
33891	8	5	21	5	25	With respect to aviation, the report discusses short-term mitigation strategies and mentions NOx emissions from aviation as an example of reducing emissions of short-lived climate forcing agents. It misses to discuss contrails and the potential to reduce the climate effect from contrails by avoiding flights in cold and humid atmospheric regions in which persistent contrails tend to form preferentially	Accept. Needs a reference
36946	8	5	21	5	22	p. 5, lines 21-22 "Short-term mitigation strategies can be cost-effective such as." English usage. Suggest: "Short-term mitigation strategies that can be cost effective include."	Accept- reworded.
36947	8	5	24	5	24	p. 5. Line 24 "Black carbon and aerosols can produce both positive and negative radiative forcings." Delete. True but covered extensively elsewhere.	Reject - not in summary
36949	8	5	24	5	24	"Black carbon and aerosols" should instead read "black carbon and other aerosols" since black carbon is itself an aerosol in this context.	Accept
36948	8	5	24	5	25	p. 5. Line 24-25. "Short-term reductions can be achieved can be improved through improved engine maintenance and retrofits." This sentence misses completely the effects of ultra-low sulfur diesel and pollution control equipment on transportation particulate emissions. The fastest way for countries that have not already done so to make dramatic reductions in particulate emissions is to switch to ultra low sulfur diesel. Suggest. "Short-term reductions in black carbon and aerosol emissions can be achieved by low-sulfur fuels, pollution control equipment, improved engine maintenance, and retrofits.	Accept
36950	8	5	25	5	26	p. 5. Line 25-26. "Methane and nitrous oxide vehicle tail-pipe emissions are technically possible as are reducing high altitude NOx emissions from aviation that effect ozone levels. First clause is true but unimportant, due to low level of CH4 and N2O tailpipe emission levels. Suggest rephrase as: "High altitude aviation NOx emissions may affect ozone levels. Emission reductions are technically possible."	Accept
32731	8	5	28	5	31	Changing consumer behaviour etc is more than a short-term fix. It is a sure way to reduce emissions, rather than shifting them or leading to unintended consequences from normalized metrics.	Accept

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
34263	8	5	28	5	37	this item is also addressed both in the SPM Summary for Policymakers (Page 18/25, line 18: Many fuel-economy techs are already commercially available and cost-effective for consumers with behavioral options such as “eco-driving” offering an additional 5-10% fuel savings) and in the TS Technical Summary (Page 35/59, line 4: An additional 5-10% fuel saving can possibly be achieved by fuel economy measures such as […] eco-driving, […]). FIAT Group Automobiles wants to underline that the eco-driving technologies could provide the expected fuel efficiency benefits more effectively if exploited at a larger extent by the car manufacturers and exploited at a larger extent by the drivers. By the car manufacturers side, this could be practiced by supporting their economic and technical effort by adequate incentives, i.e. by sponsoring at some extent the cost for implementation of this technology, e.g. by means of the rewarding of a part of the corresponding CO2 emissions saving. By the drivers' side, the right driver would be information and instruction, which would more effective as soon as the market penetration of the technology would be spreading. We propose the present comment to remind that the eco-driving techs, thus mentioned several times in the text as effective at a relatively high extent, is not sufficiently acknowledged by the authorities and supported by the customers. We suggest a stronger and more explicit sustain by this report.	Accept the comment but need to find a reference that supports thet statement.
20385	8	5	28	5	33	Consider deleting co-benefits discussion	Reject. Is in the main text and relevant
36951	8	5	28	5	33	In this paragraph, it would be good to include eco-driving as a cost effective, short-term behavioral strategy.	Accept
36952	8	5	28	5	33	The benefits in the short-term of mode shifts seems to be overstated, depending on short-term is being defined, as these tend to be expensive infrastructure improvements and/or involve changing personal behavior. The difficulty in achieving reductions from a change in travel choice and behavior should not be minimized, particularly if the US is included in the discussion.	Reject - eg move to cycling in many cities including in US
25958	8	5	28	5	33	This point is a bit confusing. What co-benefits are being considered? It is not clear that fuel economy produces substantial co-benefits (even before we allow for rebounds). The modelling studies suggest by far largest impacts are from increasing physical activity by increasing walking and cycling (not mode share but actual time spent walking and cycling across the population). This point needs to be highlighted. Improving traffic flow is a mixed blessing, this is most likely to lead to increases in vehicle kms.	Accept= reworded
34870	8	5	28	5	33	Content: Given the weak (particularly: quantitative) basis of conclusions about behavioural options it can not be concluded from the chapter that "[change of consumer behaviour] could dominate transport mitigatoin action in the short-term"]. If you want to uphold this claim it needs to be substantiated by being very explicit about what would drive this behavioural change (you only write "encourage").	Accept- reworded
36953	8	5	29	5	31	The statement that consumer behavioral changes "could dominate transport mitigation actions in the short-term" appears to contradict the statement in the next paragraph that consumer behavior is "difficult to predict and quantify...and could be constrained by lack of social acceptance." Recommend making the first statement weaker.	Accept
24516	8	5	31	5	31	When improving road traffic flows, focus should be on public transport - faster road traffic alone has a marginal effect on GHG emissions, if any; to the contrary, just speeding up road traffic incl. Private cars can set the "vicious cycle" in motion: higher speeds resulting in higher travel distances, more space consumption and hence less attractive public transport and non-motorized alternatives	Accept
32180	8	5	33	5	33	Quote that "CO2-sparring behavior in driving" can reduce CO2 emissions by 10 to 30% (From know how, but I have no reference).	Reject unless we can find a reference

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
25959	8	5	34	5	37	Most changes require some kind of behaviour change. I would argue against the idea that measures to increase walking and cycling require behaviour change while other interventions don't. I would suggest that this also distracts attention for focusing on walking and cycling systems and what kind of infrastructure is needed.	Reject - eg more efficient aircraft designs
34867	8	5	34			Content: "difficult to predict ..." is in contradiction to the 3rd bullet point on the previous page - please make consistent.	Accept
31249	8	5	36	5	37	Unclear text	Accept - reworded
27133	8	5	38	6	15	This section duplicates the top point on the page. There should be one point on potential to decarbonise significantly in the long-term, and a separate point about barriers to overcome in order to unlock this potential.	Reject - unclear - but if top point is the header, then text seeks to exapnd upon that.
32732	8	5	38	5	39	The remarks here are justification for changes in consumer behaviour being at the heart of reducing transport emissions.	Accept
36954	8	5	38	5	39	Suggest changing "demand" to "consumption". Demand does not necessarily equal consumption and it is the consumption of transportation services that could offset the reduction of fuel carbon and energy intensities.	Reject- demand common term used in literaturs
34868	8	5	38	5	46	Content: This paragraph is very general, please try to be more concrete.	Reject - not backed up in text
34869	8	5	38	5	46	Content: Implementing options vs. demand increase. This section needs to be framed differently.One main cause for the mitigation challenges in the transport sectors being so great is the expected demand increase (200-400%). This should be taken as the point of reference, i.e. baseline. Taking the current status quo and assessing the potential of options with respect to that is the wrong approach. Maybe it makes sense to move this paragraph (at least the part on demand) before paragraph 4 of the ES. The barriers part could then be moved after paragraph 4, before going into detail about short-term strategies.	Accept
32730	8	5	4	5	4	A key way to reduce emissions is to address how vehicles are operated. Emissions savings can be realized in both the existing and new fleet. On the contrary, technological upgrades/changes represent one-off changes to vehicle efficiency and are dependent on fleet turnover rates.	Accept- covered in para below
27795	8	5	4	5	8	Different ways to replace oil products in the transport sector are mentioned. The possibility to generate gaseous and fluid fuels with regenerative electricity (power-to-gas and power-to-liquid) is not regarded.	Reject- too detailed for summary
34863	8	5	4			Content: It does not become clear whether the options listed here are claimed to contribute to the "dramatic" changes a few lines above. It also does not become clear whether options can be or even have to be combined to bring about these changes. Options should be contextualized through embedding them in strategies or the like.	Accept- reworded

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
35271	8	5	41	64	15	This chapter has discussed each sub-sector of transport, e.g. road, rail, ship and aviation. However, it fails to address mitigation actions from the perspective of the entire transport sector in a holistic manner, especially for freight movements. When making long-term policies, it is important to ensure the balance among different sub-sectors, and to avoid the modal shift from low CO2 emissions to high CO2 emissions. It is suggested to make the following two revisions: 1) In line 41, page 5, after "achieved", the following text should be added: "Long-term mitigation policies related to transport sector need to encourage the modal shift for freight movements from high CO2 emission sub-sectors, such as road transport, to low CO2 emission sub-sectors, such as waterborne transport or rail, and to balance policies among these sub-sectors based on their CO2 contribution proportion of the global emissions [8.1.1] without impairing world trade." Transport-related CO2 emissions are expected to increase dramatically and are difficult to mitigate since "trade, economic development, etc. all rely on the transport sector" [8.1.1]. Over the past few decades, "more than three quarters of transport sector increase is coming from road vehicles" [FAQ 8.1]), which is a high CO2 emission mode of transportation. Thus, it is vital to for the long-term mitigation policy to avoid the unfavorable modal shift for freight movements, i.e., from waterborne transport or rail to road transport. 2) In line 15 on page 64, after "(Yamaguchi, 2010)", the following text should be added: "Market-based measures (MBM) are a highly controversial issue for international shipping transport under IMO. China and India have expressed pertinent views that MBM would lead to adverse impacts on trade. It was agreed by consensus within IMO that there was a need for a continued impact assessment (UNCTAD, 2012)".	Accept - but already covered..Section 8.4.2.2. argues for a modal shift from high carbon to low carbon modes- hence no need to insert the proposed text. The links between trade, freight transport and emissions could be more explicitly examined .
20386	8	5	41	5	41	Evidence here seems more "robust" than "medium"	Accept but variations in IAMs. So willleave as is
36955	8	5	43	5	46	The claim that opportunities exist for city-level transport measures is repeated twice with little explanation (also on p. 48, lines 9-12). Perhaps remove at least one or both instances, and rely on evidence elsewhere in the chapter?	Reject - not clear where repeated
24667	8	5	47	6	8	Previous IPCC reports (e.g. IPCC AR4 WG1 CH2 pp186-188) have presented research that estimates the total climate impact of air travel at between 1.9 and 5 times the direct emissions from combustion CO2, due to various emissions from engines, contrails, and contributions to cirrus cloud formation. A switch to renewable fuel does not reduce these effects, although flying at lower altitudes can reduce the impacts, as can reduction of NOx and other emissions. This chapter does not refer to these issues, which will increase pressure on the air transport industry to cut emissions in ways that may affect the level of air travel that is sustainable. Suggest that these issues should be mentioned in this chapter, as they have major implications for future air travel. Suggested citation: Robert Sauseni, Ivar Isaksenii, Volker Grewei, Didier Hauglustaineiii, David S. Leeiv, Gunnar Myhreii, Marcus O. Köhlerv, Giovanni Pitarivi, Ulrich Schumanni, Frode Stordalii and Christos Zerefosvii (2005). An Update on IPCC (1999), Meteorologische Zeitschrift 2005, in print [A useful graphic is included in Aviation Radiative Forcing]	Accept - Ref checked
22740	8	5	47	6	15	This material can be deleted	reject - long-term options relevant
34889	8	5	47			Content: It is not clear whether this paragraph is on aviation only or not	Accept- reworded - it is on aviation
34890	8	5	47			Content: Instead of "fuel carbon intensity" consider writing "fuel switch" as this is what it is about. And what fuels this would be to.	Accept
34891	8	5	47			Content: As mentioned above also here the framing is wrong as the expected demand increase should be factored into the challenge.	Accept

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
34892	8	5	47			Content: This sentence makes it sound like decarbonizing aviation is not a big challenge. It is my understanding that it is actually the biggest challenge as there is only one option and as large scale biofuel use has significant implications that need to be made transparent.	Accept in part - fuel not the only option
32734	8	5	48	5	48	Quantify high growth rates.	Accept if can find data
36943	8	5	5	5	8	There are likely substantial ghg emissions associated with the development of some alternative fuels (e.g. natura gas, hydrogen) to make them as easily accessible as gasoline and diesel are currently. For example, there are likely significant emissions from manufacturing, construction and installation of these systems. Are these considered in "life-cycle" analyses?	Yes
36944	8	5	5	5	8	Suggest moving low carbon fuels bullet point to lower position in bulleted list because of the present relative unimportance of low carbon fuels compared with other mitigation measures.	Accept
34864	8	5	5	5	20	Content: This list is ordering options according to Kaya factors (ASIF), I suggest to indtroduce the appropriate definitions (resp. bolding them)	Too detailed for summary
24514	8	5	7	5	8	Applies not only to biofuels, but also to electricity and hydrogen	Accept - in previous sentence
34523	8	5	9	5	12	It is proposed to change "...enhancing vehicle and..." and "...and vehicle designs..." to "...enhancing vehicle, ship and..." and "..., vehicle and ship designs..." respectively, and deleted the word "vehicles" in 12th line, as it is conclusion obtained by International Maritime Organization (IMO) and it is also mentioned in Section 8.3.2 that "Similar or slightly lower potentials exist for trucks, ships and aircraft".	Accept
30315	8	5	9	5	9	Energy intensity is normally defined in terms of MJ/pkm or MJ/tkm, while fuel economy is normally defined in terms of MJ/km. In order not to confuse readers and to keep consistency, please use the phrase "energy intensity" in terms of MJ/pkm or MJ/tkm and use the phrase "fuel economy" in terms of MJ/km throughout this chapter.	Accept
24665	8	5	1	5	20	Transport energy consumption can be significantly reduced with much simpler methods and at much lower costs, especially for passenger transport. These expensive, R&D-dependent options should be presented after the lower cost, short-term mitigation strategies. Electrification is only an effective form of mitigation if driven by renewable energy. Suggest the source of electric power should be referred to both in the executive summary and the relevant sections, as it is in section 8.9.2.1, specifically lines 20-23 0n p.59. Suggest change line 4 to: 'Medium-term emission reductions are feasible because of…' and change the start of line 16 to: 'and enable uptake of lowC transport systems where electricity is from renewable sources'.	Accept -amended
24666	8	5	21	5	37	Such policies are especially relevant to countries such as the US, Canada and Australia where the personal vehicle fleet is composed of larger, heavier vehicles than in Europe or Japan, for example. Suggest lines 21-37 should come before line 4, i.e. short-term mitigation strategies should come before medium and long-term measures. Suggest that on lines 31-32 the reference to improving traffic flows requires qualification, or should be deleted, as the net effects are ambiguous. Improved traffic flows promote private car usage and will only reduce energy consumption if combined with policies to encourage public transport, such as congestion charges, tollways or parking fees. This is because cars are so much more energy intensive than public transport systems that only a small increase in the number of cars on the road can raise fuel consumption more than a reduction in losses due to stop-start traffic. See, for example, the comparisons in Figure 8.1.6, in section 8.1.2, p13. Suggest rewording for this- append to line 33: 'Regulations can provide effective mitigation through encouraging behavioural change for passenger transport. This includes congestion charges and tollways to encourage use of public transport, and vehicle registration charges, particularly for new vehicles.'	Accept - amended but less detail

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
20418	8	50		50		Row 7: most shifts to non-motorized modes are from transit, not motor vehicles	Disagree - there is evidence for both. US is more from transit until recently
37168	8	50	1			The section on "Improved vehicle internal combustion engine technologies..." should include information on other potential efficiency gains, such as lightweighting. In addition, it mentions behavioral issues that can reduce vehicle efficiency gains, but not the potential for outreach on driving more efficiently ("ecodriving"). Both of these could either be described under this category or given their own categories.	Disagree - discussed in text.
37169	8	50	1			Mode shift - a significant barrier for the success of transit strategies (at least in the U.S.) is matching the travel time and convenience of private auto travel.	Agree - not new and fully discussed but is now happening very much more than expected.
37171	8	50	1			Local opposition is a major barrier to infill and other transportation-supportive land use strategies (row 8 in the table)	Agree and is in text.
37172	8	50	1			The section on "mobility service substitution by reducing the need to travel through enhanced communications" is not mentioned anywhere outside of this table. If this is a major way to achieve demand reduction, the chapter should discuss it in the main text. If not, it should be left out of the table.	Agree - now in text.
37170	8	50	7	50	7	"A reasonable climate" is listed as a barrier to mode shift to cycling. A reasonable climate is not a barrier. The barrier would be harsh climate conditions in some areas. Please reword. This barrier also applies to mode shift to walking.	Agreed - changed
20419	8	51		51		Row 11: "immediate" suitability of being able to shift modes is incorrect. This is highly dependent on available capacity and is dependent on the type of commodity being transported. See, for example: Noland, Robert B. and Zia Wadud, “Review of Oil Demand Restraint Policies for Heavy Goods Vehicles”, Energy Sources Part B: Economics, Planning, and Policy, 4, (2009), 84-99.	Disagree - potential is there.
22049	8	51	1	51	1	in row 12 under modal shift for truck to waterbourne transport - a barrier is also the difficulty in measuring the benefit of any mitigation measure or shift to lower carbon intensity transport from a national perspective, due to debate regarding apportionment of emissions, and transparent measurable indicators. See Gilbert & Bows, 2012, Exploring the scope for complementary sub-globa lpolicy to mitigate CO2 from shipping, Energy Policy 50 (2012) 613–622	Agreed but too esoteric I feel for a table
22050	8	52	1	52	1	Generally, aviation is omitted from much of the 'demand reduction' discussion. 14. another barrier to enhanced communication includes an absense of technical training and available IT support to encourage use. Also, opportunities include Business budgets saved. Time saved. Reference to include regarding demand reduction/mobility service changed for aviation include Randles and Mander, TASM listed earlier.	Thanks - enough refs though
26345	8	53	17	53	19	Data cited in these lines needs to be clarified. It is stated that "The UNEP pipeline database for clean development mechanism (CDM) eligible projects show only 42 CDM projects out of 9064 have been transport-related". As of today, 20 April 2013, there have been 6.707 registered CDM projects in total, so 9064 CDM projects cited in this paragraph needs to be clarified. It is also recommended to use the term "registered" instead of "eligible" CDM projects, as this term corresponds to terminology used in the CDM project cycle.	Agree and text upgraded.
37173	8	53	19	53	21	p.53, lines 19-21. This statement implies that GEF and the World Bank have unfunded the transport sector. While more efforts could have been spent on the transport sector, GEF indeed has a dedicated transport strategy in GEF 5. The GEF transport fund in GEF 5 has indeed increased. See Dixon et al. (2011) on summary of GEF FCV activities as an example.	Agree and text upgraded.
24527	8	53	28	53	28	Sentence on NGOs not clear - how does it help to cut financing for transport-related NGOs??	Agreed - changed text
37174	8	53	28	53	29	Sakamoto et al 2010 does not advocate shifting resources from transport-related NGOs.	Agreed - changed text

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
29813	8	53	33			Value capture has downsides in terms of increased prices for housing and dispacement of poor people as a result of the infrastrucutre developments. Kindly refer case study on BRT projects from India and its impacts on urban poor. http://www.unep.org/transport/lowcarbon/Pdf's/BRT_Casestudies_India_fullreport.pdf	Read this and found nothing on VC.
22051	8	53	37	53	49	In terms of institutional barriers, issues of emission apportionment for international transport should be considered and discussed here.	Discussed in text
22052	8	53	37	53	49	An additional opportunity will be the impact of the decarbonisation agenda on shipping fossil fuels, in terms of demand management/impacts. See Mander et al., Mander et al., Carbon Management, 2012, 3(6) 601–614	In text.
24528	8	53	38	53	39	Standards for EV infrastrcuture should not be put in first place as institutional barrier, compared to subsidies and all the other barriers mentioned later in the text	Agreed - changed text.
37175	8	53	38	53	44	Consider if this is repetitive of other parts of the text. Also, it is quite poorly written and should be reworked.	Disagree - well written and very clear!
37176	8	53	45	53	45	The subject for the first sentence of this paragraph should be clarified. If this paragraph were quoted out of context, the first sentence does not make sense.	Agree - rewritten.
20420	8	53		53		Delete 8.8.2	Disagree - required.
24526	8	53	12			The section on financing is too weak. Also it should be emphasized that a huge potential for financing lies not only in redirecting funding for unsustainable transport, but also in abolishing massive subsidies for fossil fuels which still exist in many countries (e.g. Indonesia). Getting such financial issues right should be priority, only then additional financing for low-carbon transport should be accessed.	Agree to add subsidy removal to table.
20421	8	53		54		Delete 8.8.3 - I found this section highly speculative.	Disagree - based on literature
24529	8	53	37			Generally enhance the text and approach on barriers, which is now scattered and not very comprehensive. A nested approach of 4 types of barriers could be used, to be found in Bongardt et al. 2013	Disagree - no space
22747	8	54				If looking to cut - Figure 8.9.1 could go - simply refer to the corresponding figure in the appropriate chapter. Besides - hard to read and understand.	Figure 8.9.1 has been modified - it has been reduced in terms of the number of years covered and a range of non-IAM scenarios have been incorporated into the graph. This gives the graph a new relevance with the incorporation of non-IAM scenarios and hence we have decided that it should remain.
32766	8	54	18	58	3	Much of what is stated here is repeating what was said earlier in terms of how to reduce emissions from individual transport modes. This section should be shortened to reflect the new contributions only.	Editorial
22746	8	54	27	54	29	The sentence: "Despite this, top-down scenarios demonstrate that atmospheric stabilisation at 450 ppm CO2 by 2100 will rely heavily on transport sector mitigation." Needs a refernce to support this statement. Studies that I am aware of show the transport sector to be one of the least responsive to carbon pricing. What is meant by this statement?	Editorial. The sentence will be reviewed for clarity. Without the transport sector contribution stabilization may not be reacheable.
27827	8	54	27	54	29	Why is atmospheric stabilization at 450 ppm heavily linked to mitigation in transport sector?	Editorial. The sentence will be reviewed for clarity. Without the transport sector contribution stabilization may not be reacheable.
34908	8	54	27			"indicating high uncertainty": Please discuss this with Ch.6 authors. While a large amount of scenarios might allow to analyse them in statistical terms, the spread is only in part about uncertainty and to a large degree due to different assumptions. Please see discussion in Section 6.2.3	Noted. Text will be cross-referenced with Chapter 6 discussion on uncertainty.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
37177	8	54	3	54	6	Needs to be reworked to be more clear.	Noted.
37178	8	54	9	54	9	p. 54, line 9. "Results from the integrated assessment models (Chapter 6) show that directed measures can reduce GHG emissions substantially from the transport sector" It would be a grave mistake to assert that integrated assessment models "show" in the sense of proving anything about the distant future. A better word choice would be: "Results from the integrated assessment models suggest that directed measures may substantially reduce GHG emissions from the transport sector."	Editorial.
34907	8	54	9			Detail: Reference should go to "AR5 Scenarios Database" (exact referece tbd) rather than Ch.6	Noted.
24342	8	54		62		The Chapter 8 should be shortened removing all the sections 8.2 (this section is relevant, of course - but not so much considering the main objectives of Chapter 8) and 8.9 (this section should be removed to the Chapter 4).	Rejected: Sections have been fixed and cannot be removed
24533	8	54	5			The difference between the long-term energy-economic modeling and bottom up approaches (e.g. A-S-I) is very striking (but only the former are shown in scenario diagrammes). Some discussion and reflection on this is required: the former would project abatement to take place after 2050 when technologies are supposed to be cheaper. This ignores the role of short/medium term sustainability for transport (taking measures for non-climate reasons) and includes a rather risky approach of assuming technology will become cheaper. Many measures in the transport sector are not taken for climate reasons...	Accepted: comment will be reflected in the comparison of results bottom-up and IAM studies.
20422	8	55				Figure 8.9.1 - this graph and those similar graphs that follow (8.9.2, 8.9.3, 8.9.4, 8.9.5) are not well explained. I don't think you need these in the text.	Figure 8.9.2 has been removed and the issues raised are now solely discussed within the text. Figures 8.9.3 and 8.9.4 have now been combined into one graph and the text has been revised with an improved explanation of the material in the graph.
37180	8	55	1			Good data to display, but the text definitions need to be consolidated or shortened. Graphs and figures should communicate quickly, clearly and without too much reading of text (otherwise, describe the data in text).Condense or shorten the descriptions for the percentiles in the text part of the table. For instance, you could just show one red square as "525 ppm or above in 2100," one yellow square as "450 ppm to 525 ppm in 2100," etc., and then in the figure legend state "boxed regions indicate the 25th to 75th percentile of the distribution, whereas the unboxed regions indicate lower or upper quartiles of the distribution (below and above the boxed region, respectively)."	The discussion within the text has been adjusted to make the interpretation of the graphs more straight-forward and easier to understand.
37182	8	55	14	55	15	p. 55, lines 14-15. "The potential for decoupling freight transport from GDP seems to be strong although the ranges for freight activity are greater than those for passenger transport." The evidence adduced in the rest of the paragraph contradicts this sentence, indicating that the potential for decoupling freight transport from GDP seems to be weak. This is an illustration of the hazards of trying to understand sectoral detail from the output of an integrated assessment model, in which the sectoral detail is modeled in a highly abstract fashion. It isn't clear what the authors mean by "the ranges for freight activity" Ranges of what? Ton-km per unit GDP?	Accepted: the discussion about potential decoupling of freight from GDP will be reviewed.This point usefully highlights the difficulty of reconciling the results of the IAM exercise with more empirically-based decoupling research done specifically in the transport sector. This reconciliation is currently been reviewed.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
37183	8	55	16	55	17	This sentence is important, and there are several citations that can readily show this; citation is recommended. Here are two, both presenting graphically this relationship: Corbett, J. J.; Winebrake, J. J., Freight Transportation and the Environment. In Intermodal Transportation: Moving Freight in a Global Economy, Meyer, M. D.; Giuliano, G., Eds. Eno Transportation Foundation: Washington, 2009. Corbett, J. J.; Winebrake, J. J., The impact of globalization on international maritime transport activity: Past trends and future perspectives. In Globalization, Transport, and Environment, Braathen, N. A., Ed. Organization for Environmental Cooperation and Development: Paris, France, 2008.	Taken into Account. Thank you for providing these references. Two important references that will be cited in the next draft.
27154	8	55	21	55	21	Again, need a source/reference for assertion that localised sourcing reduces emissions - this may or may be the case.	Accepted. A reference for this will be obtained or the comment will be deleted.
37181	8	55	9	55	12	Population growth is a major (and perhaps the main driver). It isn't listed here but needs to be.	Accepted. Population growth is a driver and should be included.
37179	8	55	1	60	25	The figures in this section are confusing, and the message being conveyed is unclear. The authors night consider whether Figures 8.9.1, 8.9.2, 8.9.3, 8.9.4 or 8.9.5 add sufficient value to the discussion to warrant inclusion.	Noted. Figures in this section will all be revised.
27828	8	56	1	56	1	Being no expert on integrated assessment models, I was nevertheless wondering why in Fig. 8.9.2. (a) the upper limit of the maximum value is almost the same for the different CO2-concentrations in 2100 and all the other years. Additionally, the 75th percentile and the maximum values are the same for all 3 CO2-conentrations for all years.	This figure has been removed and we have discussed and provided projections for transport activity in IAMs in the text. However to address the point, some models do not change their demand projections in terms of pkm and tkm, hence the maximum and 75th percentile estimates are similar across the three different CO2 concentration levels.
34271	8	56	10	56	12	"Improved vehicle FE, smarter systems, improved traffic flows and better driving practices play an important role in stabilization goals in all transition pathways."	Editorial
22053	8	56	16			This states: "freight transport efficiency" however it appears this means "freight transport energy efficiency" rahter than including other aspects of transport efficiency?	Editorial Point accepted. Text will be amended accordingly.
34913	8	56	7			This should, in my view, be "technology efficiency" and not "energy intensity" as only the technology but not the structural aspect that is subsumed under "energy intensity" is discussed.	Editorial
24694	8	56	13	56	21	A major barrier to freight energy intensity reduction is the lack of data and the relative difficulty in modelling and quantifying potential efficiency improvements. This can be addressed through programs aimed at gathering detailed data from a range of transport fleets; running demonstration trials etc. such as have been attempted at state government level in Australia. Suggest Add after line 31: 'A major barrier to freight energy intensity reduction is the lack of detailed energy and fleet data and the relative difficulty in modelling and quantifying potential efficiency improvements. This can be addressed through programs aimed at gathering detailed data from a range of transport fleets, running demonstration trials and quantifying improvements over a suitable sample of vehicles. Such trials have been attempted at state government level in Australia."	Taken into Account. Comment will be considered in Editorial process. Response to comment 1096 deals with this issue. It is a good point which will be more fully discussed in the next draft.
20423	8	57				Check caption, I believe it is incorrect	This plot has been revised and we have revised the captions used for all of the graphs.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
37184	8	57	1			Perhaps better y-axis labels would be "Change in Passenger Travel Energy Intensity from 2010 (PJ/b p-km)" for (a) and "Change in Freight Energy Intensity from 2020 (PG/b t-km)" for (b).	This plot has been revised, however we have been careful to review the y-axis labels for all of the graphs. Good suggestion - can adjust title
34914	8	57	10			Detail: "relative to" instead of "than"	Editorial
20853	8	57	14	58	3	Biofuels are effective in order to reduce GHG emission. However there are several obstacles to introduce them, such as the competition with food. In this text, what we should overcome is described.	Taken into account.
34915	8	57	14	57	16	The figure does not show the "leading to practically zero" as this is only true for the 0-25th percentile in the range.	Taken into account.
34916	8	57	21			See my above comment on usage of uncertainty, please see discussion in Section 6.2.3	Taken into account.
37185	8	57	6	57	6	"increase in travel demand." "Demand" is mis-used. "Increase in passenger travel" would be better.	Editorial
37186	8	57	6	57	7	To the statement--> "The increase in travel demand will mostly take place within the road and aviation sub sectors, driven inter alia by income (8.2)." -->You may wish to consider the potential for higher income to lead to an increased capacity to telecommute and use other virtual travel instead of physical travel. This could mitigate the projection for increased travel demand driven by increased income.	Taken into account.
22054	8	58	1	58	2	"biofuels tend to have a more important role in a shorter term (up to 2050)". This is because it is assumed that they will lead to high GHG savings, but in fact these are highly uncertain as discussed elsewhere. Many models assume biofuels have zero GHG emisisons because of the way biomass is accounted under Kyoto rules.	Taken into account. Assumptions made in the models regarding biofuels will be spelled out clearly.
22056	8	58	10			"transport proves difficult to decarbonise". Is this supposed to mean "completely decarbonise"? It doesn't appear to be so difficult to make some progress on decarbonisation, but the real question is to what degree it will be possible to do this.	Taken into account.
37188	8	58	17	58	18	p.58, lines 17-18. The top-down and bottom-up analyses indirectly implied different energy and environmental policies (economy-wide policies such as energy tax or carbon tax vs. sectorial policies such as vehicle fuel consumption/GHG standards and low-carbon fuel standards). Thus, the discussion regarding the two approaches should be broadened to include policy implications.	Taken into account.
34918	8	58	24	58	25	Detail: BU detail -> higher potential - this needs explanation as it could also be that case that greater detail brings up more barriers	Editorial. Further explanations will be added.
34919	8	58	38	59	11	Content: There must be more studies/data than the ones cited here.	Accepted. Further references if available will be included.
37187	8	58	4			p.58, Fig. 8.9.4. CO2 emissions here should be direct GHG emissions. Upstream and indirect emissions should be removed so that double-counting with other sectors (in other chapters) can be avoided. When direct CO2 emissions are included in this chart, biogenic CO2 from biofuel combustion requires some careful consideration. Depending on the feedstock type and the fate of feedstock without biofuel production, treatment of biogenic CO2 from biofuels can be determined here.	This graph does incorporate direct emissions - however unfortunately the IAMC AR5 Database does not include data on transport sector GHG emissions. The issues of indirect emissions from biofuels are important and would need careful consideration (as noted). Indeed, IAM should have a good representation of the indirect emissions with respect to all fuels used within the sector.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
22055	8	58	7			This is contrary to what has been seen in the EU, where there is some indication of passenger decoupling but none for freight. See figure 3.1 and 3.3 of TERM 2012 report: http://www.eea.europa.eu/publications/transport-and-air-quality-term-2012	Accepted. Thank you for the reference. Comment wil be reflected in discussion. It is true that (negative) decoupling of the GDP-tonne-km relationship has not occurred at an EU level but there is evidence of it happening in particular countries (e.g. UK, Finland and Denmark). This point probably needs some elaboration in the next draft.
34917	8	58	9	58	10	Detail: "it has been accepted" consider changing to "inter alia model comparision suggests that" to make clear that Pietzcker et al. is not one study	Accepted. Editorial changes will be made.
20424	8	58		60		This section should be deleted. Much of the discussion is opinion and value judgements. While I may not disagree with all these, they should not be in an IPCC chapter. For example, p.59, line 18: "Policies will also be needed to support critical and structural/cultural changes ensuring that social objectives are not subdued." Some may disagree with this statement and it is not clear what research in the cited references builds a case for this statement. Another example, p.60, line 1: "Desired cultural changes involve a closer and systemic linkage between land use and transport decisions through institutional and policy reform". Never mind that I don't quite understand what this means in practical terms, but "desired" implies it is desired by someone, but who?	Editorial changes are made to the entire section.
22057	8	59	1	59	11	Aviation scenarios are not explicitly mentioned here but there is some work on EU aviation scenarios that could add further estimates from bottom-up work, published in Bows et al., Aviation in turbulent times, Technology Analysis and Strategic Management, Vol. 21, No. 1, January 2009, 17–37. where through stakeholder input and quantiative analysis, it was dificult to envisage scenarios where emissions were better than than 40% above 1990 levels by 2030. Key conclusions from the paper were: (1) Aviation's emissions will not be brought inline with global or EU emissions constraints associated with the 2degreeC threshold between acceptable and dangerous climate change without other sectors making significantly deeper cuts. (2) Even under the most technically optimistic future presented, either demand management or a reduction in the current rate of aviation growth through other means is required if the sector's emissions in 2030 are to reduce below their 1990 level.	Accepted. Thank you for the reference. Comment wil be reflected in discussion.
34920	8	59	12	59	15	Content: This can not be concluded from sectoral BU studies; please also check whether it is sound to claim this for cross-sectoral BU studies as these usually do not take a systems view that is required. Do not randomly pick a few top-down studies here - the whole purpose of the scenario database and section 8.9.1 is to avoid basing claims on just few scenarios if this can be avoided!	Rejected: The number of Global Scenario studies for Transport is limited. And the authors have reviewed those studies that are available. The reviewer did not provide further references to back up the claim that the chapter has not consider the available scenario literature.
34922	8	59	17	59	18	This sentence does semantically not make any sense, also the components by themselves: What type of "capacity" is meant? What does "suceed from a systems perspective" mean? Has the distinction between "demand and supply side" policies been introduced anywhere?	Accepted. Editorial changes will be made to this sentences.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
34924	8	59	20	59	23	I very much question that this is what the IEA reference given says. This sentence does not make sense. You need to be more concrete with what you mean by "systems perspective" or otherwise it is meaningless. Do you mean the cost-effective attribution of mitigation contribution to sectors? If so, I still do not see how this relates to what follows.The usage of "integration" in the context of supply and demand is also wrong in my view. There is the issue of how to meet supply with demand concerning volatility of some energy sources but this seems not to be meant here. Also "low carbon fuels" and "power generation" is wrong, think of renewables. And a sentence "a [...] interaction [...] can interact" just does not make any sense!	Accepted. Full editorial review will be made for this section.
34925	8	59	24	59	26	Speaking of "production volume" for the demand side does not make any sense. And further: Production of what?	Editorial. Fully revised.
34926	8	59	27	59	28	"compete with" - in what regard. Also this sentence does not make any sense!	Editorial. Fully revised.
34927	8	59	28	59	32	The one example given does not support your point sufficiently as pipeline infrastructures are very specific. If you want to uphold the general claim data is needed on the costs of infrastructure or resource needs e.g. for different modes. Please also check that the order of magnitude of energy provided from the mentioned hydrogen networks are in the order of the oil ones.	Taken into account
26563	8	59	33		37	take out, repetitive with previous points.	Editorial
34928	8	59	35	59	36	Be more specific than "considerable" on the lead time	Editorial
34929	8	59	39			The short time of this infrastructure built contradicts the "considerable" lead time mentioned a few lines above! Having contradicting data is fine, not commenting on it is not.	Editorial
34931	8	59	40			The information on what was done in the previous decade is irrelevant in this context.	Editorial. Fully revised.
32733	8	6	1	6	1	Define middle distances.	Accept
27797	8	6	1	6	2	The current version leaves the impression that with this modal shift a reduction of the aviation share will result. This is not necessarily the case. This development will lead to free slots for larger, long-distance operating aircraft and even more air transport if infrastructure policy does not interact (e.g. by adapting airport capacities).	Accept we consider message of aviation reduction through modal shift is one option
20387	8	6	10	6	10	correct terminology is "transit-oriented"	Accept
20388	8	6	14	6	15	Context of last sentence of this paragraph is unclear. What climate change feedbacks are being referred to?	Accept= reworded
25960	8	6	16	6	25	There are example of reductions in car use in developed countries, consider London. I would suggest the ease of changing travel patterns rather than energy intensity depends in part on structure of cities and so on, rather than on maturity of economy.	Accept- reworded
32181	8	6	18	6	25	No interest. Suppress	Reject - regional differences shown
27798	8	6	18	6	20	Please include in front of the sentence "With the exception of internationally regulated sectors such as maritime transport,".	Accept
32735	8	6	2	6	2	The point of better communications to offset growth in aviation (proxy for in person meetings) is weak.	reject - long-term options relevant
34264	8	6	21	6	23	"Regions with existing and mature transport infrastructures in place may find it easier to improve energy intensity and, to a lesser degree, reduce carbon intensity, than to change travel patterns." This is exactly what we mean: we need supplemental information and incentives to have drivers as well to behave as partners in this team work to reduce CO2 emissions.	Accept but cannot include this industry view without references
36957	8	6	23	6	25	It is worth noting that global trends show that without strong policies, developing countries may follow the historical path of developed countries in transport demand and mode share.	Accept
34893	8	6	26	6	27	Content: Delete here and add above at p.6,l.19 to remove redundancy	Accept
24518	8	6	31	6	32	The statement on reduction of GHG intensity in emerging economies seems optimistic - to date, few projections support such a view	accept - so "could"
34894	8	6	31	6	32	Content/Link: Please provide link to section and if possible numbers and conditions that need to be fulfiled	Will do

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
36958	8	6	33	6	39	Message of this paragraph is not clear. The first sentence refers to climate mitigation actions, while the second refers to non-climate policies, which should be clarified.	Accept- reworded
24038	8	6	33	6	34	"Co-benefits resulting from climate change mitigation actions in the transport sector can 34 significantly contribute to sustainable development. [Robust evidence; high agreement]" is worth to be in SPM	Accept - co-benefits in SPM
25961	8	6	33	6	39	Physical activity benefits need to be mentioned specifically here as they are relatively large.	Accept but improved health already noted
34524	8	6	34	6	39	Is it logical that the conclusion is "Robust evidence; high agreement" while the supporting section is "medium evidence; medium agreement"?	Reject Latter relates to rebound effect only so is in sentence.
20791	8	6	34	6	39	Line 34 says [Robust evidence; high agreement], while the line 39 says [medium evidence, medium agreement]. Why are they different?	Reject Latter relates to rebound effect only so is in sentence.
20389	8	6	35	6	36	There is limited evidence of policies that actually reduce congestion, short of congestion pricing. What is this sentence referring to? If travel costs go down, then travel goes up, so not sure how this is consistent with GHG reduction.	Accept- reworded
30304	8	6	40	6	47	Need to adopt an approach that does not foreground 'choice' but rather explores how practices may shift in order to nurture more sustainable mobility cultures and behaviours. For example, schooling systems have a big impact on parental journey constraints and how and when parents will need to travel. Systems supporting walking, cycling, and local public transport are important but under-valued.	Accept - but too detailed for summary.
22738	8	6	40	7	2	This section on knowledge gaps is very unballanced. A few knowledge gaps are mentioned: Lack of consistent assessment of worldwide potential costs….Consumer behavior, etc. These are correct, if vague, statements. Significantly missing A) Robust methodology for incorporating direct and indirect land use change in lifecycle assessments of biofuels; B) a good estimate of the likely improvement in biofuel GHG emission reductions from technical gains from crop production to converstion technology; C) impact of automated vehicle technology on mobility for disabled, GHG emissions and land use change. It is quite possible that advancements in autonomous vehicle technology could lead to huge rebound driving and emissions due to lowering the cost of driving. This is simply unknown. There are lots of other unknowns. Either significantly strengthen this section or drop entirely.	Reject A) and B)- comes in Ch 11. Accept C.
22741	8	6	40	7	2	Subsection: "Knowledge Gaps" - this section is missing how the emergence of autonomous vehicle technology may disrupt current estimates of VMT use by cars and other modes. Autonomous vehicles could while providing great mobility advantages for the disabled, may lead to very large increases in driving as the largest cost of driving (time) is dramatically lowered.	Accept
36959	8	6	40	6	45	The biggest single barrier to reducing transportation sector emissions is that all transportation vehicles rely on stored energy, and hydrocarbon fuels combine outstanding energy density (both in terms of J/kg and J/M3) and very competitive prices. Non-hydrocarbon vehicles usually carry some sort of performance penalty compared with hydrocarbon-fueled vehicles. Suggest mentioning key technology knowledge gaps: --Improving the cost and energy density of non-hydrocarbon energy storage mediums, such as batteries, supercapacitors, and pressure vessels; --Cost-effective mechanisms for converting non-hydrocarbon feedstocks, such as cellulose and lignin, into synthetic hydrocarbon fuels. --Improving the weight/volume/power output/efficiency trade-off for engines.	Too detailed for summary but in 8.11

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
27799	8	6	40	7	2	As the majority of technical innovations stem from "developed" countries, it seems crucial to find a plausible way to describe future advantages and disadvantages of energy/resource use to the common people. It is an option to appeal to their conscience; however, this hasn't worked so well in the past, especially when plans or legislative measures have been shown to have good intentions but in the end have not been successful. Most importantly, since the common people - one way or another - will end up paying for improved efficiency in transport, they need to see that their taxes, transfers and other financial exchanges are directly applied to helping with the problem at hand.	Agree but not clear if relevant here
25962	8	6	40	7	2	The question of understanding transport cultures is important here. It is about transport practices not just transport choices. Consider work of Elizabeth Shove e.g. " Governing transitions in the sustainability of everyday life" and" CAUTION! Transitions ahead: politics, practice, and sustainable transition management" and Aldred "'On the outside': constructing cycling citizenship"	Accept - cocvered in 8.9 but need full references if to include
34895	8	6	41	6	42	Content: This is in my view not a gap but a conceptual problem that the report adresses by linking the systems approach of the integrated assessment models with the bottom-up sectoral scenarios and soft-links to option-specific potentials.	Agree but are wide discrepanacies so rejected
27134	8	6	45	6	45	Not sure effects on timetables is enough of a material concern to be mentioned in the executive summary.	Accept.
25873	8	6	6	6	8	Also mention averse effects on biodiversity, water and food availability (see Bioenergy Annex in Chapter 11).	Reject- see Ch 11
33230	8	6	9			I would frame this more explicitly - "land use policies and infrastructure developments can be major building blocks towards reducing GHG emissions"	Reject see Ch 11
36956	8	6	9	6	15	p.6, lines 9-15. While it is important to discuss the interaction between land use policies and infrastructure development for transportation needs, it is equally important to discuss land use policies and biofuel development. Some of the studies cited in Chapter 8 overlooked or ignored global agriculture/forest policies that help prevent indirect land use changes.	Reject- see Ch 11
24669	8	6	21	6	23	Regions with mature transport systems can encourage behavioural change with improvements to public transport amenity such as refurbishing trains or bus interiors to be more comfortable, providing security, and improving ticketing systems. Uncomfortable, dirty or unsafe public transport systems encourage use of private vehicles. For example, the train system in Tokyo is cleaner, safer and has substantially better ticketing systems that the Sydney rail network, is fast and runs on time. Car traffic in Tokyo is much less gridlocked than might be expected given the population density. Suggest reword: 'Regions with mature transport systems can encourage behavioural change by improving public transport amenity. For example, refurbishing train or bus interiors to be more comfortable, providing security, and improving ticketing systems can all encourage a shift from LDVs to public transport.'	Accept but too detailed for summary.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
24670	8	6	41	7	2	There is a lack of comprehensive and consistent assessments of the worldwide potential and costs to mitigate GHG emissions from the transport sector. Better knowledge of consumer behaviour and the relationship between transport and lifestyle is needed, particularly how and when people will choose to avoid making journeys, take public transport, use new types of low-carbon vehicles, other mobility services. How severely transport services and scheduled timetables could be impacted by climate change feedbacks, both positively and negatively, is unknown. The outcomes of climate change impacts on transport have not been determined. The cost-effectiveness of carbon-reducing measures in the freight sector and on possible rebound effects can only be estimated at this stage. However, rebound effects for larger freight businesses can be controlled through better energy management, improved energy data, and specific standards. Changes in transporting materials as a result of the decarbonisation of other sectors and adaptation of the built environment are unknown.' [Regarding standards, Standards Australia is developing an Energy Audit Standard for transport, AS/NZS3598.3 Energy Audits - Transport.]	Accept in part. We agree that freight rebound effects can be suppressed by appropriate policy measures though it is not clear how the measures proposed in this comment would work. It is important to flag up the freight transport demands from decarbonisation elsewhere and adaptation even if they cannot be quantified at this stage.
24668	8	6	6	6	8	Suggest more balance on biofuels is needed. It would be preferable to state that significant advances are required before biofuels can provide major mitigation potential. Essentially, what may be needed is the development of algal rather than crop-based biofuels so as not to cause land-use issues. Suggest append to line 8: 'and will depend on the development of advanced biofuels produced from algae and lignocellulosic feedstocks' [reference: section 8.3.4.4, p25 lines 47-48 and p26, lines 1-2.]	Accept but too detailed for summary.
29846	8	6	21	6	22	Redundancy : « Regions with existing and mature transport infrastructures in place [...]». « in place » is redundant.	Accept
22748	8	60	1	60	9	The paragraph: "Desired….lifestyles." appears to be opinion/editorial in basis with limited scientific support. For example: what is the scientific basis that: " a willingness to replace forecasting with backcasting paradigms in thinking and planning for development," will lead to decarbonizing the transportation sector? Where is the empirical evidence? Mind you some parts of this paragraph I agree with, but again, I do not think this is evidence-based information, it appears to be an editorial.	Editorial. Paragraphs are fully revised.
34932	8	60	1	60	9	This topic is discussed in Section 8.3.6 - it does not become clear why this is discussed here.	Taken into account.
25964	8	60	10	63	24	There is inadequate attention to non-motorised travel in this section. In particular that supporting non-motorised travel can actually provide access and support development, often more effectively, more equitably and with fewer adverse effects that providing for motorised travel. I refer to my article Woodcock et al 2007 Energy and Transport Appendix A - Transport and Millenium Development Goals. I agree with what the authors are trying to do when writing about the slow food movement but I think the section needs to be clearer about how local development can be better supported (as opposed to globalised and inequitable integration) in low income settings.	Taken into account. Thank you for providing the references.
34934	8	60	12	60	20	Concerning transformation pathways discussed here please take into account that also taking historically unaccounted pathways (i.a. leap-frogging) is a further option.	Taken into account.
34272	8	60	16	60	16	check for typo: double spacing in “will stabilize at a similar level”	Editorial.
24530	8	60	19	60	20	It certainly not only depends on vehicle efficiency and fuel switch, but on policies for sustainable transport in general (including shifting/maintaining favorable shares for PT and NMT etc.).	Accepted. Comment will be reflected in revised text.
23425	8	60	19	60	20	This depends on the stringency of mitigation policies relating to vehicle energy efficiency and fuel switching (Fig. 8.9.5). This is an arbitrary conclusion. It can be corrected as follows: This depends on the stringency of mitigation policies relating to vehicle energy efficiency and fuel switching mostly(Fig. 8.9.5).	Editorial.
37189	8	60	5	60	6	Perhaps more explanation as to why replacing forecasting with backcasting is necessary; this opportunity is difficult to understand. Did you mean "integrate" instead of "replace?"	Accepted.
20425	8	60		63		Delete this section, it includes too much opinion and not enough fact-based research evidence. The last 2 paragraphs are largely irrelevant to transport.	Editorial Fully revised.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
34935	8	61	1	61	4	I question whether this is what the references are saying, as what is taken as "starting point" is arbitrary - depending on how far you go back in US history emissions were at any level lower than today.	Taken into account. Text will be revised
24531	8	61	16	61	22	Absolutely correct, but can be shortened /deleted as there is no link to mitigation	Editorial.
34273	8	61	21	61	21	check for typo: double spacing in “developing countries to improve conditions”	Editorial
22058	8	61	23			This sentence is vague, suggestive and does not define what policy recommendations we are talking about. Suggest it is removed.	Editorial. Fully revised.
37192	8	61	27	61	30	p. 61, lines 27-30. "Strategies need to be found…." Policy advocacy. Delete. Generally, sentences that use "need" or "must" as in "something needs to be done" or "something must be done" should be deleted, particularly when the neediness, as in this case, uses the passive voice so that the reader can't tell who, exactly, needs to do something.	Editorial. Text is fully revised.
34938	8	61	27	61	30	While at the beginning of the paragraph the point is made that linking sustainability and mitigation is essential in this last sentence there is no mention of mitigation, so I suggest to add at the end "while reducing emissions"	Editorial. Text is fully revised.
34936	8	61	4	61	6	As mentioned in the general comment the purpose of this section (8.9) should be to relate bottom-up and top-down studies. Looking at the average global mitigation required, e.g. for a 450ppm goal, taking into account the demand increase that comes from i.a. the countries discussed just here, means that what is discussed here with a positive connotation ("than have managed to stabilize") is actually relatively far away from what is required from the transport sector to contribute to meeting a 450ppm goal. This needs to be discussed here - not having this contextualization in this section boils down to the numbers given here to be meaningless.	Taken into account. Suggestion will be considered in the revised text.
37190	8	61	7	61	7	p. 61, line 7. "rapid speed" suggest "acceleration"	Editorial. Accepted.
34937	8	61	7	61	15	Move discussion of policies to policy section.	Noted.
37191	8	61	8	61	8	p. 61, line 8. "is proceeding under difficult realities:" Suggest: "is subject to significant constraints and has damaging side-effects:	Accepted. Editorial review will consider this suggestion.
32767	8	62	13	62	13	A technical and formal definition should be used here, complete with references.	Unclear what the reviewer wants us to define technically.
26350	8	62	13	62	13	In the sentence stating that "LDCs are the least developed among developing countries" it is recommended to add a list of countries belonging to this group of countries and include a reference to e.g. the UNFCCC web-site where a list of LDCs can be found.	Accepted. The entire report has a glossary describing which countries are included. A note will be made in text to reference this list.
22749	8	62	13	63	24	This sub-section, from "Least Developed Countries to …..enforcement," should be cut in half or more. While this is an very important area, most of the text is loosely written editorializing with little evidence-based research. For example this passage, "Effective policies to address climate change through the transport sector in these countries will place heavy emphasis on building economic and social resilience as a risk management strategy (to reduce the vulnerabilities of these countries to climate change), while working to sidestep the historic environmental and social burdens of economic development, and progressively working to reduce and reverse their climate change footprints (or their share contributions to the changing climate)," represents sentiments with which many would agree. But these sentiments are not based on evidence from LDC nations. This is not the appropriate venue for opinion.	Accepted. The text in Box will be fully revised.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
37194	8	62	13	63	24	Box 8.1 lacks quantitative metrics or milestone, seems like advocacy, is not very rigorous, and not very well written. Please delete or entirely re-work. In addition, it seems to have veered off a bit from climate mitigation. Perhaps it needs to be more clearly stated that mitigation should be conducted in such a way that it does not harm and ideally would help social fairness (if that's what the authors intend). Suggest an increased emphasis on how clean transport technology and planning can help LDCs have sustainable transport systems over the long-term that compliment the stated social objectives in this section.	Accepted. The text in Box will be fully revised.
29962	8	62	13	62	13	The first sentence of this text box seems a little too obvious. Probably check with the definitions as provided in Text Box 1.1 to write a little more advanced opening.	Accepted. The text in Box will be fully revised.
22059	8	62	23	62	26	Sentence muddled	Unclear what the reviewer wants us to do here.
34274	8	62	23	62	23	check for typo: double spacing in “to changing climate). If preservation”	Editorial
34347	8	62	24			Please refrain from attaching priorities to different policy objectives.	Noted.
37193	8	62	3	63	24	p.62, Box 8.1. A key issue is that mobility via motorization in LDCs will be increased with significant personal and social benefits, since mobility based on walking in these countries restricts people's accessibility to opportunities. This increased mobility is a balanced act with social benefits on one hand and social costs (energy use and environmental pollution) on the other hand. This needs to be presented in the Box.	Accepted. Box is being re-written and comment will be reflected in the text.
32768	8	62	32	62	32	This assertion may be true, but is only a one objective of a transportation system which achieves a range of environmental, social and economic goals.	Noted.
26564	8	62	32		42	wishful list? Take out?	Noted.
37195	8	62	32	62	34	Rework and combine these two sentences: "Effective transportation planning will prioritize safety. It will involve developing initiatives to improve the safety of rural and urban travelers, beginning with lower hanging fruit that can save the lives of non-motorized and motorized rural and urban system users." to "Effective transportation planning must prioritize safety for rural and urban travelers, beginning with lower hanging fruit that can save the lives of non-motorized and motorized rural and urban system users."	Editorial. Text is fully revised.
30554	8	62	34			Improvement of pedestrain and bicycle infrastructure and speed control by traffic calming measures will be crucial for improving safety(Elvik et al, 2009).	Taken into account.
34275	8	62	38	62	38	check for typo: double comma in “transportation planning, i.e.,, transportation plans”	Editorial
26346	8	62	4	63	24	Box 8.1 Least Developed Countries: Transport, Climate Change and Sustainable Development contains too few references to literature sources. Furthermore, the only 3 references citing in the box cite information not directly relevant to the transport sector in LDCs. One of the references describes general characteristics of LDCs suchs as a level of gross national income per capita, level of human development in terms of health, nutrition and education and a level of economic vulnerability index. The other two references describe main characteristics of the slow ciites movement in Europe. Therefore, it is recommended to include references to literature sources describing transport-related aspects and challenges in LDCs as the box is devoted to these aspects. Although it might be challenging to find literature on comparative analysis of issues related transport, climate change mitigation and sustainable development in LDCs, it would be possible to find literature on individual countries from the LDCs regional group covering these aspects. Please consult the web-sites of multilateral development banks (such as the World Bank, Asia Development Bank, Inter-American Development Bank, as well as UN agencies working in the field of development) that periodically conduct and pubish country reviews to find country reviews of individual LDCs and glean the description of the issues related to tranposport and climate change in LDCs in the context of sustainable development.	Accepted. Box is being re-written and comment will be reflected in the text.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
26347	8	62	4	63	24	Box 8.1 Least Developed Countries: Transport, Climate Change and Sustainable Development contains a description of measures and instruments (such as integrated systems decision-making, effective institutions and enforcement of laws, rules and regulations, environmentally-conscious and integrated transportation planning) which are more relevant and better suited to be included in Chapter 12: Human Settlements, Infrastructure and Spatial Planning as this chapter is devoted to wider systemic improvements and related governance, institutions and decision-making.	Accepted. Box is being re-written and cross-references to other chapters will be attended to.
26348	8	62	4	63	24	In Box 8.1 Least Developed Countries: Transport, Climate Change and Sustainable Development, it is important to describe a profound difference in trends and main characteristics of the transport sector and their impacts on transport-related GHG emissions in LDCs compared to other developing countries. Due to their special economic circumstances and levels of development, transport in LDCs is characterized by large shares of non-motorized means of transport (including walking), high occupancy rates of collective transport (including occupancy of the roof of a vehicle), and usage of very old vehicles among others. There are also profound differences in trends observed in transport in LDCs compared to more advanced developing countries. LDCs are gradually moving from non-motorized means of transport to collective motorized means of transport (semi-formal, informal or public transit), whereas more advanced developing countries currently shift from collective means of transport to individual motorized transport.	Accepted. Box is being re-written and comment will be reflected in the text.
26349	8	62	4	63	24	In Box 8.1 Least Developed Countries: Transport, Climate Change and Sustainable Development, it is important to describe a challenge related to channeling carbon finance to mitigation projects (under the CDM or NAMAs) in the transport sector in LDCs due to suppressed demand for transport in LDCs and its impact on emission reduction calculations of mitigation projects.	Accepted. Box is being re-written and comment will be reflected in the text.
34538	8	62	42	62	42	In Box 8.1, after "experienced historically", a new sentence is suggested to be added: "The direct and indirect socioeconomic impacts on trade, consumers and industries particularly in LDCs and small island developing states (SIDSs) in terms of cost-effectiveness must be one of the criteria and carefully dealt with when considering the potential market-based measures (MBM) for international shipping transport (UNCTAD, 2012).". The reason is that further work on MBM for international shipping transport is one critical issue for LDC and it is also agreed to be taken into account. (Reference: UNCTAD (2012). Review of Maritime Transport. United Nations Conference on Trade and Development, New York, p100. Available at: http://unctad.org/en/PublicationsLibrary/rmt2012_en.pdf)	Accepted. Box is being re-written and comment will be reflected in the text.Thank you for reference.
23426	8	62	42	62	42	In Box 8.1, after "experienced historically", a new sentence is suggested to be added: "The direct and indirect socioeconomic impacts on trade, consumers and industries particularly in LDCs and small island developing states (SIDSs) in terms of cost-effectiveness must be one of the criteria and carefully dealt with when considering the potential market-based measures (MBM) for international shipping transport (UNCTAD, 2012).". The reason is that further work on MBM for international shipping transport is one critical issue for LDC and it is also agreed to be taken into account.	Accepted. Box is being re-written and comment will be reflected in the text.Thank you for reference.
24532	8	62	4			Instead of including the box, rather try to incorporate LDC consideration in the regular literature review in each subchapter/section. As it stands, Box 8.1 could be dramatically shortened/deleted as it also lacks relevance for mitigation issues.	Accepted. Box is being re-written and references incorporated in the chapter.
26351	8	63	2	63	10	This paragraph describes the slow cities movement in Europe and gives examples of the values European cities in this movement aspire to such as "promotion of organic culture, banning genetically-modified foods and organizms, preservation of local traditions and heritage". It is unclear how these initiatives are related to transport. Furtheremore, since Box 8.1 Least Developed Countries: Transport, Climate Change and Sustainable Development is devoted to specificies of the transport sector in LDCs, it is recommended to give examples from LDCs and describe measures that are applicable to LDCs and reduce their transport-related GHG emissions.	Accepted--wording deleted. Examples given for LDCs.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
34276	8	63	21	63	21	check for typo: double spacing in “they will distinguish between”	editorial--to be copyedited
30305	8	63	25	69	37	Sectoral policies - where is cycling? Where is walking? Cycling clearly needs substantial investment in infrastructure lacking in most countries; this is a chance to make this clear (see City Cycling, for example, referenced in the bibliography). Instead, 'road transport' only refers to motorised road transport, with cycling and walking only appearing in the negative (i.e. reducing car use can help encourage walking and cycling). It is really important that cycling is promoted as a sectoral area needing investment, not just tagging along into 'road transport' (as not being the car) or land use planning (which is more broadly focused). Please include a section on cycling and consider one on walking (many countries lack acceptable walking infrastructure too).	accepted. Paragraph added at end of 8.1.1 and words added on bike sharing and in section 8.1.5
26565	8	63	32			ADD but this raises issues of public inacceptability, to which elected officials are sensitive.	Unclear what this means
37196	8	63	39	63	44	The points made in this paragraph have been stated elsewhere in the chapter multiple times.	editoiral--to be copyedited
20854	8	63	25			Some regulations are effective, but we should describe its problems, such as the influence to family budget.	Accepted--sentences added throughout section
20795	8	63	25	69	37	While it is written "In this section, for each transport mode, policies and strategies are categorized by policy type", this categorization can only be explicitely found in the "8.10.1 Road transport" section. Even in the road transport section, paragraphs related to activity reduction are not fully employing the categorisation. For example, line 9-16 of page 67 is obviously related to market-based, but no mention can be found throughout the paragraph.	Taken into account--words added to some modal subsections
32769	8	63	26	66		Elements of this section repeats the sectoral analysis earlier in the Chapter.	Taken into account-much was deleted here and in earlier sections
19998	8	63	26	63	30	Add a table according to a comprehensive category with ASIF framework/policy type/precise policy involved for different transport modes.	Rejected because chapter was already far too long
23427	8	63	26	63	30	Add a table according to a comprehensive category with ASIF framework/policy type/precise policy involved for different transport modes.	Rejected because chapter was already far too long
22062	8	64	12	64	15	The comment that carbon taxes would need to be high to achieve the same impact as a regulation, should also mention that they would need to be high to achieve a high chance of avoiding 2°C	Rejected because it is implied and there is shortage of space
25740	8	64	13	64	15	This part should be kept in the final version report because "voluntary agreement" is an effective method to improve energy efficiency and reduce GHG emissions, as described in the section 15.5.7.4. There are successful examples of "voluntary target scheme" in the world. Each industry in Japan has voluntary target and the voluntary target scheme has played a big role, as described in (Yamaguchi, 2012, page35 and 154), (Manuel, 2010, page 6 and 13), and (Yamaguchi, 2010, abstract). In addition, there is also a successful example of "voluntary target scheme" in Netherlands, as shown in (Martijin, 2002, page162). These literatures are listed in the No22 line of this table.	Rejected. Other policies are far more effective.
37197	8	64	20	64	22	The "they" on line 21 in "but they appear to be declining in OECD countries" needs to be clarified.	editoial--copy editing
34539	8	64	22	64	23	The sentence of "The reason for the peaking of car use is not yet well understood, but policy seems to be playing little or no role." should be replaced by "Due to more road especially expressway are built while it is lack of corresponding public transport to accommodate huge population and people’s wish of quality life which is equal to OECD countries, but policy seems to be playing little or no role." The reason for the peaking of car used in emerging economies and some developing countries is clear.	Rejected. Adds too many words and little value
22063	8	64	22	64	22	Refers to 'peaking of car use' – should take care to make clear that this is per capita, not aggregate.	Accepted
37198	8	64	22	64	23	p.64, lines 22-23. Prices (or costs) of different transport modes play some role in peak of car use and fuel use. Thus, some economic mechanism (policies) could have some effects on reaching peak of car use.	This deiscussion deleted from this section and addressed elsewhere.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
20426	8	64	24	64	24	Mayor & Tol is incorrect reference, this paper discusses aviation not road transport.	Accepted. Reference deleted. Agreed; not any more in the text, but two references exist , related to aviation
37199	8	64	29	64	30	p. 64, lines 29-30 "They are the first major policies in the world to be premised on the measurement of life-cycle GHG intensities, though interpretation of life-cycle analyses can be misleading" The authors appear to be saying that these are the first major policies to be based on the mistaken interpretation of life-cycle analyses. The author's point isn't clear. Is LCA a Good Thing, badly implemented in this instance, and the lesson is it should be done better in the future, or is the point that LCA is problematic because it is so hard to generate an unambiguous interpretation?	Accepted. Text is clarified
37200	8	64	30	64	33	p.64, lines 30-33. It is not clear why interpretation of LCA could be misleading. Including LCA emissions provides a more complete understanding of technology options for certain policies such as GHG emission standards by the US EPA and California's LCFS. On the other hand, including LCA emissions, especially upstream emissions occurred in other sectors, poses double-counting issues with other sectors covered in other chapters.	Taken into consdieration in varous places in WGIII
26566	8	64	34		42	already covered, take out.	editorial--to be copyedited
37202	8	64	38	64	38	p. 64, line 38, "the effectiveness of these policies is uncertain, but promising in that they provide a durable policy framework" The authors appear to be saying that they aren't sure the policy will work, but fortunately the policy will be kept in place for a long time whether it works or not. The author's intent isn't clear here. "Uncertain" might have several meanings in this context, as in "the policy is likely to be effective, but we can't say how effective," OR "we don't know whether the policy is effective or not," OR "we think the policy will be ineffective, but are too diplomatic to come right out and say it." The interpretation of the first clause, of course, affect what we think about the value of durability in an uncertain policy. More clarity would be helpful.	Acepted. Wording is simplified.
37201	8	64	38	64	40	This point about the promising nature of renewable fuel standards is very speculative and the subject of significant debate. It is suggested to remove it, or at least ground it in citations from the literature, with evidence on both sides of the issue.	Accepted. Text removed
20794	8	64	41			"mandatory targets" should be "mandatory biofuel blending targets" (cf. REN21, 2012 page 15)	Accepted. Text removed.
32187	8	64	42	64	42	Add a small paragraph: In spite of demanding maintenance, zero CO2-emission wood gas vehicules are rentable, as one oil liter is remplaced by about three kilogram of wood. There was one million such vehicules during the Second World War. It has particularly great interest when wood is cheap, such as in certain developping countries and in OCDE agriculture (FAO, 1986, Vaitilingom et al., 2012). A promising pathway is to use pyrolysis to produce electricity and charcoal, and to use this one in wood gas vehicules, with twice less maintenance (Knoef, 2012). Knoef HAM, 2012, Handbook on Biomass Gasification - Second Edition. BTG Biomass Technology Group BV, Enscheide, The Netherland. 500 pp. FAO 1986 Wood gas as engine fuel. FAO Forestry Paper 72, 132 pp. www.fao.org/docrep/T0512E/T0512e00.htm Vaitilingom G, Agier Y , Lacour S, 2012, Un carburant spécifique pour les engins agricoles : étude de quatre filières de production de biocarburants agricole. Ecotechnologie, 54-60. cemadoc.cemagref.fr	Rejected. Too minor to consdier in this chapter
22064	8	64	43	64	44	The statement doesn't make sense and in fact it may make more sense to use regulatory rather than economic instruments due to the existence of market failures. This is clearly visible in the case of new vehicle efficiency standards.	Statement removed
26697	8	64	44	64	46	This decision is yet to be taken. This is only a proposal by the European Commission.	Accepted. Text removed

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
20864	8	64	5	64	7	There are several problems regarding market-based mechanism, such as carbon leakage and instability the carbon price. These problems should be described as well.	Rejected. Dealt with elsewhere in report.
25739	8	64	5	64	6	This part should be deleted completely and there should be an explanation that market-based mechanism such as emission trading has several problems. Volatility of emission permit prices affects volatility of product prices as evidenced by fluctuating price developments in the EU-ETS. Therefore, the market-based policy tools of cap-and-trade cannot provide credible incentives for the technological change, as described in (Montgomery, 2005, abstract) and (Baldursson, 2009, page29). In addition, CO2 leakage caused by the implementation of the ETS happened actually through transfer of industry from one country to others. Market mechanisms at least under Kyoto-like international scheme, where the condition of all countries' meaningful participation is not met, do not work well, as shown in (Rosendahl, 2011, abstract), (Aichele, 2012, page336), and (Peters, 2011, page1). These literatures are listed in the No9 line of this table.	Accepted. Text was deleted.
22060	8	64	5	64	7	Once source of evidence for an extremely strong statement - this needs better justification.	Do not understand
22061	8	64	8			The line states that market policies are economically more efficient than fuel carbon intensity standards. I would say "can be more efficient". I would add the sentence that: However, if market failures occur, complementary policy is needed to remove them" As a result, to gain large emissions reductions, a suite of policy instruments will be needed"	Accepted. The general thrust of the comment is inccorporated into the section.
22742	8	64				References on Economics of Low Carbon Fuel Standard Economics and Energy Security are sparce or limited. More complete analysis is from: Leiby, Paul and Jonathan Rubin, “Energy Security Implications of a National Low Carbon Fuel Standard, Energy Policy (2012), http://dx.doi.org/10.1016/j.enpol.2012.06.058. Rubin, Jonathan and Paul Leiby, “Tradable Credits System Design and Cost Savings for A National Low Carbon Fuel Standard for Road Transport,” Energy Policy (2012), http://dx.doi.org/10.1016/j.enpol.2012.05.031.	Accepted--the entire speial issue that included these two papers was added to the references
19999	8	64	25	64	33	Add some literatures about China, such as Cai et al. 2011; Yang et al. 2010; Feng et al.,2012. They discuss how to reduce fuel carbon intensity by inducing fuel tax, vehicle and vessel tax in China.	Accepted--several China papers were added (though not the ones suggested)
23428	8	64	25	64	33	In this section, the policies towards accelerating the utiliztion of EV have not been touched properly. China has started the "10 city 1000 EV " projects and cities such as Beijing, Shanghai, Shenzhen,Qingdao have implemented various market-based or command-and control policies on EV development. Policies shoud not just include some"target" , practical policies on going haveeven more important meanings for the future.	Taken into account--with mandatefrom Califrnia mentioned. Not enough space to discuss other weaker policies.
22065	8	65	10	65	11	Not only will reducing energy intensity show the greatest promise, but it also appears likely to play the largest role in the decarbonisation that will be achieved in that time. See the decomposition of the illustrative scenarios in: http://www.eutransportghg2050.eu/cms/assets/EU-Transport-GHG-2050-Final-Report-22-06-10.pdf	Accepted in several statements in the section
37205	8	65	11	65	15	This discussion of tailpipe GHG emissions regulations could be made shorter and clearer, and assessments of the costs and time frames associated with achieving GHG emissions reductions through vehicle fuel economy measures (especially relative to other measures) should be noted.	Accepted. New text is provided under "vehicle energy intensity"

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
34540	8	65	16	65	16	After "performance standards (Wang et al., 2010).", the following is suggested to be added: "For example, China regulated the energy intensity for cars in operation in June 2011 (MOT, 2011) which required cutting GHG emissions per freight by 10% by 2015 below 2005 levels.". The detailed information about energy intensity of road transport needs to be added as convinced evidence. (Reference: MOT (2011). Implementation of energy-saving and emission reduction scheme in transport section under "National Twelfth Five-Year Plan". Ministry of Transport (MOT) of the Government of the People's Republic of China, Beijing.)	Rejected. Too much detail. No space. Since the SOD was completed more information has become available on energy efficiency improvements in Chinese road freight. Reference will be made to this in the next draft - which may involve citing the reference mentioned in this comment.
25888	8	65	17			I would suggest to eliminate the line for California in this graph, as an IPCC report should not go into this detail, and as it does not show a significant difference from the US line.	Fig 8.10.1 now deleted from the new text which is much shorter
37206	8	65	17			p.65, Fig. 8.10.1. The ICCT has the most up-to-date chart on its website to summarize global fuel consumption standards. Please use that chart to replace this chart.	Fig 8.10.1 now deleted from the new text which is much shorter
22066	8	65	23			"stimulate reductions of vehicle size (as in Europe)" There is absolutely no evidence for this statement. In fact average pan area and footprint are if anythgin slightly increasingin Europe over the last decade. See graph 5.17 and 5.19 of ICCT European vehicle market statistics : http://www.theicct.org/european-vehicle-market-statistics-2012	Accepted. Text deleted
29911	8	65	3	65	9	In this section the London congestion charge or the one in Gothenburg should be discussed as example or role model.	Rejected. Not enough space for details. Conestiion charges are noted in text.
22750	8	65	3	65	9	The paragraph: "Regulatory instruments….'zero emissions vehicle'...(CARB, 2012)" could be read by imply that policy option available is to mandate a certain percentage of ZEVs as was done in California. A disclaimer needs to follow this paragraph to note that life cycle emissions from "ZEVs" could be ~ 25% to 85% of emissions from a conventional gasoline vehicle depending on the electric grid mix.	Discussion of upstream emissions are addressed elsewhere in the chapter.
32773	8	65	32	66	2	Policy design should maintain/enhance horizontal and vertical equity while ensuring the internalization of external costs. Introducing the impacts of policies on specific groups in only a few lines leaves the reader with an incomplete impression and does not help the argument for full-cost, equitable policies.	Equity is addressed several times. No space for expanded discussion.
37203	8	65	6	65	9	Statements such as this one about the types of policies that exist should be connected to evidence of their effectiveness at reducing GHGs. A large number of programs could potentially be mentioned here, and given that space is an issue, programs such as California's should be given as examples of general categories of initiatives and, when possible, compared on similar measures of cost effectiveness in achieving climate change goals.	Accepted. Important point.
20000	8	65	3	65	6	Add a literature about baning high pollutant vehicles, Yang et al. 2010	Rejected. This policy plays minor role relative to other policies, is not widely consdiered, and has equity implications
22067	8	66	11	66	12	The potential improvements won't be realised without regulation. But there is no reason to believe they can't be achieved.	Taken into account
32770	8	66	12	66	14	The assertion of truck manufacturers tending to not have the resources for R&D needs to be defended. A number of truck manufacturers are subsidiaries of larger vehicle manufacturers, such as Mercedes, Volvo and Renault. Reference for HDV use being more varied than LDV as it relate to emissions.	Accepted. Text deleted.
22068	8	66	12	66	13	"and have less R&D capability" but fuel use is a key sales and purchase criterion for HDVs, so in fact it should be easier for manufacturers to focus on this.	Accepted with respect to fuel and carbon taxes.
26567	8	66	25			ADD and because diesel is more concerned by air pollution norms.	Role of air pollution standards is addressed.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
32771	8	66	26	66	30	Activity reduction should refer to reducing vehicle km travelled. Traffic management, better truck routing and ITS for car parking address the efficiency of the activity, rather than its reduction.	Issue of overall efficiency vs emission reduction is addressed in systems section.
32852	8	66	26	66	31	Is the objective "energy efficient modes of travel" or "reduced emissions and mitigation"? Energy efficient modes of travel does not necessarily imply mitigation. Example, "AHSs include advanced vehicle control systems and advanced traffic management/information systems. Barth (1994) has found that if AHSs operate at full capacity, permitting 8000 vehicles per hour rather than the current 2000 vehicles per hour, emissions will increase by a factor of two over current levels. Clearly, in this situation there are potential gains in energy intensity, as well as economic gains by reducing travel times. However, a fourfold increase in vehicles per hour would greatly increase aggregate consumption, and create serious challenges for feeder networks unequipped with AHS. If indeed the objective of this technology is sustainability, this increase in vehicles would require a corresponding increase in fuel efficiency by a factor of four—not readily attainable, particularly given the historically dismal performance of the automobile industry. Furthermore, this assumes consumers would purchase no additional vehicles as a consequence of the perceived travel benefits. Again, this would be unlikely as demonstrated by latent demand. Additional vehicle purchases would greatly increase resource consumption, eroding any potential intensity gains. The potential for AHS to reduce energy and materials intensity is inconclusive, yet not promising." (Rattle, Robert (2010) Computing Our Way to Paradise?, Altamira Press) □[Barth, M.J., Evaluating the Impact of IVHS Technologies on Vehicle Emissions using a Modal emission Model, National Proceedings of the Policy Conference on Intelligent Transportation Systems and the Environment, Arlington, VA, 1994.]	Relationship between effiincy and emissions is acknolwedged, but too compklicated to fully address
37207	8	66	29	66	30	The point about "and smart real-time information to reduce time searching for a parking space" could use a citation, and perhaps a little bit of discussion/quantification.	accepted. Refs added

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
37204	8	66	3	66	49	"LDV standards in place in the US could cut in half fuel consumption per vehicle km between 2010 and 2025 (EPA, 2011). The estimated cost of USD 1800 [note: we show $1836 in Table I-24 of EPA/NHTSA Federal Register preamble dated October 15, 2012, but more commonly cite $1800 as in Table III-8 of the same preamble and in most communications documents] per vehicle for decreasing fleet-wide real world (or on-road) fuel consumption [note: liters/100 km is fuel consumption, the inverse of fuel economy, and it is important to add "real world" or "on-road whatever the authors prefer"to distinguish these values from the levels of the projected standards, which would be lower in fuel consumption space since the standards are based on idealized tests and do not reflect adjustments for real world consumer values] from 8.5 [note: based on 2016 fuel economy value of 27.8 mpg in Table III-4 of preamble cited above"this value is from the EPA staffer who calculated that value and wrote that section of the preamble] l/100 km in 2016 to 5.9 l/100km in 2025 is significantly less than the fuel savings that would accrue to each vehicle even with the low fuel prices in the US. Simulation and cost assessment modeling, based on extensive inputs from industry, indicated that major changes in vehicle technology would be elicited, but that the standards would not by themselves motivate significant shifts away from petroleum-fueled ICEs with PEV shaving [note: not sure about this word selection"other choices could be "achieving" or "accounting for up to the authors] only 2% [note: this 2% value is shown in many tables of the preamble cited above, including Table III-29 and Table III-52] market share if automakers were to meet the 2025 standards based only on economics." On page 39-40 The text in the section 8.6.4 "Fuel carbon intensity" talks about carbon dioxide intensity but the accompanying Table, Table 8.6.1, references "mitigation costs and potentials in GHG reductions". Our question is: with biofuels we can see have you could have zero fossil fuel inputs and therefore 100% reductions in CO2. But how can you have 100% reductions in GHGs as the Table label suggests? Can you please clarify what the 0-100% biofuel GHG emissions reductions are. On page 30. The section entitled "Driving rebound effects" , please add as a reference the most recent David Greene study on the VMT rebound effect, Greene, Energy Policy 2012 "Rebound 2007: Analysis of National Light-Duty Vehicle Travel Statistics", Energy Policy, vol. 41, pp. 14-28, 2012. Below is where the Greene cite should be added. IPCC Report Language: Changes in reaction to lowering the cost of travel (through fuel economy measures or using budget airline operators) is commonly called the (direct) "rebound effect" (Greene et al., 1999). In North America this has been found to be in the range of a "0.05 to "0.30 fuel cost elasticity (e.g. a 50% cut in the fuel cost of driving results in a 2.5% to 15% increase in driving) with some studies finding it is declining and may be at the low end of this range (Hughes et al., 2006; Small and van Dender, 2007; EPA, 2012, Greene, 2012).	Taken into account. The reference is used and the general thust is accepted, but lack of space for addressing these details.
35272	8	66	34	66	36	1) Shanghai and Beijing have different urban size, instead of “similar size(Hao et al., 2011)”. Shanghai and Beijing’s urban areas are 6,340Km2 (same size for urban district area) and 12,187 km2 (16,410 km2 for urban district area), respectively, which are quite different in URBAN AREA. (China Urban Construction Statistical Yearbook, 2012). Moreover, the population density in urban area could be a better indicator when doing the comparison. 2) The comparison between Beijing and Shanghai here is not correct or comprehensive. It is suggested to delete the sentence “Shanghai limited…until recently.’	Rejected. The literature supports the assertions in the text.
23429	8	66	34	66	36	Area of Shanghai is much less than Beijing. The statement that "are of similar size" is wrong. Shanghai has similar affluence but the culture and city size is totally different from Beijing. Rational City planning and urban spatial distribution of function area is also playing key roles in Shanghai to reduce transportation load.	Rejected. Similar size is understood to mean population size.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
20427	8	66	45	66	45	"California created" - this is incorrect, California has just passed legislation (SB375) and is implementing that through the planning process.	accepted. Wording changed
20001	8	66	34	66	49	Low fare in Beijing's public transport is essential to reduce dependence on vehicles. Pls refer to the literature of Feng et al. 2012.	Generasl thought is accepted but not enogh space for details
22069	8	67	10			"relatively inelastic in their response" it should be added "at least in the short term" since their is clearly greater elasticity when people have time to adapt their behaviour.	Taken into account--statement added that "drivers are more elastic when price increases are planned and certain"
37208	8	67	14	67	16	Who made the 2012 commitment?	Text revised
32772	8	67	36	67	38	What is the year of these figures?	figure deleted
25889	8	67	36	67	38	Please specify to which year this figures refer to.	figure deleted
34277	8	67	6	67	6	check for typo: double spacing in “use management; and providing”	editorial--to be copyedited
22070	8	68	10	68	16	The statement here suggests that the shipping policy will necessarily reduce emissions, when in fact it is an energy efficiency design index that has been brought in that serves to improve, which even if met, will do little to cut emissions as growth is expected to continue	Amended in reveised text
30931	8	68	11	68	12	The last sentence mixes IMO requirements – which deal with international shipping – and inland waterways, which are normally covered by national policies. The statement that there are few if any policies promoting advanced fuels for waterborne craft on inland waters is likely not correct.	Reject. No references found - none given here
29543	8	68	13	22		This text is not sufficiently accurate. The date of entry into force of the SEEMP is not correct and should most likely be "from 1 january 2013" (to be checked). A possible reference might be to IMO resolution MEPC.203(62). The reference IMO(2011) and IISD (2011) appear to be press briefings: this would not be acceptable in an IPCC report. Additional suggestions may be found for example on http://www.imo.org/OurWork/Environment/pollutionprevention/airpollution/pages/technical-and-operational-measures.aspx	Amended
30932	8	68	14	68	15	First, there is no overall target for shipping - reference to 10% should be removed. Second, the EEDI targets will be phased in over 2013 to 2025 period - this should be clarified here.	Amended
27830	8	68	16	68	17	The Ship Energy Efficiency Management Plan (SEEMP) already became mandatory on January 1 2013 (IMO, 2011). Please correct the date in the sentence. And 2. - the second part of the sentence "when a minimum energy efficiency level for different ship types and sizes is expected to cover as much as 70% of emissions from new ships and achieve approximately 25-30% reductions by 2030 compared with business-as-usual (IISD, 2011)." is not clear to me. Should this be a mandatory connection for the implementation of the EEDI? In the IMO regulation there is no such option included.	Amended
29192	8	68	16	68	22	The date for SEEMP becoming mandatory is January 2013 not 2015 as stated in the document. Also, the percentage reductions on GHG emissions from applying EEDI and SEEMP mentioned in the same paragraph are not actually stated in the link that IPCC has listed as a reference (IMO 2011). We think it should just say ‘The application of EEDI and SEEMP is expected to reduce CO2 emissions’ or something to that effect.	Amended
22071	8	68	19	68	23	The estimates regarding CO2 emissions of 13% and 23% are, I believe, in relation to a counterfactual baseline, and not real term emissions, this should be made clear.	Accept
31444	8	68	20	68	22	We suppose that this does not refer to absolute emissions - the relevant reference should be indicated (compared to business-as-usual? pr. tonnes kilometre?).	Amended

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
25089	8	68	22			Add after '2011)', "This is a good example of how each sector can contribute to global GHG reductions by taking appropriate and feasible measures relevant to the sector (Yamaguchi 2012). For reference, Yamaguchi M. (2012). Policy and Measures. In: Climate Change Mitigation, A Balanced Approach to Climate Change. M. Yamaguchi, (ed.), Springer Publishing Company, London, UK pp.129–159	Rejected - reference included but addition not needed
22072	8	68	29	68	30	Check that this 50% is in absolute terms, and not (again) relative to some counterfactual baseline.	Accept
29193	8	68	29	68	29	"aviation strategy to reduce carbon emissions by 50% from 2005 to 2050" is an IATA goal not a ICAO goal - this needs to be checked and clarified	Agree; not any more in new version
27155	8	68	31	68	32	A more appropriate reference would be Committee on Climate Change (2009) "Meeting the UK aviation target". This is a very influential study of UK aviation emissions to 2050, which assumed "Likely" fuel efficiency improvement of 0.8%/year and up to 1.5%/year in a "Speculative" scenario.	Reference included; thank you
32188	8	68	36	68	36	Add: Since the 1931 Chicago convention, aviation don't pay taxes on kerosen. It is an abnormal situation, allowing unfair concurrence with other transport mode, particularly to rail over short to mid-distance, and international freight.	Need to check if this important point about kerosene escaping taxation is made in the chapter. If not, it should be.
22073	8	68	39	68	39	the Wood et al., reference does not appear in the references but should be included.	Accept
37209	8	68	39	68	39	Conclusions from Winchester et al. 2013 would be relevant here. That paper found that a nationwide cap-and-trade policy would likely have the unintended consequence of slowing aircraft fleet turnover. Through diverted revenue, technological upgrades would be delayed which would slow GHG reductions. The reference is: Winchester, N., C. Wollersheim, R. Clewlow, N.C. Jost, S. Paltsev, J.M. Reilly and I.A. Waitz (2013). The impact of climate policy on US aviation, Journal of Transport Economics and Policy, 47(1), 1-15. The paper is available online at: http://web.mit.edu/aeroastro/partner/projects/project31.html	Reference included; thank you
29194	8	68	42	68	43	“the emission reduction target is 20% below 1990 levels by 2020, rising to 80-95% below these levels by 2050 (European Climate Foundation, 2011).” Is not correct - the EU ETS target for aviation is 5% below the average of 2004-6 from 2013 onwards. The 20% target referenced here is for the wider ETS and not for the Aviation ETS. This will need to be clarified.	Thank you; excluded in the new version, due to shorter one
30933	8	68	44	69	44	The reference to non-EU airlines is incorrect - the potential applicability delay would apply only to flights that originate outside the EU, or flights whose final destination is outside the EU, for non-EU airlines. There is no deferral of applicability considered for non-EU airliners that are operating within the EU (e.g., origin and destination remain within the EU). In addition, the delay is at this stage only a proposal, it has not yet been approved by the EU Parliament.	OK, excluded in the new version; Thank you
37210	8	68	44	68	44	Malina et al. 2012 is not in bibliography.	Now added thanks
29195	8	68	44	68	46	"The applicability of ETS policy for non-EU airlines (Malina et al., 2012) has been delayed for one year from November 2012 in anticipation of new ICAO initiatives towards a global market-based mechanism for all aviation emissions (ICAO, 2012).” is incorrect and should read “The applicability of ETS policy to non-European routes (Malina et al., 2012) has been delayed for one year following a proposal by the European Commission in November 2012 in anticipation of new ICAO initiatives towards a global market-based mechanism for all aviation emissions”. To clarify the ETS still applies to all non-EU airlines which operate European routes – it is routes between airports in the European Economic Area (EEA) and those not in the EEA which can be exempted if an airline chooses to take advantage of the derogation.	Agreed; Thank you; excluded in the new shorter version

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
23430	8	68	44	68	46	"The applicability of ETS policy for non-EU airlines has been delayed for one year" should be replaced by "flights to or from aerodromes outside the EU has been derogating temporarily from the application of EU ETS policy for one year , but the Directive continues to apply in full in respect of flights between aerodromes in the EU(include the flights of non-EU airlines)"(2012/328 (COD),Proposal for a DECISION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL: derogating temporarily from Directive 2003/87/EC of the European Parliament and of the Council establishing a scheme for greenhouse gas emission allowance trading within the Community)	Agree, but not relevant in the new text; 8.10 is smaller now.
34541	8	68	9	68	9	A new sentence of "Although waterborne transport is a comparatively efficient means in terms of g CO2/ton*km (IMO, 2009) compared to other transport modes," is proposed to be added at the beginning of this paragraph. This is the conclusion drawn from the Figure 8.1.6 contained in Chapter 8 and the report of Second IMO GHG Study 2009 released by IMO, this should be addressed. (Reference: IMO (2009). Second IMO GHG Study 2009. International Maritime Organization, 4 Albert Embankment, London SE1 7SR.)	New version of 8.10 is smaller. Relevant references included.
27829	8	68	9	68	12	The sentence should possibly read: "The IMO has adopted mandatory measures to reduce GHG emissions from international shipping and therewith introduced the first mandatory GHG reduction regime for an international industry sector".	Relevant references included, but no extra text can be added, since new version of 8.10 is smaller.
24695	8	68	3	68	4	Australia is currently investigating the feasibility of high-speed rail, so it may be misleading to state that we are (or are planning to) invest in high-speed rail. Suggest removing the reference to Australia from this sentence	Accepted.
29878	8	68	12	68	12	Too many words : « are unusual » should be deleted	editorial--to be copyedited
40703	8	68	14	68	15	The EEDI targets a 30% energy efficiency improvement from shipping. Therefore, "10% GHG emission reduction target" should be replaced with "30% energy efficiency improvement target". (Source: IMO MEPC 62/24/Add.1 Annex 19, page 11, Table 1)	text deleted.
40704	8	68	15	68	16	The EEDI is based on an energy-efficiency relative and does not have relation to emission targets in absolute terms. Therefore there is no relation to shipping demand. Therefore "The EEDI may not meet the target if shipping demand increases faster than fuel carbon and energy intensities improve." should be deleted.	Rejected. The statement is correct as it stands
24696	8	68	16	68	17	The reference to SEEMP is incorrect. The amendments to Annex VI of MARPOL that introduce the EEDI and SEEMP entered into force on 1 January 2013. Chapter 2 regulation 5, paragraph 4.4 of those amendments provide "For existing ships, the verification of the requirement to have a SEEMP on board according to regulation 22 all take place at the first intermediate or renewal survey identified in paragraph 1 of this regulation, whichever is first, on or after 1 January 2013". Perhaps the sentence was confusing the SEEMP with the EEDI, chapter 4-regulation 21 table 1 of the amendments provide that the first EEDI reduction factors apply from 1 January 2015, except where a waiver consistent with regulation 19 applies. Suggest clarify 1) if the sentence is referring to SEEMP OR the EEDI, and 2) if referring to SEEMP, correct the dates	Amended
40705	8	68	16	68	17	The Ship Energy Efficiency Management Plan (SEEMP) is mandatory requirement which entered into force from January 2013. Therefore "The voluntary Ship Energy Efficiency Management Plan (SEEMP) becomes mandatory from 2015" should be replaced with "The Ship Energy Efficiency Management Plan (SEEMP) becomes mandatory from 2013". (Source: IMO MEPC 62/24/Add.1 Annex 19, page 13, Regulation 22)	Amended
26698	8	68	8			UNFCCC work on sectoral approaches should be mentioned here	Rejected. Not enough space.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
40702	8	68	9	68	11	This achievement is the remarkable as any other industrial sectors have never concluded a similar international mandatory instrument or treaty to address CO2 emissions of that sector. This achievement is regarded as “The most important thing here is that the standards apply to all vessels regardless of a ships' nationality. Although there are some exceptions and grace periods, conditions for these exceptional treatments are the same for all vessels. One of the basic principles of IMO is a nondiscriminatory approach, and also no more favorable treatment of ships. Although several countries argued that the UNFCCC principle of Common but Differentiated Responsibility (CBDR) should be reflected, this has not been accepted as the principle does not conform to the IMO's principle. It is a breathtaking decision to have every country bound by the same standard. This may suggest the image of future international cooperation in the field of climate change (Yamaguchi M., 2012).” In this regard, this should be added after 2011 in line 11. For reference: Yamaguchi M. (2012). Policy and Measures. In: Climate Change Mitigation, A Balanced Approach to Climate Change. M. Yamaguchi, (ed.), Springer Publishing Company, London, UK pp.136-138	Reference included
26699	8	68	23			UNFCCC work on sectoral approaches should be mentioned here	Not clear what this means
24697	8	68	24	68	25	The phrase "After the Kyoto Protocol assigned the responsibility for international aviation GHG emission 25 reductions to the International Civil Aviation Organisation (ICAO) (Petersen, 2008)" is incorrect. Suggest that it should be removed. The rest of the first sentence is correct. The Kyoto Protocol (KP) does not "assign[ed] the responsibility for international aviation GHG emission reductions to the International Civil Aviation Organisation (ICAO)". Provisions of the KP are only binding on countries Party to that Protocol. They are not binding on international organisations, such as ICAO. As such the KP cannot "assign responsibility" to ICAO. Instead, as stated its Article 2.2, the Kyoto Protocol directs "Parties to the Kyoto Protocol included in Annex I to the UN Framework Convention on Climate Change" to pursue international aviation GHG emission limitation/reduction working through ICAO. ICAO is a UN specialized agency created in 1944 to, among other things, sets standards and regulations necessary for aviation environmental protection.	Thank you, agree. The text not anylonger in new shorter version
28983	8	68	28	68	29	The statement "global aviation strategy to reduce carbon emissions by 50% from 2005 to 2050", should be removed from this paragraph. While this goal has been adopted by the aviation industry, it was not adopted by ICAO member States and was not reflected in ICAO Assembly resolution A37-19 (available in the following link: http://www.icao.int/environmental-protection/Documents/AA37-Env-Resos-9958.pdf).	Agree; Thank you.
40706	8	68	28	68	32	"In 2010, the 190 states subscribing to ICAO agreed on a non-binding, global aviation strategy to reduce carbon emissions by 50% from 2005 to 2050; to improve fuel efficiency by an average of 2% per annum until 2050; achieve carbon neutral growth from 2020; and establish a medium-term global goal from 2020 (ICAO, 2010b)." The sentence includes the elements which are not ones of global aspirational goals adopted at the ICAO Assembly in 2010. "to reduce carbon emissions by 50% from 2005 to 2050" was not adopted at ICAO in 2010. In this regard, the sentence should be replaced with “In 2010, the 37th Session of the ICAO Assembly adopted global aspirational goals for the international aviation sector to improve fuel efficiency by an average of 2% per annum until 2050 and to keep its global net carbon emissions from 2020 at the same level.”	Removed in the new shorter version. Thank you.
40707	8	68	31	68	32	"These aspirational goals exceed the assumptions made in many scenarios (e.g. (Mayor and Tol, 2010))." The sentence is ambiguous because, for example, examples of scenarios are not shown. In this regard, the sentence should be deleted.	Reference given with the details

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
40708	8	68	40	68	44	"The only current binding policy to mitigate emissions is the inclusion of air transport in the EU emission trading scheme (ETS) (Anger, 2010; Petersen, 2008), The EU is currently responsible for 35% of global aviation emissions (Preston et al., 2012) and the emission reduction target is 20% below 1990 levels by 2020, rising to 80-95% below these levels by 2050 (European Climate Foundation, 2011)." The parts of the sentence should be deleted and replaced as follows: 1) The part of the sentence "The only current binding policy to mitigate emissions is the inclusion of air transport in the EU emission trading scheme (ETS) (Anger, 2010; Petersen, 2008) should be deleted because EU-ETS is not the only binding policy to mitigate aviation emissions. (e.g. Australia's carbon tax for its domestic airlines), and 2) The part of the sentence "The EU is currently responsible for 35% of global aviation emissions (Preston et al., 2012)" should be replaced with "Preston et al.(2012) estimated that the EU is currently responsible for 35% of global aviation emissions.". ICAO and its member States have not decided any attribution of specific obligations to individual States. In this regard, Preston et al.(2012) was supposed to use its own method of estimating EU share of global aviation emissions.	Taken the paragraph out, due to shorter new version.
28984	8	68	42	68	43	The statement "the emission reduction target is 20% below 1990 levels by 2020, rising to 80-95% below these levels by 2050" is misleading as it seems to be specific to aviation while it is not. The target is for all sectors combined.	Agreed; deleted
40709	8	68	44	68	46	"The applicability of ETS policy for non-EU airlines (Malina et al., 2012) has been delayed for one year from November 2012 in anticipation of new ICAO initiatives towards a global market-based mechanism for all aviation emissions (ICAO, 2012)." The reference (ICAO, 2012) does not describe a causal connection between the former and the latter parts of the sentence. In this regard, "in anticipation of new ICAO initiatives towards a global market-based mechanism for all aviation emissions" should be deleted.	Agreed; thank you.
22074	8	69	1	69	1	The use of biofuels in aviation is promoted through the zero-carbon rating given to sustainable biofuels under the ETS. The EC is also working with the aviation industry to introduce 2Mt of biofuels in aviation by 2020 (2020 Flightpath).	reference included; Thank you
22075	8	69	1	69	5	A comment regarding the sustainability of the biofuel assumed is needed here, otherwise it reads as if this is a solution without barriers. It should be made clear that these biofuels face exactly the same challenge as other biofuels in terms of delivering GHG savings as well as the other challenges of competition for land, food prices, water, environmental impacts etc. In particular since vegetable oil based biofuels tend to perform worse than starch and sugar based ones due to the greater demand for land area.	Reject - covered in Bioenergy Annex and deleted from here
22076	8	69	10	69	11	The comment that constraints on fuel efficiency improvements being possibly due to 'increasing lead-times' required for certification, may be one issue, but technnical constraints given how much progress has arleady been made by aviation compared with other modes, should also be cited.	Accept - but too specific for here. not any longer relevant due to a shorter version of 8.10
27157	8	69	14	69	16	Benefits of market instruments apply to all sectors not just aviation, so this point is not specific to this discussion. It should be covered in one of the other chapters (on instruments).	Accept -is in policy chapters covered on instruments
22077	8	69	16	69	17	Reference list here should certainly include the analysis of including aviation in the EU's Emissions Trading Scheme published in a Tyndall Working paper and in a book edited by Upham et al., entitled Aviation in a low carbon EU, by Bows, Anderson et al., 2007.	Reference included already in Ref Chapter part/end; not any text could be added due to a shorter version of 8.10
33517	8	69	19			This sentence should be re-formulated. Where aviation has energy efficiencies similar to the car, the problem of distances covered remains. One hour of flight time corresponds to 6-8 hours of car driving, and efficiencies are thus only one aspect in terms of GHG. Switching to train and bus thus remains important, as is to prevent switching from car driving to flying, irrespective of specific emission factors per pkm.	Thank you; useful but not relevant in a new shorter 8.10

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
33518	8	69	22			Please add reference: OECD & UNEP (2011). Climate Change and Tourism Policy in OECD Countries. Organization of Economic Co-operation and Development (OECD) and United Nations Environment Programme (UNEP), Paris, France.	Reject- not clear what it adds to current text.
37211	8	69	24	69	37	This section is very repetitive with previous sections. Recommend combining it into those previous sections instead of having it stand alone here.	Committee on climate Change, 2009, already as reference; UNEP included, Thank you.
27156	8	69	3	69	4	Again, credible reference (also independent from industry) is Committee on Climate Change (2009) "Meeting the UK aviation target". This has scenarios for biofuel penetration of 10-30% by 2050, and was used as the basis for UNEP "Bridging the Gap" study assumptions on aviation biofuels. Our study of global bioenergy (CCC (2011), "Bioenergy Review") broadly confirmed these as sensible assumptions given scarce bioenergy resource and competition from other (non-transport) sectors.	Comm-tee on climate Change, 2009, already as reference; UNEP included, Thank you.
37212	8	69	36	69	37	Please add to the following sentence: "Policies to support the building of more roads, airports and other infrastructure can help relieve congestion in the short term but also induce travel demand (Duranton and Turner, 2011)." Make it "Policies to support the building of more roads, airports and other infrastructure can help relieve congestion in the short term but also induce travel demand (Duranton and Turner, 2011) and create GHG emissions from construction (Chester and Horvath)."	Accepted
37213	8	69	38	70	11	p.69-70. Regarding gaps, one of them is that the infrastructure requirement for new transportation fuels (low-carbon transportation fuels such as electricity, hydrogen, and biofuels) is less understood. Please add a paragraph on this.	Accept h
32774	8	69	39	69	43	It has been stated that elasticities are low towards fuel cost except there is certainty in the magnitude and direction of the change. Much of the LDV discussion refers to research which has made assumptions on the costs of components for novel vehicle powertrains. This is the greatest source of concern as assumed rates of learning, cost decreases and associated impacts cannot be determined robustly.	Accept but not sure how to include given limited space
23432	8	69	39	69	40	The prices of crude oil products and other fossil fuel price fluctuation are uncertainties with the energy market. These are caused by intrinsic dynamics and external shocks but not knowledge gaps. The mitigation potential of the transportation are facing such kind of uncertainties.	Comment covered by new revised text of 8.11 and Chapter 7
37214	8	69	41	69	41	Why is "fuel cells" italicized here?	Editorial
32189	8	69	42	69	42	Add a paragraph: Flight rescheduling. Aviation emits GHG but also provokes formation of contrails and less well known contrail-induced cirrus, whose radiative power is one to four time that of its GHG (IPCC 1999, Sausen et al. 2005, Haywood et al. 2009, Burkardt and Karcher 2011). Flight at lower altitude when conditions are favourable to contrail formation, particularly in night and winter, can reduce it by 45% (Fichter et al. 2005, Stubert et al. 2006, Neuwinger and Burkardt 2012). Burkarhdt U, Kärcher B 2011 Global radiative forcing from contrail cirrus. Nature Climate Change, 1, 54-58 Fichter C, Marquart S, Sausen R, Lee D 2005 The impact of cruise altitude on contrails and relative radiative forcing. Meteorol. Zeitschrift, 14, 563-572 Haywood J et al. 2009 A case study of the radiative forcing of persistent contrails evolving into contrail-induced cirrus. J Geophys Res 114, D24201, doi:10.1029/2009JD012650 IPCC, 1999 - J.E.Penner, D.H.Lister, D.J.Griggs, D.J.Dokken, M.McFarland (Eds.) Aviation and the Global Atmosphere. Cambridge University Press, UK. pp 373. Available from www.ipcc.ch Newwinger C, Burkardt U 2012 Sensitivity of contrail cirrus radiative forcing to air traffic scheduling. J Geophys Res, 117, D10205, doi:10.1029/2011JD016736 Sausen R et al. 2005 Aviation radiative forcing in 2000: An update on IPCC (1999). Meteorol Zeitschrift, 14, 555-561 Stuber N, Forster P, Rädel G, Shine K 2006 The importance of the diurnal and annual cycle of air traffic for contrail radiative forcing. Nature, 441, 864-867	Useful for 8.3 - not for Gaps. Some references already in Ref part of Chapter/end; chapter shorter, including 8.10, so no additional text possible. agree with comment

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
23433	8	69	44	69	45	There is little knowledge of people's willingness to pay for "green" properties and its relative importance to transportation service elements such as convenice, comfort, easy access and even flaunt	Agree but too detailed
22078	8	69	46	69	47	A 'gap' is identified in the understanding of consumer behaviour in relation to aviation, yet there has been work by Randles and Mander (and vice-versa) specifically on this issue. See for instance: Randles and Mander regading air transport demand and consumer behaviour, e.g. Aviation consumption and the Climate Change debate, Technology Analysis and Strategic Management, 21, No1, Jan 2009, 93-113).	Accept
30934	8	69	6	69	11	There is no reference to the work at ICAO in the development of a global CO2 standard. Suggest the following text be added to the end of this paragraph "Work is also underway at ICAO to define a CO2 standard for new airplanes, targeting 2015 for completion".	Agree, but not relevant in the new version of 8.10 Sectoral policies
27831	8	69	8			This sentence should probably read: "The IMO has adopted mandatory measures to reduce GHG emissions from international shipping and therewith introduced the first mandatory GHG reduction regime for an international industry sector."	Accepted
23431	8	69	18	69	18	Add one sentece before "Complementary policies": While developing green technologies, operational measures and related policies to ensure an optimum balance between the growth of aviation and the need to protect the environment. (ICAO Environmental Report 2010)	Thank you; 8.10 is shorter now, so not possible to add anything;
20428	8	69		70		Discussion of knowledge seems overly pessimistic about what is known.	Reject. Balance aimed for
25443	8	69	44	69	4	A coherent framework for using the insights of behavioral economics (such as presented in Della Vigna, Psychology and Economics, Journal of Economic Literature, 2009) to predict mobility behavior systematically seems to be lacking. Would not that be an important gap in knowledge, too?	Accept.
32182	8	7	1	7	2	Suppress	Not clear why? Reject
34896	8	7	1			Detail: Please rephrase "transporting materials" to make it clearer, probably "demand for transport service of materials" is meant.	Accept
22079	8	70	12	70	12	A gap omitted here is how shifting patterns of trade, due to the decarbonisation agenda, or climate impacts, may in turn influence freight transport, particularly shipped freight, although preliminary work has been done by Mander et al, and will be done within a new EPSRC funded project 'shipping in a changing climate' at UCL/Manchester/Southampton/Newcastle/Strathclyde.	Accept, There is currently little published research on this subject. We are aware of the UK 'Low Carbon Shipping' research projects and will enquire if they have produced relevant outputs.
37215	8	70	9	70	11	Why just focus on Shanghai? Or at least emphasize that it is one of several examples. Beijing and other cities in China have also been expanding their subway systems at a rapid rate. Also this sentence does not seem an appropriate way to end the chapter. Perhaps instead summarize conclusions?	Accept - though conclusions are in Eec Summary - not here.
22745	8	71				References in chapter 8 reflect a bias towards papers from (some) lead authors at the expense of balance. This (understandable) bias lowers the credibility of the chapter. Without naming specific individuals (one LA self-cites 24 times in the body and tables of the report to 9 separate publications). I urge the CLAs and LAs to remove some of their self-citations and add a more diverse set of references. The point is the science.	Accept - these were largely placeholders and now removed.
26353	8	73	30	73	35	A duplication of the reference to the same document	Accept
26352	8	73	7	73	10	A duplication of the reference to the same document	Accept
26354	8	75	16	75	23	A duplication of the reference to the same document	Accept
26355	8	78	13	78	19	A duplication of the reference to the same document	Accept
20098	8	8	1	8	1	I honnestly don't like this structure wih 11 sections, which is not a structure (which should typically have 2-4 sections with subsections). If authors have the possibiliy, while shortening susbstantially, to "repack" this 11 in 3, 4 ou 5 more robusts sections, this would be more readable	Reject- sections set by IPCC bureau so cannot change

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
20099	8	8	1	8	1	The title 8.1 "Freight and passenger transport" is not very illustrative of what is in this section. Should ie be renamed by "Drivers of transport demand" ? 81 is actually a combination of data on emissions, general socio-economic context, etc. which explains the difficulty to give it a tittle ? Again, while shortening, improve the structure ! See for example 8.1.1 "the context..." whih deals with GHG emissions, so does 8.1.2, what explains the existence of two distinct sub-sections. It honnestly does not jump at the reader Same 8.1.1 mentions "land, air and water", which means "all mode": why not saying only "the context of transport", and deals really with the socio-economic context ?	Accept 8.1 is fixed as above. 8.1.1 and 8.1.2 headings deleted. We are constrained in our choice of section and sub-section headings. Remaineder of the comment is rather confusing.
21924	8	8	11	8	11	"In spite of… various transport policies implemented over the past few decades". This comment is relevant for land-based transport modes but is not relevant for international aviation and shipping where policies around energy efficiency have not been implemented until 2013.	Accept -amended. But the text not anymore in new draft
21925	8	8	11	8	12	It would be helpful here to have some transport indicators in addition to the CO2 indicator. I.e. passenger or freight-tonne km timeline by mode of transport.	Accept- see later in text. Figure 8.1.6 expresses GHG emissions as a ratio of pass-kms and tonne-kms - the main activity measures for transport
23387	8	8	12			Aviation should be Internal Aviation or Domestic Aviation.	Accept - amended
21926	8	8	19	8	21	Be explicit about units of transport growth.	Noted. Text was revised and shortened in the part. This is the introduction, empirical data is to be found further down in the chapter.
36960	8	8	2	8	2	Clarify - does this refer to a trend since 1970?	Accept -amended
36963	8	8	24	8	24	It appears that the two instances of "CO2" here should be "CO2-eq." Please check this.	Section deleted to reduce length
26525	8	8	27			take out; (as discussed in this chapter)	Accept - reworded
21921	8	8	3	8	3	Was the temporary decline across all modes of transport? This sentence implies it was, but is this right if the data is split into passenger and freight and by mode?	Section deleted to reduce length
34897	8	8	3			Detail: add after "2008)" "since AR4"	Section deleted to reduce length
34525	8	8	30	8	30	"and ship fuel" is suggested to be added after "vehicle fuel", since as mentioned before, LNG are already used by ships and IMO is pushing forward this issue.	Accept - reworded. The temporary decline varied by pass and freight and by mode. We do not, however, feel that it is necessary to provide disaggregated on the extent of the decline.
30310	8	8	30	8	30	The phrase "unconventional oil and gas" should be revised to "unconventional gas" because this sentence refers only to the renewed interest in natural gas as a vehicle fuel.	Section deleted to reduce length
27135	8	8	4	8	7	It is confusing having EJ and CO2 in the same paragraph. They should be separate paras or just stick to CO2 if changes are proportional.	Accept- reworded
24039	8	8	6			"increasing faster rate than any other energy enduse sector" fits well in SPM	Accept
21922	8	8	7			An additional 15% associated with the production of fuel should be added to these emissions to give the full picture of transport GHG emissions.	Accept-reworded - and covered later in text too.
21923	8	8	9	8	9	In places, all transport modes are lumped together in a broad generalisation that does not provide a clear picture for mitigation. Here the "slow turnover of stock" is much more relevant to aviation (and shipping) than it is to road transport (particularly passenger road transport in OECD nations).	Accept - amended. But not relevant in the new shorter version
36961	8	8	9	8	9	p. 8, line 9. "huge sunk costs" Authors probably mean something like "huge future costs to rebuild a low-emissions transport system."	Reject. Sunk costs already spent.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
29847	8	8	19	8	20	Unclear : « freight transport had grown more rapidly than passenger transport, mainly through the use of heavy duty road vehicles (HDVs) and shipping for international movements; » what does « movements » refers to ? Wouldn't it be clearer to replace it by « exchanges » ?	Section deleted to reduce length. This statement does need to be clarified, especially as it does not specify the metric being used to compare growth rates for passenger and freight transport. The term 'freight movement' should be used.
19992	8	8	2	8	11	Lack of freight/passenger transport activity data at global or regional level. Pls add the trend figure/table.	Reject- covered later. Such data is currently lacking
23386	8	8	2	8	11	Lack of freight/passenger transport activity data at global or regional level. Pls add the trend figure/table.	As above. The chapter contains as much statistical data as we are able to find at a global level.
29848	8	8	27	9	11	Lack of references : this list of new developments in the sector is really appropriate and enlights the purpose of this chapter, but it would be helpful to the readers to give the appropriate references for each of these assertions (giving credits to the works that demonstrated the existence of these new developments)	Accept- amended to give sections where details and refs can be found.
29799	8	8	27	9	11	The said lacks any references and has problems in sentence construction. It can be easily dropped as the same ideas repeat later.	Amended
19991	8	8	7	8	7	7.0 Gt should be modified as "nearly 7.0 Gt" according to the data (6.7558 Gt)of (IEA 2012b), or this figure will not match with that in Line 11 page 14.	Accepted+Q548

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32508	8	801		802		The page numbers refer to the pages of the pdf document (and do not coincide with the page numbers as printed in the bottom right of the document. Life Cycle Assessment (LCA) is standardused by ISO with that name. Therefore, it should never be referred to as Life Cycle Analysis. Furthermore, once defined, it can be referred to simply as "LCA". Many important works of Brandão et al. (e.g. 2013) and Levasseur are missing, which are particular relevant to chapters 8 and 11. These are: -Brandão M, Levasseur A, Kirschbaum M, Cowie A, Weidema B, Jørgensen SV, Hauschild M, Chomkhamsri K, Pennington D (2013) Key issues and options in accounting for carbon sequestration and temporary storage in life cycle assessment and carbon footprinting. The International Journal of Life Cycle Assessment 18 (1) 230-240. DOI: 10.1007/s11367-012-0451-6. http://link.springer.com/article/10.1007%2Fs11367-012-0451-6 -Levasseur A, Lesage P, Margni M, Brandão M, Samson R (2012) Assessing temporary carbon sequestration and storage projects through land use, land-use change and forestry: comparison of dynamic life cycle assessment with ton-year approaches. Climatic Change. DOI: 10.1007/s10584-012-0473-x. http://www.springerlink.com/content/b3251u56v728m870/?MUD=MP13. -Levasseur A, Brandão M, Lesage P, Margni M, Pennington D, Clift R, Samson S (2012) Valuing temporary carbon storage. Nature Climate Change 2, 6–8. doi:10.1038/nclimate1335. http://www.nature.com/nclimate/journal/v2/n1/full/nclimate1335.html. -Brandão M, Mila i Canals L, Clift R (2011) Soil Organic Carbon changes in the cultivation of energy crops: implications for GHG balances and soil quality for use in LCA. Biomass & Bioenergy35 (6). 2323–2336. Special issue: Modelling Environmental, Economic and Social Aspects in the Assessment of Biofuels. http://www.sciencedirect.com/science/article/pii/S0961953409002402 -Brandão M, Clift R, Mila I Canals L, Basson L (2010) A Life-Cycle Approach to Characterising Environmental and Economic Impacts of Multifunctional Land-Use Systems: An Integrated Assessment in the UK. Sustainability 2(12): 3747-3776. Special issue: Life Cycle Sustainability Assessment. http://www.mdpi.com/2071-1050/2/12/3747/pdf -Mueller-Wenk R and Brandão M (2010) Climatic impact of land use in LCA - carbon transfers between vegetation/soil and air. The International Journal of Life Cycle Assessment 15(2) 172-182. http://www.springerlink.com/content/02628184t2q98051/fulltext.pdf -Brandão M (2012) Food, Feed, Fuel, Timber or Carbon Sink? Towards Sustainable Land Use: a consequential life cycle approach. Springer. 125pp. -Brandão M (2012) Food, Feed, Fuel, Timber or Carbon Sink? Towards Sustainable Land Use: a consequential life cycle approach. PhD thesis. Centre for Environmental Strategy (Division of Civil, Chemical and Environmental Engineering), Faculty of Engineering and Physical Sciences, University of Surrey, UK. 246 pp. Appendices 541 pp. -Mulligan D, Edwards R, Marelli L, Scarlat N, Brandão M, Monforti-Ferrario F (2010) The effects of increased demand for biofuel feedstocks on the world agricultural markets and areas. Luxembourg: Publications Office of the European Union. ISBN 978-92-79-16220-6. http://publications.jrc.ec.europa.eu/repository/bitstream/111111111/16193/1/en24464_iluc%20workshop.pdf -Brandão M, Levasseur A (2011) Assessing temporary carbon storage in life cycle assessment and carbon footprinting: outcomes of an expert workshop. Joint Research Centre, European Commission, Ispra, Italy	Assume this refers to LCA Annex. LCA largely deleted from Ch 8

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32509	8	806				The page numbers refer to the pages of the pdf document (and do not coincide with the page numbers as printed in the bottom right of the document. Life Cycle Assessment (LCA) is standardused by ISO with that name. Therefore, it should never be referred to as Life Cycle Analysis. Furthermore, once defined, it can be referred to simply as "LCA". Many important works of Brandão et al. (e.g. 2013) and Levasseur are missing, which are particular relevant to chapters 8 and 11. These are: -Brandão M, Levasseur A, Kirschbaum M, Cowie A, Weidema B, Jørgensen SV, Hauschild M, Chomkhamsri K, Pennington D (2013) Key issues and options in accounting for carbon sequestration and temporary storage in life cycle assessment and carbon footprinting. The International Journal of Life Cycle Assessment 18 (1) 230-240. DOI: 10.1007/s11367-012-0451-6. http://link.springer.com/article/10.1007%2Fs11367-012-0451-6 -Levasseur A, Lesage P, Margni M, Brandão M, Samson R (2012) Assessing temporary carbon sequestration and storage projects through land use, land-use change and forestry: comparison of dynamic life cycle assessment with ton-year approaches. Climatic Change. DOI: 10.1007/s10584-012-0473-x. http://www.springerlink.com/content/b3251u56v728m870/?MUD=MP13. -Levasseur A, Brandão M, Lesage P, Margni M, Pennington D, Clift R, Samson S (2012) Valuing temporary carbon storage. Nature Climate Change 2, 6–8. doi:10.1038/nclimate1335. http://www.nature.com/nclimate/journal/v2/n1/full/nclimate1335.html. -Brandão M, Mila i Canals L, Clift R (2011) Soil Organic Carbon changes in the cultivation of energy crops: implications for GHG balances and soil quality for use in LCA. Biomass & Bioenergy35 (6). 2323–2336. Special issue: Modelling Environmental, Economic and Social Aspects in the Assessment of Biofuels. http://www.sciencedirect.com/science/article/pii/S0961953409002402 -Brandão M, Clift R, Mila I Canals L, Basson L (2010) A Life-Cycle Approach to Characterising Environmental and Economic Impacts of Multifunctional Land-Use Systems: An Integrated Assessment in the UK. Sustainability 2(12): 3747-3776. Special issue: Life Cycle Sustainability Assessment. http://www.mdpi.com/2071-1050/2/12/3747/pdf -Mueller-Wenk R and Brandão M (2010) Climatic impact of land use in LCA - carbon transfers between vegetation/soil and air. The International Journal of Life Cycle Assessment 15(2) 172-182. http://www.springerlink.com/content/02628184t2q98051/fulltext.pdf -Brandão M (2012) Food, Feed, Fuel, Timber or Carbon Sink? Towards Sustainable Land Use: a consequential life cycle approach. Springer. 125pp. -Brandão M (2012) Food, Feed, Fuel, Timber or Carbon Sink? Towards Sustainable Land Use: a consequential life cycle approach. PhD thesis. Centre for Environmental Strategy (Division of Civil, Chemical and Environmental Engineering), Faculty of Engineering and Physical Sciences, University of Surrey, UK. 246 pp. Appendices 541 pp. -Mulligan D, Edwards R, Marelli L, Scarlat N, Brandão M, Monforti-Ferrario F (2010) The effects of increased demand for biofuel feedstocks on the world agricultural markets and areas. Luxembourg: Publications Office of the European Union. ISBN 978-92-79-16220-6. http://publications.jrc.ec.europa.eu/repository/bitstream/111111111/16193/1/en24464_iluc%20workshop.pdf -Brandão M, Levasseur A (2011) Assessing temporary carbon storage in life cycle assessment and carbon footprinting: outcomes of an expert workshop. Joint Research Centre, European Commission, Ispra, Italy	This comment is a repetition of comment no 32508 and hence not addressed here again.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
32510	8	810				The page numbers refer to the pages of the pdf document (and do not coincide with the page numbers as printed in the bottom right of the document. Life Cycle Assessment (LCA) is standardused by ISO with that name. Therefore, it should never be referred to as Life Cycle Analysis. Furthermore, once defined, it can be referred to simply as "LCA". Many important works of Brandão et al. (e.g. 2013) and Levasseur are missing, which are particular relevant to chapters 8 and 11. These are: -Brandão M, Levasseur A, Kirschbaum M, Cowie A, Weidema B, Jørgensen SV, Hauschild M, Chomkhamsri K, Pennington D (2013) Key issues and options in accounting for carbon sequestration and temporary storage in life cycle assessment and carbon footprinting. The International Journal of Life Cycle Assessment 18 (1) 230-240. DOI: 10.1007/s11367-012-0451-6. http://link.springer.com/article/10.1007%2Fs11367-012-0451-6 -Levasseur A, Lesage P, Margni M, Brandão M, Samson R (2012) Assessing temporary carbon sequestration and storage projects through land use, land-use change and forestry: comparison of dynamic life cycle assessment with ton-year approaches. Climatic Change. DOI: 10.1007/s10584-012-0473-x. http://www.springerlink.com/content/b3251u56v728m870/?MUD=MP13. -Levasseur A, Brandão M, Lesage P, Margni M, Pennington D, Clift R, Samson S (2012) Valuing temporary carbon storage. Nature Climate Change 2, 6–8. doi:10.1038/nclimate1335. http://www.nature.com/nclimate/journal/v2/n1/full/nclimate1335.html. -Brandão M, Mila i Canals L, Clift R (2011) Soil Organic Carbon changes in the cultivation of energy crops: implications for GHG balances and soil quality for use in LCA. Biomass & Bioenergy35 (6). 2323–2336. Special issue: Modelling Environmental, Economic and Social Aspects in the Assessment of Biofuels. http://www.sciencedirect.com/science/article/pii/S0961953409002402 -Brandão M, Clift R, Mila I Canals L, Basson L (2010) A Life-Cycle Approach to Characterising Environmental and Economic Impacts of Multifunctional Land-Use Systems: An Integrated Assessment in the UK. Sustainability 2(12): 3747-3776. Special issue: Life Cycle Sustainability Assessment. http://www.mdpi.com/2071-1050/2/12/3747/pdf -Mueller-Wenk R and Brandão M (2010) Climatic impact of land use in LCA - carbon transfers between vegetation/soil and air. The International Journal of Life Cycle Assessment 15(2) 172-182. http://www.springerlink.com/content/02628184t2q98051/fulltext.pdf -Brandão M (2012) Food, Feed, Fuel, Timber or Carbon Sink? Towards Sustainable Land Use: a consequential life cycle approach. Springer. 125pp. -Brandão M (2012) Food, Feed, Fuel, Timber or Carbon Sink? Towards Sustainable Land Use: a consequential life cycle approach. PhD thesis. Centre for Environmental Strategy (Division of Civil, Chemical and Environmental Engineering), Faculty of Engineering and Physical Sciences, University of Surrey, UK. 246 pp. Appendices 541 pp. -Mulligan D, Edwards R, Marelli L, Scarlat N, Brandão M, Monforti-Ferrario F (2010) The effects of increased demand for biofuel feedstocks on the world agricultural markets and areas. Luxembourg: Publications Office of the European Union. ISBN 978-92-79-16220-6. http://publications.jrc.ec.europa.eu/repository/bitstream/111111111/16193/1/en24464_iluc%20workshop.pdf -Brandão M, Levasseur A (2011) Assessing temporary carbon storage in life cycle assessment and carbon footprinting: outcomes of an expert workshop. Joint Research Centre, European Commission, Ispra, Italy	This comment is a repetition of comment no 32508 and hence not addressed here again.

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32511	8	822				The page numbers refer to the pages of the pdf document (and do not coincide with the page numbers as printed in the bottom right of the document. Life Cycle Assessment (LCA) is standardused by ISO with that name. Therefore, it should never be referred to as Life Cycle Analysis. Furthermore, once defined, it can be referred to simply as "LCA". Many important works of Brandão et al. (e.g. 2013) and Levasseur are missing, which are particular relevant to chapters 8 and 11. These are: -Brandão M, Levasseur A, Kirschbaum M, Cowie A, Weidema B, Jørgensen SV, Hauschild M, Chomkhamsri K, Pennington D (2013) Key issues and options in accounting for carbon sequestration and temporary storage in life cycle assessment and carbon footprinting. The International Journal of Life Cycle Assessment 18 (1) 230-240. DOI: 10.1007/s11367-012-0451-6. http://link.springer.com/article/10.1007%2Fs11367-012-0451-6 -Levasseur A, Lesage P, Margni M, Brandão M, Samson R (2012) Assessing temporary carbon sequestration and storage projects through land use, land-use change and forestry: comparison of dynamic life cycle assessment with ton-year approaches. Climatic Change. DOI: 10.1007/s10584-012-0473-x. http://www.springerlink.com/content/b3251u56v728m870/?MUD=MP13. -Levasseur A, Brandão M, Lesage P, Margni M, Pennington D, Clift R, Samson S (2012) Valuing temporary carbon storage. Nature Climate Change 2, 6–8. doi:10.1038/nclimate1335. http://www.nature.com/nclimate/journal/v2/n1/full/nclimate1335.html. -Brandão M, Mila i Canals L, Clift R (2011) Soil Organic Carbon changes in the cultivation of energy crops: implications for GHG balances and soil quality for use in LCA. Biomass & Bioenergy35 (6). 2323–2336. Special issue: Modelling Environmental, Economic and Social Aspects in the Assessment of Biofuels. http://www.sciencedirect.com/science/article/pii/S0961953409002402 -Brandão M, Clift R, Mila I Canals L, Basson L (2010) A Life-Cycle Approach to Characterising Environmental and Economic Impacts of Multifunctional Land-Use Systems: An Integrated Assessment in the UK. Sustainability 2(12): 3747-3776. Special issue: Life Cycle Sustainability Assessment. http://www.mdpi.com/2071-1050/2/12/3747/pdf -Mueller-Wenk R and Brandão M (2010) Climatic impact of land use in LCA - carbon transfers between vegetation/soil and air. The International Journal of Life Cycle Assessment 15(2) 172-182. http://www.springerlink.com/content/02628184t2q98051/fulltext.pdf -Brandão M (2012) Food, Feed, Fuel, Timber or Carbon Sink? Towards Sustainable Land Use: a consequential life cycle approach. Springer. 125pp. -Brandão M (2012) Food, Feed, Fuel, Timber or Carbon Sink? Towards Sustainable Land Use: a consequential life cycle approach. PhD thesis. Centre for Environmental Strategy (Division of Civil, Chemical and Environmental Engineering), Faculty of Engineering and Physical Sciences, University of Surrey, UK. 246 pp. Appendices 541 pp. -Mulligan D, Edwards R, Marelli L, Scarlat N, Brandão M, Monforti-Ferrario F (2010) The effects of increased demand for biofuel feedstocks on the world agricultural markets and areas. Luxembourg: Publications Office of the European Union. ISBN 978-92-79-16220-6. http://publications.jrc.ec.europa.eu/repository/bitstream/111111111/16193/1/en24464_iluc%20workshop.pdf -Brandão M, Levasseur A (2011) Assessing temporary carbon storage in life cycle assessment and carbon footprinting: outcomes of an expert workshop. Joint Research Centre, European Commission, Ispra, Italy	This comment is a repetition of comment no 32508 and hence not addressed here again.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
32512	8	824		828		The page numbers refer to the pages of the pdf document (and do not coincide with the page numbers as printed in the bottom right of the document. Life Cycle Assessment (LCA) is standardused by ISO with that name. Therefore, it should never be referred to as Life Cycle Analysis. Furthermore, once defined, it can be referred to simply as "LCA". Many important works of Brandão et al. (e.g. 2013) and Levasseur are missing, which are particular relevant to chapters 8 and 11. These are: -Brandão M, Levasseur A, Kirschbaum M, Cowie A, Weidema B, Jørgensen SV, Hauschild M, Chomkhamsri K, Pennington D (2013) Key issues and options in accounting for carbon sequestration and temporary storage in life cycle assessment and carbon footprinting. The International Journal of Life Cycle Assessment 18 (1) 230-240. DOI: 10.1007/s11367-012-0451-6. http://link.springer.com/article/10.1007%2Fs11367-012-0451-6 -Levasseur A, Lesage P, Margni M, Brandão M, Samson R (2012) Assessing temporary carbon sequestration and storage projects through land use, land-use change and forestry: comparison of dynamic life cycle assessment with ton-year approaches. Climatic Change. DOI: 10.1007/s10584-012-0473-x. http://www.springerlink.com/content/b3251u56v728m870/?MUD=MP13. -Levasseur A, Brandão M, Lesage P, Margni M, Pennington D, Clift R, Samson S (2012) Valuing temporary carbon storage. Nature Climate Change 2, 6–8. doi:10.1038/nclimate1335. http://www.nature.com/nclimate/journal/v2/n1/full/nclimate1335.html. -Brandão M, Mila i Canals L, Clift R (2011) Soil Organic Carbon changes in the cultivation of energy crops: implications for GHG balances and soil quality for use in LCA. Biomass & Bioenergy35 (6). 2323–2336. Special issue: Modelling Environmental, Economic and Social Aspects in the Assessment of Biofuels. http://www.sciencedirect.com/science/article/pii/S0961953409002402 -Brandão M, Clift R, Mila I Canals L, Basson L (2010) A Life-Cycle Approach to Characterising Environmental and Economic Impacts of Multifunctional Land-Use Systems: An Integrated Assessment in the UK. Sustainability 2(12): 3747-3776. Special issue: Life Cycle Sustainability Assessment. http://www.mdpi.com/2071-1050/2/12/3747/pdf -Mueller-Wenk R and Brandão M (2010) Climatic impact of land use in LCA - carbon transfers between vegetation/soil and air. The International Journal of Life Cycle Assessment 15(2) 172-182. http://www.springerlink.com/content/02628184t2q98051/fulltext.pdf -Brandão M (2012) Food, Feed, Fuel, Timber or Carbon Sink? Towards Sustainable Land Use: a consequential life cycle approach. Springer. 125pp. -Brandão M (2012) Food, Feed, Fuel, Timber or Carbon Sink? Towards Sustainable Land Use: a consequential life cycle approach. PhD thesis. Centre for Environmental Strategy (Division of Civil, Chemical and Environmental Engineering), Faculty of Engineering and Physical Sciences, University of Surrey, UK. 246 pp. Appendices 541 pp. -Mulligan D, Edwards R, Marelli L, Scarlat N, Brandão M, Monforti-Ferrario F (2010) The effects of increased demand for biofuel feedstocks on the world agricultural markets and areas. Luxembourg: Publications Office of the European Union. ISBN 978-92-79-16220-6. http://publications.jrc.ec.europa.eu/repository/bitstream/111111111/16193/1/en24464_iluc%20workshop.pdf -Brandão M, Levasseur A (2011) Assessing temporary carbon storage in life cycle assessment and carbon footprinting: outcomes of an expert workshop. Joint Research Centre, European Commission, Ispra, Italy	This comment is a repetition of comment no 32508 and hence not addressed here again.
26356	8	83	20	83	27	A duplication of the reference to the same document	Accept

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
32513	8	844				The page numbers refer to the pages of the pdf document (and do not coincide with the page numbers as printed in the bottom right of the document. Life Cycle Assessment (LCA) is standardused by ISO with that name. Therefore, it should never be referred to as Life Cycle Analysis. Furthermore, once defined, it can be referred to simply as "LCA". Many important works of Brandão et al. (e.g. 2013) and Levasseur are missing, which are particular relevant to chapters 8 and 11. These are: -Brandão M, Levasseur A, Kirschbaum M, Cowie A, Weidema B, Jørgensen SV, Hauschild M, Chomkhamsri K, Pennington D (2013) Key issues and options in accounting for carbon sequestration and temporary storage in life cycle assessment and carbon footprinting. The International Journal of Life Cycle Assessment 18 (1) 230-240. DOI: 10.1007/s11367-012-0451-6. http://link.springer.com/article/10.1007%2Fs11367-012-0451-6 -Levasseur A, Lesage P, Margni M, Brandão M, Samson R (2012) Assessing temporary carbon sequestration and storage projects through land use, land-use change and forestry: comparison of dynamic life cycle assessment with ton-year approaches. Climatic Change. DOI: 10.1007/s10584-012-0473-x. http://www.springerlink.com/content/b3251u56v728m870/?MUD=MP13. -Levasseur A, Brandão M, Lesage P, Margni M, Pennington D, Clift R, Samson S (2012) Valuing temporary carbon storage. Nature Climate Change 2, 6–8. doi:10.1038/nclimate1335. http://www.nature.com/nclimate/journal/v2/n1/full/nclimate1335.html. -Brandão M, Mila i Canals L, Clift R (2011) Soil Organic Carbon changes in the cultivation of energy crops: implications for GHG balances and soil quality for use in LCA. Biomass & Bioenergy35 (6). 2323–2336. Special issue: Modelling Environmental, Economic and Social Aspects in the Assessment of Biofuels. http://www.sciencedirect.com/science/article/pii/S0961953409002402 -Brandão M, Clift R, Mila I Canals L, Basson L (2010) A Life-Cycle Approach to Characterising Environmental and Economic Impacts of Multifunctional Land-Use Systems: An Integrated Assessment in the UK. Sustainability 2(12): 3747-3776. Special issue: Life Cycle Sustainability Assessment. http://www.mdpi.com/2071-1050/2/12/3747/pdf -Mueller-Wenk R and Brandão M (2010) Climatic impact of land use in LCA - carbon transfers between vegetation/soil and air. The International Journal of Life Cycle Assessment 15(2) 172-182. http://www.springerlink.com/content/02628184t2q98051/fulltext.pdf -Brandão M (2012) Food, Feed, Fuel, Timber or Carbon Sink? Towards Sustainable Land Use: a consequential life cycle approach. Springer. 125pp. -Brandão M (2012) Food, Feed, Fuel, Timber or Carbon Sink? Towards Sustainable Land Use: a consequential life cycle approach. PhD thesis. Centre for Environmental Strategy (Division of Civil, Chemical and Environmental Engineering), Faculty of Engineering and Physical Sciences, University of Surrey, UK. 246 pp. Appendices 541 pp. -Mulligan D, Edwards R, Marelli L, Scarlat N, Brandão M, Monforti-Ferrario F (2010) The effects of increased demand for biofuel feedstocks on the world agricultural markets and areas. Luxembourg: Publications Office of the European Union. ISBN 978-92-79-16220-6. http://publications.jrc.ec.europa.eu/repository/bitstream/111111111/16193/1/en24464_iluc%20workshop.pdf -Brandão M, Levasseur A (2011) Assessing temporary carbon storage in life cycle assessment and carbon footprinting: outcomes of an expert workshop. Joint Research Centre, European Commission, Ispra, Italy	This comment is a repetition of comment no 32508 and hence not addressed here again.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
32514	8	861				The page numbers refer to the pages of the pdf document (and do not coincide with the page numbers as printed in the bottom right of the document. Life Cycle Assessment (LCA) is standardused by ISO with that name. Therefore, it should never be referred to as Life Cycle Analysis. Furthermore, once defined, it can be referred to simply as "LCA". Many important works of Brandão et al. (e.g. 2013) and Levasseur are missing, which are particular relevant to chapters 8 and 11. These are: -Brandão M, Levasseur A, Kirschbaum M, Cowie A, Weidema B, Jørgensen SV, Hauschild M, Chomkhamsri K, Pennington D (2013) Key issues and options in accounting for carbon sequestration and temporary storage in life cycle assessment and carbon footprinting. The International Journal of Life Cycle Assessment 18 (1) 230-240. DOI: 10.1007/s11367-012-0451-6. http://link.springer.com/article/10.1007%2Fs11367-012-0451-6 -Levasseur A, Lesage P, Margni M, Brandão M, Samson R (2012) Assessing temporary carbon sequestration and storage projects through land use, land-use change and forestry: comparison of dynamic life cycle assessment with ton-year approaches. Climatic Change. DOI: 10.1007/s10584-012-0473-x. http://www.springerlink.com/content/b3251u56v728m870/?MUD=MP13. -Levasseur A, Brandão M, Lesage P, Margni M, Pennington D, Clift R, Samson S (2012) Valuing temporary carbon storage. Nature Climate Change 2, 6–8. doi:10.1038/nclimate1335. http://www.nature.com/nclimate/journal/v2/n1/full/nclimate1335.html. -Brandão M, Mila i Canals L, Clift R (2011) Soil Organic Carbon changes in the cultivation of energy crops: implications for GHG balances and soil quality for use in LCA. Biomass & Bioenergy35 (6). 2323–2336. Special issue: Modelling Environmental, Economic and Social Aspects in the Assessment of Biofuels. http://www.sciencedirect.com/science/article/pii/S0961953409002402 -Brandão M, Clift R, Mila I Canals L, Basson L (2010) A Life-Cycle Approach to Characterising Environmental and Economic Impacts of Multifunctional Land-Use Systems: An Integrated Assessment in the UK. Sustainability 2(12): 3747-3776. Special issue: Life Cycle Sustainability Assessment. http://www.mdpi.com/2071-1050/2/12/3747/pdf -Mueller-Wenk R and Brandão M (2010) Climatic impact of land use in LCA - carbon transfers between vegetation/soil and air. The International Journal of Life Cycle Assessment 15(2) 172-182. http://www.springerlink.com/content/02628184t2q98051/fulltext.pdf -Brandão M (2012) Food, Feed, Fuel, Timber or Carbon Sink? Towards Sustainable Land Use: a consequential life cycle approach. Springer. 125pp. -Brandão M (2012) Food, Feed, Fuel, Timber or Carbon Sink? Towards Sustainable Land Use: a consequential life cycle approach. PhD thesis. Centre for Environmental Strategy (Division of Civil, Chemical and Environmental Engineering), Faculty of Engineering and Physical Sciences, University of Surrey, UK. 246 pp. Appendices 541 pp. -Mulligan D, Edwards R, Marelli L, Scarlat N, Brandão M, Monforti-Ferrario F (2010) The effects of increased demand for biofuel feedstocks on the world agricultural markets and areas. Luxembourg: Publications Office of the European Union. ISBN 978-92-79-16220-6. http://publications.jrc.ec.europa.eu/repository/bitstream/111111111/16193/1/en24464_iluc%20workshop.pdf -Brandão M, Levasseur A (2011) Assessing temporary carbon storage in life cycle assessment and carbon footprinting: outcomes of an expert workshop. Joint Research Centre, European Commission, Ispra, Italy	This comment is a repetition of comment no 32508 and hence not addressed here again.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
32515	8	868				The page numbers refer to the pages of the pdf document (and do not coincide with the page numbers as printed in the bottom right of the document. Life Cycle Assessment (LCA) is standardused by ISO with that name. Therefore, it should never be referred to as Life Cycle Analysis. Furthermore, once defined, it can be referred to simply as "LCA". Many important works of Brandão et al. (e.g. 2013) and Levasseur are missing, which are particular relevant to chapters 8 and 11. These are: -Brandão M, Levasseur A, Kirschbaum M, Cowie A, Weidema B, Jørgensen SV, Hauschild M, Chomkhamsri K, Pennington D (2013) Key issues and options in accounting for carbon sequestration and temporary storage in life cycle assessment and carbon footprinting. The International Journal of Life Cycle Assessment 18 (1) 230-240. DOI: 10.1007/s11367-012-0451-6. http://link.springer.com/article/10.1007%2Fs11367-012-0451-6 -Levasseur A, Lesage P, Margni M, Brandão M, Samson R (2012) Assessing temporary carbon sequestration and storage projects through land use, land-use change and forestry: comparison of dynamic life cycle assessment with ton-year approaches. Climatic Change. DOI: 10.1007/s10584-012-0473-x. http://www.springerlink.com/content/b3251u56v728m870/?MUD=MP13. -Levasseur A, Brandão M, Lesage P, Margni M, Pennington D, Clift R, Samson S (2012) Valuing temporary carbon storage. Nature Climate Change 2, 6–8. doi:10.1038/nclimate1335. http://www.nature.com/nclimate/journal/v2/n1/full/nclimate1335.html. -Brandão M, Mila i Canals L, Clift R (2011) Soil Organic Carbon changes in the cultivation of energy crops: implications for GHG balances and soil quality for use in LCA. Biomass & Bioenergy35 (6). 2323–2336. Special issue: Modelling Environmental, Economic and Social Aspects in the Assessment of Biofuels. http://www.sciencedirect.com/science/article/pii/S0961953409002402 -Brandão M, Clift R, Mila I Canals L, Basson L (2010) A Life-Cycle Approach to Characterising Environmental and Economic Impacts of Multifunctional Land-Use Systems: An Integrated Assessment in the UK. Sustainability 2(12): 3747-3776. Special issue: Life Cycle Sustainability Assessment. http://www.mdpi.com/2071-1050/2/12/3747/pdf -Mueller-Wenk R and Brandão M (2010) Climatic impact of land use in LCA - carbon transfers between vegetation/soil and air. The International Journal of Life Cycle Assessment 15(2) 172-182. http://www.springerlink.com/content/02628184t2q98051/fulltext.pdf -Brandão M (2012) Food, Feed, Fuel, Timber or Carbon Sink? Towards Sustainable Land Use: a consequential life cycle approach. Springer. 125pp. -Brandão M (2012) Food, Feed, Fuel, Timber or Carbon Sink? Towards Sustainable Land Use: a consequential life cycle approach. PhD thesis. Centre for Environmental Strategy (Division of Civil, Chemical and Environmental Engineering), Faculty of Engineering and Physical Sciences, University of Surrey, UK. 246 pp. Appendices 541 pp. -Mulligan D, Edwards R, Marelli L, Scarlat N, Brandão M, Monforti-Ferrario F (2010) The effects of increased demand for biofuel feedstocks on the world agricultural markets and areas. Luxembourg: Publications Office of the European Union. ISBN 978-92-79-16220-6. http://publications.jrc.ec.europa.eu/repository/bitstream/111111111/16193/1/en24464_iluc%20workshop.pdf -Brandão M, Levasseur A (2011) Assessing temporary carbon storage in life cycle assessment and carbon footprinting: outcomes of an expert workshop. Joint Research Centre, European Commission, Ispra, Italy	This comment is a repetition of comment no 32508 and hence not addressed here again.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
32516	8	871				The page numbers refer to the pages of the pdf document (and do not coincide with the page numbers as printed in the bottom right of the document. Life Cycle Assessment (LCA) is standardused by ISO with that name. Therefore, it should never be referred to as Life Cycle Analysis. Furthermore, once defined, it can be referred to simply as "LCA". Many important works of Brandão et al. (e.g. 2013) and Levasseur are missing, which are particular relevant to chapters 8 and 11. These are: -Brandão M, Levasseur A, Kirschbaum M, Cowie A, Weidema B, Jørgensen SV, Hauschild M, Chomkhamsri K, Pennington D (2013) Key issues and options in accounting for carbon sequestration and temporary storage in life cycle assessment and carbon footprinting. The International Journal of Life Cycle Assessment 18 (1) 230-240. DOI: 10.1007/s11367-012-0451-6. http://link.springer.com/article/10.1007%2Fs11367-012-0451-6 -Levasseur A, Lesage P, Margni M, Brandão M, Samson R (2012) Assessing temporary carbon sequestration and storage projects through land use, land-use change and forestry: comparison of dynamic life cycle assessment with ton-year approaches. Climatic Change. DOI: 10.1007/s10584-012-0473-x. http://www.springerlink.com/content/b3251u56v728m870/?MUD=MP13. -Levasseur A, Brandão M, Lesage P, Margni M, Pennington D, Clift R, Samson S (2012) Valuing temporary carbon storage. Nature Climate Change 2, 6–8. doi:10.1038/nclimate1335. http://www.nature.com/nclimate/journal/v2/n1/full/nclimate1335.html. -Brandão M, Mila i Canals L, Clift R (2011) Soil Organic Carbon changes in the cultivation of energy crops: implications for GHG balances and soil quality for use in LCA. Biomass & Bioenergy35 (6). 2323–2336. Special issue: Modelling Environmental, Economic and Social Aspects in the Assessment of Biofuels. http://www.sciencedirect.com/science/article/pii/S0961953409002402 -Brandão M, Clift R, Mila I Canals L, Basson L (2010) A Life-Cycle Approach to Characterising Environmental and Economic Impacts of Multifunctional Land-Use Systems: An Integrated Assessment in the UK. Sustainability 2(12): 3747-3776. Special issue: Life Cycle Sustainability Assessment. http://www.mdpi.com/2071-1050/2/12/3747/pdf -Mueller-Wenk R and Brandão M (2010) Climatic impact of land use in LCA - carbon transfers between vegetation/soil and air. The International Journal of Life Cycle Assessment 15(2) 172-182. http://www.springerlink.com/content/02628184t2q98051/fulltext.pdf -Brandão M (2012) Food, Feed, Fuel, Timber or Carbon Sink? Towards Sustainable Land Use: a consequential life cycle approach. Springer. 125pp. -Brandão M (2012) Food, Feed, Fuel, Timber or Carbon Sink? Towards Sustainable Land Use: a consequential life cycle approach. PhD thesis. Centre for Environmental Strategy (Division of Civil, Chemical and Environmental Engineering), Faculty of Engineering and Physical Sciences, University of Surrey, UK. 246 pp. Appendices 541 pp. -Mulligan D, Edwards R, Marelli L, Scarlat N, Brandão M, Monforti-Ferrario F (2010) The effects of increased demand for biofuel feedstocks on the world agricultural markets and areas. Luxembourg: Publications Office of the European Union. ISBN 978-92-79-16220-6. http://publications.jrc.ec.europa.eu/repository/bitstream/111111111/16193/1/en24464_iluc%20workshop.pdf -Brandão M, Levasseur A (2011) Assessing temporary carbon storage in life cycle assessment and carbon footprinting: outcomes of an expert workshop. Joint Research Centre, European Commission, Ispra, Italy	This comment is a repetition of comment no 32508 and hence not addressed here again.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
32517	8	873		874		The page numbers refer to the pages of the pdf document (and do not coincide with the page numbers as printed in the bottom right of the document. Life Cycle Assessment (LCA) is standardused by ISO with that name. Therefore, it should never be referred to as Life Cycle Analysis. Furthermore, once defined, it can be referred to simply as "LCA". Many important works of Brandão et al. (e.g. 2013) and Levasseur are missing, which are particular relevant to chapters 8 and 11. These are: -Brandão M, Levasseur A, Kirschbaum M, Cowie A, Weidema B, Jørgensen SV, Hauschild M, Chomkhamsri K, Pennington D (2013) Key issues and options in accounting for carbon sequestration and temporary storage in life cycle assessment and carbon footprinting. The International Journal of Life Cycle Assessment 18 (1) 230-240. DOI: 10.1007/s11367-012-0451-6. http://link.springer.com/article/10.1007%2Fs11367-012-0451-6 -Levasseur A, Lesage P, Margni M, Brandão M, Samson R (2012) Assessing temporary carbon sequestration and storage projects through land use, land-use change and forestry: comparison of dynamic life cycle assessment with ton-year approaches. Climatic Change. DOI: 10.1007/s10584-012-0473-x. http://www.springerlink.com/content/b3251u56v728m870/?MUD=MP13. -Levasseur A, Brandão M, Lesage P, Margni M, Pennington D, Clift R, Samson S (2012) Valuing temporary carbon storage. Nature Climate Change 2, 6–8. doi:10.1038/nclimate1335. http://www.nature.com/nclimate/journal/v2/n1/full/nclimate1335.html. -Brandão M, Mila i Canals L, Clift R (2011) Soil Organic Carbon changes in the cultivation of energy crops: implications for GHG balances and soil quality for use in LCA. Biomass & Bioenergy35 (6). 2323–2336. Special issue: Modelling Environmental, Economic and Social Aspects in the Assessment of Biofuels. http://www.sciencedirect.com/science/article/pii/S0961953409002402 -Brandão M, Clift R, Mila I Canals L, Basson L (2010) A Life-Cycle Approach to Characterising Environmental and Economic Impacts of Multifunctional Land-Use Systems: An Integrated Assessment in the UK. Sustainability 2(12): 3747-3776. Special issue: Life Cycle Sustainability Assessment. http://www.mdpi.com/2071-1050/2/12/3747/pdf -Mueller-Wenk R and Brandão M (2010) Climatic impact of land use in LCA - carbon transfers between vegetation/soil and air. The International Journal of Life Cycle Assessment 15(2) 172-182. http://www.springerlink.com/content/02628184t2q98051/fulltext.pdf -Brandão M (2012) Food, Feed, Fuel, Timber or Carbon Sink? Towards Sustainable Land Use: a consequential life cycle approach. Springer. 125pp. -Brandão M (2012) Food, Feed, Fuel, Timber or Carbon Sink? Towards Sustainable Land Use: a consequential life cycle approach. PhD thesis. Centre for Environmental Strategy (Division of Civil, Chemical and Environmental Engineering), Faculty of Engineering and Physical Sciences, University of Surrey, UK. 246 pp. Appendices 541 pp. -Mulligan D, Edwards R, Marelli L, Scarlat N, Brandão M, Monforti-Ferrario F (2010) The effects of increased demand for biofuel feedstocks on the world agricultural markets and areas. Luxembourg: Publications Office of the European Union. ISBN 978-92-79-16220-6. http://publications.jrc.ec.europa.eu/repository/bitstream/111111111/16193/1/en24464_iluc%20workshop.pdf -Brandão M, Levasseur A (2011) Assessing temporary carbon storage in life cycle assessment and carbon footprinting: outcomes of an expert workshop. Joint Research Centre, European Commission, Ispra, Italy	This comment is a repetition of comment no 32508 and hence not addressed here again.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
32518	8	877		878		The page numbers refer to the pages of the pdf document (and do not coincide with the page numbers as printed in the bottom right of the document. Life Cycle Assessment (LCA) is standardused by ISO with that name. Therefore, it should never be referred to as Life Cycle Analysis. Furthermore, once defined, it can be referred to simply as "LCA". Many important works of Brandão et al. (e.g. 2013) and Levasseur are missing, which are particular relevant to chapters 8 and 11. These are: -Brandão M, Levasseur A, Kirschbaum M, Cowie A, Weidema B, Jørgensen SV, Hauschild M, Chomkhamsri K, Pennington D (2013) Key issues and options in accounting for carbon sequestration and temporary storage in life cycle assessment and carbon footprinting. The International Journal of Life Cycle Assessment 18 (1) 230-240. DOI: 10.1007/s11367-012-0451-6. http://link.springer.com/article/10.1007%2Fs11367-012-0451-6 -Levasseur A, Lesage P, Margni M, Brandão M, Samson R (2012) Assessing temporary carbon sequestration and storage projects through land use, land-use change and forestry: comparison of dynamic life cycle assessment with ton-year approaches. Climatic Change. DOI: 10.1007/s10584-012-0473-x. http://www.springerlink.com/content/b3251u56v728m870/?MUD=MP13. -Levasseur A, Brandão M, Lesage P, Margni M, Pennington D, Clift R, Samson S (2012) Valuing temporary carbon storage. Nature Climate Change 2, 6–8. doi:10.1038/nclimate1335. http://www.nature.com/nclimate/journal/v2/n1/full/nclimate1335.html. -Brandão M, Mila i Canals L, Clift R (2011) Soil Organic Carbon changes in the cultivation of energy crops: implications for GHG balances and soil quality for use in LCA. Biomass & Bioenergy35 (6). 2323–2336. Special issue: Modelling Environmental, Economic and Social Aspects in the Assessment of Biofuels. http://www.sciencedirect.com/science/article/pii/S0961953409002402 -Brandão M, Clift R, Mila I Canals L, Basson L (2010) A Life-Cycle Approach to Characterising Environmental and Economic Impacts of Multifunctional Land-Use Systems: An Integrated Assessment in the UK. Sustainability 2(12): 3747-3776. Special issue: Life Cycle Sustainability Assessment. http://www.mdpi.com/2071-1050/2/12/3747/pdf -Mueller-Wenk R and Brandão M (2010) Climatic impact of land use in LCA - carbon transfers between vegetation/soil and air. The International Journal of Life Cycle Assessment 15(2) 172-182. http://www.springerlink.com/content/02628184t2q98051/fulltext.pdf -Brandão M (2012) Food, Feed, Fuel, Timber or Carbon Sink? Towards Sustainable Land Use: a consequential life cycle approach. Springer. 125pp. -Brandão M (2012) Food, Feed, Fuel, Timber or Carbon Sink? Towards Sustainable Land Use: a consequential life cycle approach. PhD thesis. Centre for Environmental Strategy (Division of Civil, Chemical and Environmental Engineering), Faculty of Engineering and Physical Sciences, University of Surrey, UK. 246 pp. Appendices 541 pp. -Mulligan D, Edwards R, Marelli L, Scarlat N, Brandão M, Monforti-Ferrario F (2010) The effects of increased demand for biofuel feedstocks on the world agricultural markets and areas. Luxembourg: Publications Office of the European Union. ISBN 978-92-79-16220-6. http://publications.jrc.ec.europa.eu/repository/bitstream/111111111/16193/1/en24464_iluc%20workshop.pdf -Brandão M, Levasseur A (2011) Assessing temporary carbon storage in life cycle assessment and carbon footprinting: outcomes of an expert workshop. Joint Research Centre, European Commission, Ispra, Italy	This comment is a repetition of comment no 32508 and hence not addressed here again.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
32519	8	882		884		The page numbers refer to the pages of the pdf document (and do not coincide with the page numbers as printed in the bottom right of the document. Life Cycle Assessment (LCA) is standardused by ISO with that name. Therefore, it should never be referred to as Life Cycle Analysis. Furthermore, once defined, it can be referred to simply as "LCA". Many important works of Brandão et al. (e.g. 2013) and Levasseur are missing, which are particular relevant to chapters 8 and 11. These are: -Brandão M, Levasseur A, Kirschbaum M, Cowie A, Weidema B, Jørgensen SV, Hauschild M, Chomkhamsri K, Pennington D (2013) Key issues and options in accounting for carbon sequestration and temporary storage in life cycle assessment and carbon footprinting. The International Journal of Life Cycle Assessment 18 (1) 230-240. DOI: 10.1007/s11367-012-0451-6. http://link.springer.com/article/10.1007%2Fs11367-012-0451-6 -Levasseur A, Lesage P, Margni M, Brandão M, Samson R (2012) Assessing temporary carbon sequestration and storage projects through land use, land-use change and forestry: comparison of dynamic life cycle assessment with ton-year approaches. Climatic Change. DOI: 10.1007/s10584-012-0473-x. http://www.springerlink.com/content/b3251u56v728m870/?MUD=MP13. -Levasseur A, Brandão M, Lesage P, Margni M, Pennington D, Clift R, Samson S (2012) Valuing temporary carbon storage. Nature Climate Change 2, 6–8. doi:10.1038/nclimate1335. http://www.nature.com/nclimate/journal/v2/n1/full/nclimate1335.html. -Brandão M, Mila i Canals L, Clift R (2011) Soil Organic Carbon changes in the cultivation of energy crops: implications for GHG balances and soil quality for use in LCA. Biomass & Bioenergy35 (6). 2323–2336. Special issue: Modelling Environmental, Economic and Social Aspects in the Assessment of Biofuels. http://www.sciencedirect.com/science/article/pii/S0961953409002402 -Brandão M, Clift R, Mila I Canals L, Basson L (2010) A Life-Cycle Approach to Characterising Environmental and Economic Impacts of Multifunctional Land-Use Systems: An Integrated Assessment in the UK. Sustainability 2(12): 3747-3776. Special issue: Life Cycle Sustainability Assessment. http://www.mdpi.com/2071-1050/2/12/3747/pdf -Mueller-Wenk R and Brandão M (2010) Climatic impact of land use in LCA - carbon transfers between vegetation/soil and air. The International Journal of Life Cycle Assessment 15(2) 172-182. http://www.springerlink.com/content/02628184t2q98051/fulltext.pdf -Brandão M (2012) Food, Feed, Fuel, Timber or Carbon Sink? Towards Sustainable Land Use: a consequential life cycle approach. Springer. 125pp. -Brandão M (2012) Food, Feed, Fuel, Timber or Carbon Sink? Towards Sustainable Land Use: a consequential life cycle approach. PhD thesis. Centre for Environmental Strategy (Division of Civil, Chemical and Environmental Engineering), Faculty of Engineering and Physical Sciences, University of Surrey, UK. 246 pp. Appendices 541 pp. -Mulligan D, Edwards R, Marelli L, Scarlat N, Brandão M, Monforti-Ferrario F (2010) The effects of increased demand for biofuel feedstocks on the world agricultural markets and areas. Luxembourg: Publications Office of the European Union. ISBN 978-92-79-16220-6. http://publications.jrc.ec.europa.eu/repository/bitstream/111111111/16193/1/en24464_iluc%20workshop.pdf -Brandão M, Levasseur A (2011) Assessing temporary carbon storage in life cycle assessment and carbon footprinting: outcomes of an expert workshop. Joint Research Centre, European Commission, Ispra, Italy	This comment is a repetition of comment no 32508 and hence not addressed here again.

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32520	8	887				The page numbers refer to the pages of the pdf document (and do not coincide with the page numbers as printed in the bottom right of the document. Life Cycle Assessment (LCA) is standardused by ISO with that name. Therefore, it should never be referred to as Life Cycle Analysis. Furthermore, once defined, it can be referred to simply as "LCA". Many important works of Brandão et al. (e.g. 2013) and Levasseur are missing, which are particular relevant to chapters 8 and 11. These are: -Brandão M, Levasseur A, Kirschbaum M, Cowie A, Weidema B, Jørgensen SV, Hauschild M, Chomkhamsri K, Pennington D (2013) Key issues and options in accounting for carbon sequestration and temporary storage in life cycle assessment and carbon footprinting. The International Journal of Life Cycle Assessment 18 (1) 230-240. DOI: 10.1007/s11367-012-0451-6. http://link.springer.com/article/10.1007%2Fs11367-012-0451-6 -Levasseur A, Lesage P, Margni M, Brandão M, Samson R (2012) Assessing temporary carbon sequestration and storage projects through land use, land-use change and forestry: comparison of dynamic life cycle assessment with ton-year approaches. Climatic Change. DOI: 10.1007/s10584-012-0473-x. http://www.springerlink.com/content/b3251u56v728m870/?MUD=MP13. -Levasseur A, Brandão M, Lesage P, Margni M, Pennington D, Clift R, Samson S (2012) Valuing temporary carbon storage. Nature Climate Change 2, 6–8. doi:10.1038/nclimate1335. http://www.nature.com/nclimate/journal/v2/n1/full/nclimate1335.html. -Brandão M, Mila i Canals L, Clift R (2011) Soil Organic Carbon changes in the cultivation of energy crops: implications for GHG balances and soil quality for use in LCA. Biomass & Bioenergy35 (6). 2323–2336. Special issue: Modelling Environmental, Economic and Social Aspects in the Assessment of Biofuels. http://www.sciencedirect.com/science/article/pii/S0961953409002402 -Brandão M, Clift R, Mila I Canals L, Basson L (2010) A Life-Cycle Approach to Characterising Environmental and Economic Impacts of Multifunctional Land-Use Systems: An Integrated Assessment in the UK. Sustainability 2(12): 3747-3776. Special issue: Life Cycle Sustainability Assessment. http://www.mdpi.com/2071-1050/2/12/3747/pdf -Mueller-Wenk R and Brandão M (2010) Climatic impact of land use in LCA - carbon transfers between vegetation/soil and air. The International Journal of Life Cycle Assessment 15(2) 172-182. http://www.springerlink.com/content/02628184t2q98051/fulltext.pdf -Brandão M (2012) Food, Feed, Fuel, Timber or Carbon Sink? Towards Sustainable Land Use: a consequential life cycle approach. Springer. 125pp. -Brandão M (2012) Food, Feed, Fuel, Timber or Carbon Sink? Towards Sustainable Land Use: a consequential life cycle approach. PhD thesis. Centre for Environmental Strategy (Division of Civil, Chemical and Environmental Engineering), Faculty of Engineering and Physical Sciences, University of Surrey, UK. 246 pp. Appendices 541 pp. -Mulligan D, Edwards R, Marelli L, Scarlat N, Brandão M, Monforti-Ferrario F (2010) The effects of increased demand for biofuel feedstocks on the world agricultural markets and areas. Luxembourg: Publications Office of the European Union. ISBN 978-92-79-16220-6. http://publications.jrc.ec.europa.eu/repository/bitstream/111111111/16193/1/en24464_iluc%20workshop.pdf -Brandão M, Levasseur A (2011) Assessing temporary carbon storage in life cycle assessment and carbon footprinting: outcomes of an expert workshop. Joint Research Centre, European Commission, Ispra, Italy	This comment is a repetition of comment no 32508 and hence not addressed here again.

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32521	8	889				The page numbers refer to the pages of the pdf document (and do not coincide with the page numbers as printed in the bottom right of the document. Life Cycle Assessment (LCA) is standardused by ISO with that name. Therefore, it should never be referred to as Life Cycle Analysis. Furthermore, once defined, it can be referred to simply as "LCA". Many important works of Brandão et al. (e.g. 2013) and Levasseur are missing, which are particular relevant to chapters 8 and 11. These are: -Brandão M, Levasseur A, Kirschbaum M, Cowie A, Weidema B, Jørgensen SV, Hauschild M, Chomkhamsri K, Pennington D (2013) Key issues and options in accounting for carbon sequestration and temporary storage in life cycle assessment and carbon footprinting. The International Journal of Life Cycle Assessment 18 (1) 230-240. DOI: 10.1007/s11367-012-0451-6. http://link.springer.com/article/10.1007%2Fs11367-012-0451-6 -Levasseur A, Lesage P, Margni M, Brandão M, Samson R (2012) Assessing temporary carbon sequestration and storage projects through land use, land-use change and forestry: comparison of dynamic life cycle assessment with ton-year approaches. Climatic Change. DOI: 10.1007/s10584-012-0473-x. http://www.springerlink.com/content/b3251u56v728m870/?MUD=MP13. -Levasseur A, Brandão M, Lesage P, Margni M, Pennington D, Clift R, Samson S (2012) Valuing temporary carbon storage. Nature Climate Change 2, 6–8. doi:10.1038/nclimate1335. http://www.nature.com/nclimate/journal/v2/n1/full/nclimate1335.html. -Brandão M, Mila i Canals L, Clift R (2011) Soil Organic Carbon changes in the cultivation of energy crops: implications for GHG balances and soil quality for use in LCA. Biomass & Bioenergy35 (6). 2323–2336. Special issue: Modelling Environmental, Economic and Social Aspects in the Assessment of Biofuels. http://www.sciencedirect.com/science/article/pii/S0961953409002402 -Brandão M, Clift R, Mila I Canals L, Basson L (2010) A Life-Cycle Approach to Characterising Environmental and Economic Impacts of Multifunctional Land-Use Systems: An Integrated Assessment in the UK. Sustainability 2(12): 3747-3776. Special issue: Life Cycle Sustainability Assessment. http://www.mdpi.com/2071-1050/2/12/3747/pdf -Mueller-Wenk R and Brandão M (2010) Climatic impact of land use in LCA - carbon transfers between vegetation/soil and air. The International Journal of Life Cycle Assessment 15(2) 172-182. http://www.springerlink.com/content/02628184t2q98051/fulltext.pdf -Brandão M (2012) Food, Feed, Fuel, Timber or Carbon Sink? Towards Sustainable Land Use: a consequential life cycle approach. Springer. 125pp. -Brandão M (2012) Food, Feed, Fuel, Timber or Carbon Sink? Towards Sustainable Land Use: a consequential life cycle approach. PhD thesis. Centre for Environmental Strategy (Division of Civil, Chemical and Environmental Engineering), Faculty of Engineering and Physical Sciences, University of Surrey, UK. 246 pp. Appendices 541 pp. -Mulligan D, Edwards R, Marelli L, Scarlat N, Brandão M, Monforti-Ferrario F (2010) The effects of increased demand for biofuel feedstocks on the world agricultural markets and areas. Luxembourg: Publications Office of the European Union. ISBN 978-92-79-16220-6. http://publications.jrc.ec.europa.eu/repository/bitstream/111111111/16193/1/en24464_iluc%20workshop.pdf -Brandão M, Levasseur A (2011) Assessing temporary carbon storage in life cycle assessment and carbon footprinting: outcomes of an expert workshop. Joint Research Centre, European Commission, Ispra, Italy	This comment is a repetition of comment no 32508 and hence not addressed here again.

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32522	8	891		892		The page numbers refer to the pages of the pdf document (and do not coincide with the page numbers as printed in the bottom right of the document. Life Cycle Assessment (LCA) is standardused by ISO with that name. Therefore, it should never be referred to as Life Cycle Analysis. Furthermore, once defined, it can be referred to simply as "LCA". Many important works of Brandão et al. (e.g. 2013) and Levasseur are missing, which are particular relevant to chapters 8 and 11. These are: -Brandão M, Levasseur A, Kirschbaum M, Cowie A, Weidema B, Jørgensen SV, Hauschild M, Chomkhamsri K, Pennington D (2013) Key issues and options in accounting for carbon sequestration and temporary storage in life cycle assessment and carbon footprinting. The International Journal of Life Cycle Assessment 18 (1) 230-240. DOI: 10.1007/s11367-012-0451-6. http://link.springer.com/article/10.1007%2Fs11367-012-0451-6 -Levasseur A, Lesage P, Margni M, Brandão M, Samson R (2012) Assessing temporary carbon sequestration and storage projects through land use, land-use change and forestry: comparison of dynamic life cycle assessment with ton-year approaches. Climatic Change. DOI: 10.1007/s10584-012-0473-x. http://www.springerlink.com/content/b3251u56v728m870/?MUD=MP13. -Levasseur A, Brandão M, Lesage P, Margni M, Pennington D, Clift R, Samson S (2012) Valuing temporary carbon storage. Nature Climate Change 2, 6–8. doi:10.1038/nclimate1335. http://www.nature.com/nclimate/journal/v2/n1/full/nclimate1335.html. -Brandão M, Mila i Canals L, Clift R (2011) Soil Organic Carbon changes in the cultivation of energy crops: implications for GHG balances and soil quality for use in LCA. Biomass & Bioenergy35 (6). 2323–2336. Special issue: Modelling Environmental, Economic and Social Aspects in the Assessment of Biofuels. http://www.sciencedirect.com/science/article/pii/S0961953409002402 -Brandão M, Clift R, Mila I Canals L, Basson L (2010) A Life-Cycle Approach to Characterising Environmental and Economic Impacts of Multifunctional Land-Use Systems: An Integrated Assessment in the UK. Sustainability 2(12): 3747-3776. Special issue: Life Cycle Sustainability Assessment. http://www.mdpi.com/2071-1050/2/12/3747/pdf -Mueller-Wenk R and Brandão M (2010) Climatic impact of land use in LCA - carbon transfers between vegetation/soil and air. The International Journal of Life Cycle Assessment 15(2) 172-182. http://www.springerlink.com/content/02628184t2q98051/fulltext.pdf -Brandão M (2012) Food, Feed, Fuel, Timber or Carbon Sink? Towards Sustainable Land Use: a consequential life cycle approach. Springer. 125pp. -Brandão M (2012) Food, Feed, Fuel, Timber or Carbon Sink? Towards Sustainable Land Use: a consequential life cycle approach. PhD thesis. Centre for Environmental Strategy (Division of Civil, Chemical and Environmental Engineering), Faculty of Engineering and Physical Sciences, University of Surrey, UK. 246 pp. Appendices 541 pp. -Mulligan D, Edwards R, Marelli L, Scarlat N, Brandão M, Monforti-Ferrario F (2010) The effects of increased demand for biofuel feedstocks on the world agricultural markets and areas. Luxembourg: Publications Office of the European Union. ISBN 978-92-79-16220-6. http://publications.jrc.ec.europa.eu/repository/bitstream/111111111/16193/1/en24464_iluc%20workshop.pdf -Brandão M, Levasseur A (2011) Assessing temporary carbon storage in life cycle assessment and carbon footprinting: outcomes of an expert workshop. Joint Research Centre, European Commission, Ispra, Italy	This comment is a repetition of comment no 32508 and hence not addressed here again.

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32523	8	894				The page numbers refer to the pages of the pdf document (and do not coincide with the page numbers as printed in the bottom right of the document. Life Cycle Assessment (LCA) is standardused by ISO with that name. Therefore, it should never be referred to as Life Cycle Analysis. Furthermore, once defined, it can be referred to simply as "LCA". Many important works of Brandão et al. (e.g. 2013) and Levasseur are missing, which are particular relevant to chapters 8 and 11. These are: -Brandão M, Levasseur A, Kirschbaum M, Cowie A, Weidema B, Jørgensen SV, Hauschild M, Chomkhamsri K, Pennington D (2013) Key issues and options in accounting for carbon sequestration and temporary storage in life cycle assessment and carbon footprinting. The International Journal of Life Cycle Assessment 18 (1) 230-240. DOI: 10.1007/s11367-012-0451-6. http://link.springer.com/article/10.1007%2Fs11367-012-0451-6 -Levasseur A, Lesage P, Margni M, Brandão M, Samson R (2012) Assessing temporary carbon sequestration and storage projects through land use, land-use change and forestry: comparison of dynamic life cycle assessment with ton-year approaches. Climatic Change. DOI: 10.1007/s10584-012-0473-x. http://www.springerlink.com/content/b3251u56v728m870/?MUD=MP13. -Levasseur A, Brandão M, Lesage P, Margni M, Pennington D, Clift R, Samson S (2012) Valuing temporary carbon storage. Nature Climate Change 2, 6–8. doi:10.1038/nclimate1335. http://www.nature.com/nclimate/journal/v2/n1/full/nclimate1335.html. -Brandão M, Mila i Canals L, Clift R (2011) Soil Organic Carbon changes in the cultivation of energy crops: implications for GHG balances and soil quality for use in LCA. Biomass & Bioenergy35 (6). 2323–2336. Special issue: Modelling Environmental, Economic and Social Aspects in the Assessment of Biofuels. http://www.sciencedirect.com/science/article/pii/S0961953409002402 -Brandão M, Clift R, Mila I Canals L, Basson L (2010) A Life-Cycle Approach to Characterising Environmental and Economic Impacts of Multifunctional Land-Use Systems: An Integrated Assessment in the UK. Sustainability 2(12): 3747-3776. Special issue: Life Cycle Sustainability Assessment. http://www.mdpi.com/2071-1050/2/12/3747/pdf -Mueller-Wenk R and Brandão M (2010) Climatic impact of land use in LCA - carbon transfers between vegetation/soil and air. The International Journal of Life Cycle Assessment 15(2) 172-182. http://www.springerlink.com/content/02628184t2q98051/fulltext.pdf -Brandão M (2012) Food, Feed, Fuel, Timber or Carbon Sink? Towards Sustainable Land Use: a consequential life cycle approach. Springer. 125pp. -Brandão M (2012) Food, Feed, Fuel, Timber or Carbon Sink? Towards Sustainable Land Use: a consequential life cycle approach. PhD thesis. Centre for Environmental Strategy (Division of Civil, Chemical and Environmental Engineering), Faculty of Engineering and Physical Sciences, University of Surrey, UK. 246 pp. Appendices 541 pp. -Mulligan D, Edwards R, Marelli L, Scarlat N, Brandão M, Monforti-Ferrario F (2010) The effects of increased demand for biofuel feedstocks on the world agricultural markets and areas. Luxembourg: Publications Office of the European Union. ISBN 978-92-79-16220-6. http://publications.jrc.ec.europa.eu/repository/bitstream/111111111/16193/1/en24464_iluc%20workshop.pdf -Brandão M, Levasseur A (2011) Assessing temporary carbon storage in life cycle assessment and carbon footprinting: outcomes of an expert workshop. Joint Research Centre, European Commission, Ispra, Italy	This comment is a repetition of comment no 32508 and hence not addressed here again.

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32524	8	896				The page numbers refer to the pages of the pdf document (and do not coincide with the page numbers as printed in the bottom right of the document. Life Cycle Assessment (LCA) is standardused by ISO with that name. Therefore, it should never be referred to as Life Cycle Analysis. Furthermore, once defined, it can be referred to simply as "LCA". Many important works of Brandão et al. (e.g. 2013) and Levasseur are missing, which are particular relevant to chapters 8 and 11. These are: -Brandão M, Levasseur A, Kirschbaum M, Cowie A, Weidema B, Jørgensen SV, Hauschild M, Chomkhamsri K, Pennington D (2013) Key issues and options in accounting for carbon sequestration and temporary storage in life cycle assessment and carbon footprinting. The International Journal of Life Cycle Assessment 18 (1) 230-240. DOI: 10.1007/s11367-012-0451-6. http://link.springer.com/article/10.1007%2Fs11367-012-0451-6 -Levasseur A, Lesage P, Margni M, Brandão M, Samson R (2012) Assessing temporary carbon sequestration and storage projects through land use, land-use change and forestry: comparison of dynamic life cycle assessment with ton-year approaches. Climatic Change. DOI: 10.1007/s10584-012-0473-x. http://www.springerlink.com/content/b3251u56v728m870/?MUD=MP13. -Levasseur A, Brandão M, Lesage P, Margni M, Pennington D, Clift R, Samson S (2012) Valuing temporary carbon storage. Nature Climate Change 2, 6–8. doi:10.1038/nclimate1335. http://www.nature.com/nclimate/journal/v2/n1/full/nclimate1335.html. -Brandão M, Mila i Canals L, Clift R (2011) Soil Organic Carbon changes in the cultivation of energy crops: implications for GHG balances and soil quality for use in LCA. Biomass & Bioenergy35 (6). 2323–2336. Special issue: Modelling Environmental, Economic and Social Aspects in the Assessment of Biofuels. http://www.sciencedirect.com/science/article/pii/S0961953409002402 -Brandão M, Clift R, Mila I Canals L, Basson L (2010) A Life-Cycle Approach to Characterising Environmental and Economic Impacts of Multifunctional Land-Use Systems: An Integrated Assessment in the UK. Sustainability 2(12): 3747-3776. Special issue: Life Cycle Sustainability Assessment. http://www.mdpi.com/2071-1050/2/12/3747/pdf -Mueller-Wenk R and Brandão M (2010) Climatic impact of land use in LCA - carbon transfers between vegetation/soil and air. The International Journal of Life Cycle Assessment 15(2) 172-182. http://www.springerlink.com/content/02628184t2q98051/fulltext.pdf -Brandão M (2012) Food, Feed, Fuel, Timber or Carbon Sink? Towards Sustainable Land Use: a consequential life cycle approach. Springer. 125pp. -Brandão M (2012) Food, Feed, Fuel, Timber or Carbon Sink? Towards Sustainable Land Use: a consequential life cycle approach. PhD thesis. Centre for Environmental Strategy (Division of Civil, Chemical and Environmental Engineering), Faculty of Engineering and Physical Sciences, University of Surrey, UK. 246 pp. Appendices 541 pp. -Mulligan D, Edwards R, Marelli L, Scarlat N, Brandão M, Monforti-Ferrario F (2010) The effects of increased demand for biofuel feedstocks on the world agricultural markets and areas. Luxembourg: Publications Office of the European Union. ISBN 978-92-79-16220-6. http://publications.jrc.ec.europa.eu/repository/bitstream/111111111/16193/1/en24464_iluc%20workshop.pdf -Brandão M, Levasseur A (2011) Assessing temporary carbon storage in life cycle assessment and carbon footprinting: outcomes of an expert workshop. Joint Research Centre, European Commission, Ispra, Italy	This comment is a repetition of comment no 32508 and hence not addressed here again.

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32434	8	9				This is an important figure (8.1.2), but it underplays the occupancy issues – noted under energy intensity. But a key objective of sustainable transport policy is to raise occupancy levels of all forms of transport (passenger and freight) – there is a huge resource available (the unused capacity in all vehicles) that could be utilised – so cars would travel around with 4 people in them, not one person and empty running in freight would be close to zero through reverse logistics. This is the easiest way to make better use of the capacity that is available. (Note that occupancy is not part of the ASIF framework – but is part of the ASI thinking and the Sustainable Mobility Paradigm). Related to this issue is the almost complete absence of reference to the use of the new technology in facilitating travel or in substituting for travel – the use of smart phones to lift share or to match up trips – could change the nature of travel. Although it is mentioned, these 4 elements are not independent of each other, and so the simple arithmetic used at the end gives a potentially maximum saving rather than the real one.	Accept - but points covered elsewhere in text and no ref provided. This comment raises several different issues. The chapter does discuss opportunities for improving the loading of freight vehicles and opportunities for cutting empty running. The Intensity component in the ASIF framework includes capacity utilisation.
20390	8	9				Fig 8.1.2 is unnecessary	Reject. Is a good introdution to the following text and sets the scene for the chapter
21927	8	9	1	9	1	The phrase "bus rapid transport systems" features quite frequently but without explanation of that this term means - it is transport jargon.	Accept - should be in glossary
27136	8	9	12	9	12	Delete "although complex" - no need to justify.	Reject - to avoid implying it is straightforward
26343	8	9	12	9	17	The approach to break down transport GHG emissions into Activity, Structure, Intensity and Carbon content of fuels (the so-called ASIF approach) was introduced in 2000 by Shipper, L., Marie-Lilliu, C., and Gorham, R. So when this approach is introduced in the section, it is better to refer to those who developed it. The full reference to the report where the ASIF approach was introduced is the following one: Shipper, L., Marie-Lilliu, C., and Gorham, R. 2000. Flexing the link between transport and greenhouse gas emissions. A path for the World Bank. International Energy Agency. URL: <http://www.transport2012.org/bridging/ressources/files/1/1159,IEA-Flexing-the-Link-between-Transp.PDF >	Accept- added
19739	8	9	12	9	17	In order to be consistent with the ASIF approach shown in Figure 8.1.2 and mentioned in footnote 1, the text should include a fourth bullet point mentioning the 'S' of the ASIF approach, i.e. the modeal shares of transport use.	Accept-amended
36964	8	9	18			Figure should also recognize the effect of operations profile (speed, idling, etc.). Would be most clearly presented as a separate factor, but could be combined with activity. Could also be included as an element under energy intensity, but this might be less intuitive.	Accept- added to text not to figure.
19740	8	9	18			Please place the four branches of this figure in a way consistent with the ASIF approach, i.e. first the 'activity' part, then the 'system-infrastructure' part, then 'energy intensity' and finally 'fuel carbon intensity'. This is also useful because 'activity' and 'system' should be next to eachother because they indicate possibilities to reduce GHG emissions through behavioural/infrastructure chanes, whereas energy and carbon intensity point to technological options to mitigate emissions.	Reject as order chosen to reflect following text.
23389	8	9	19			The equation here is different from the one in "2006 IPCC Guideline for National Greenhouse Gas Inventories" Chapter 3 Mobile Combustion. In that Guideline, the "activity"means distance (in VKT) instead of pkm or tkm, and the other parameters are slightly different. However, personally I believe the equation in AR5 is a better one, because it takes the real-life "load-distance" into consideration.	Accept. Will stay with existing figure as beter reflects text- but see footnote
19741	8	9	19	9	25	The legend of Figure 8.1.2 is probably unnecessarily long. If you kep it, then include the 'S' part of the ASIF equation - see also comment no. 3 above.	Accept-amended
30548	8	9	2			Bus Rapid Transit Sytems(BRTS) not Bus Rapid Transport system	Accept- corrected
36965	8	9	26	9	28	The parenthetical examples are repetitive from the rest of the text and are not necessary. They could be deleted to save space.	Reject- give examples of interactions. But have reworded

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34526	8	9	8	9	8	"and ships" is suggested to be added after "for aviation", as biofuels are already used by ships.	Accept
21928	8	9	8	9	9	One of the developments since AR4 is given as "use of sustainably-produced biofuels including for aviation". Is this statement scientifically robust?	Reject- references given in text but not any more in the new text version
30920	8	9	9	9	9	The text states "imposing GHG emission guidelines for shipping". Should read "imposing mandatory emission standards for shipping" as both the Energy Efficiency Design Index (EEDI) and the Ship Energy Efficiency Management Plan (SEEMP) are mandatory standards as approved by IMO.	Accept- added
23388	8	9	12	9	25	The interpretation of decomposition analysis of carbon emission is misleading.1\ Change of green house gas emission but not the total GHG emission can be decomposed into the changes of carbon intensity, energy intensiy and activity. 2\ For total transportation GHG emissions change, it should be decomposed into the changes with transportation mode, change with fuel structure of each mode, change with fuel carbon intensity , change with energy intensity and change of acticity. Since decomposition technique is a commonly used tool and have been widely applied. IPCC report should follow the academic understanding.As a a reference , pls refer to Wu et.al.(2005). Energy Policy 33 (2005) 319–335	Reject. The illustrated concept shows the sources of transport emissions. Reducing any of these is a positive change to emissions. Useful reference thanks but not "transport related"
24671	8	9	13	9	17	Energy intensity is related to vehicle efficiency, but also to usage patterns, loading and the intensity indicator used. For example, an empty bus is less energy intensive than a loaded one in L/100km, but more energy intensive when measured in L per Passenger km, which is a better measure. The difference in intensity with usage can often exceed the differences between vehicle efficiencies, especially within a transport mode or class. Activity is strongly related to economic conditions, but may not be a positive feedback loop because economic growth tends to increase transport energy consumption and emissions. Suggest move line 13 so it follows line 17, as fuel switching is a longer-term measure. Rephrase line 14 to: 'energy intensity (for each transport mode is directly related to vehicle efficiency, usage patterns, loading and results are sensitive to the intensity indicator used);'	Accept- reworded

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32525	8	902				The page numbers refer to the pages of the pdf document (and do not coincide with the page numbers as printed in the bottom right of the document. Life Cycle Assessment (LCA) is standardused by ISO with that name. Therefore, it should never be referred to as Life Cycle Analysis. Furthermore, once defined, it can be referred to simply as "LCA". Many important works of Brandão et al. (e.g. 2013) and Levasseur are missing, which are particular relevant to chapters 8 and 11. These are: -Brandão M, Levasseur A, Kirschbaum M, Cowie A, Weidema B, Jørgensen SV, Hauschild M, Chomkhamsri K, Pennington D (2013) Key issues and options in accounting for carbon sequestration and temporary storage in life cycle assessment and carbon footprinting. The International Journal of Life Cycle Assessment 18 (1) 230-240. DOI: 10.1007/s11367-012-0451-6. http://link.springer.com/article/10.1007%2Fs11367-012-0451-6 -Levasseur A, Lesage P, Margni M, Brandão M, Samson R (2012) Assessing temporary carbon sequestration and storage projects through land use, land-use change and forestry: comparison of dynamic life cycle assessment with ton-year approaches. Climatic Change. DOI: 10.1007/s10584-012-0473-x. http://www.springerlink.com/content/b3251u56v728m870/?MUD=MP13. -Levasseur A, Brandão M, Lesage P, Margni M, Pennington D, Clift R, Samson S (2012) Valuing temporary carbon storage. Nature Climate Change 2, 6–8. doi:10.1038/nclimate1335. http://www.nature.com/nclimate/journal/v2/n1/full/nclimate1335.html. -Brandão M, Mila i Canals L, Clift R (2011) Soil Organic Carbon changes in the cultivation of energy crops: implications for GHG balances and soil quality for use in LCA. Biomass & Bioenergy35 (6). 2323–2336. Special issue: Modelling Environmental, Economic and Social Aspects in the Assessment of Biofuels. http://www.sciencedirect.com/science/article/pii/S0961953409002402 -Brandão M, Clift R, Mila I Canals L, Basson L (2010) A Life-Cycle Approach to Characterising Environmental and Economic Impacts of Multifunctional Land-Use Systems: An Integrated Assessment in the UK. Sustainability 2(12): 3747-3776. Special issue: Life Cycle Sustainability Assessment. http://www.mdpi.com/2071-1050/2/12/3747/pdf -Mueller-Wenk R and Brandão M (2010) Climatic impact of land use in LCA - carbon transfers between vegetation/soil and air. The International Journal of Life Cycle Assessment 15(2) 172-182. http://www.springerlink.com/content/02628184t2q98051/fulltext.pdf -Brandão M (2012) Food, Feed, Fuel, Timber or Carbon Sink? Towards Sustainable Land Use: a consequential life cycle approach. Springer. 125pp. -Brandão M (2012) Food, Feed, Fuel, Timber or Carbon Sink? Towards Sustainable Land Use: a consequential life cycle approach. PhD thesis. Centre for Environmental Strategy (Division of Civil, Chemical and Environmental Engineering), Faculty of Engineering and Physical Sciences, University of Surrey, UK. 246 pp. Appendices 541 pp. -Mulligan D, Edwards R, Marelli L, Scarlat N, Brandão M, Monforti-Ferrario F (2010) The effects of increased demand for biofuel feedstocks on the world agricultural markets and areas. Luxembourg: Publications Office of the European Union. ISBN 978-92-79-16220-6. http://publications.jrc.ec.europa.eu/repository/bitstream/111111111/16193/1/en24464_iluc%20workshop.pdf -Brandão M, Levasseur A (2011) Assessing temporary carbon storage in life cycle assessment and carbon footprinting: outcomes of an expert workshop. Joint Research Centre, European Commission, Ispra, Italy	This comment is a repetition of comment no 32508 and hence not addressed here again.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
32526	8	910		911		The page numbers refer to the pages of the pdf document (and do not coincide with the page numbers as printed in the bottom right of the document. Life Cycle Assessment (LCA) is standardused by ISO with that name. Therefore, it should never be referred to as Life Cycle Analysis. Furthermore, once defined, it can be referred to simply as "LCA". Many important works of Brandão et al. (e.g. 2013) and Levasseur are missing, which are particular relevant to chapters 8 and 11. These are: -Brandão M, Levasseur A, Kirschbaum M, Cowie A, Weidema B, Jørgensen SV, Hauschild M, Chomkhamsri K, Pennington D (2013) Key issues and options in accounting for carbon sequestration and temporary storage in life cycle assessment and carbon footprinting. The International Journal of Life Cycle Assessment 18 (1) 230-240. DOI: 10.1007/s11367-012-0451-6. http://link.springer.com/article/10.1007%2Fs11367-012-0451-6 -Levasseur A, Lesage P, Margni M, Brandão M, Samson R (2012) Assessing temporary carbon sequestration and storage projects through land use, land-use change and forestry: comparison of dynamic life cycle assessment with ton-year approaches. Climatic Change. DOI: 10.1007/s10584-012-0473-x. http://www.springerlink.com/content/b3251u56v728m870/?MUD=MP13. -Levasseur A, Brandão M, Lesage P, Margni M, Pennington D, Clift R, Samson S (2012) Valuing temporary carbon storage. Nature Climate Change 2, 6–8. doi:10.1038/nclimate1335. http://www.nature.com/nclimate/journal/v2/n1/full/nclimate1335.html. -Brandão M, Mila i Canals L, Clift R (2011) Soil Organic Carbon changes in the cultivation of energy crops: implications for GHG balances and soil quality for use in LCA. Biomass & Bioenergy35 (6). 2323–2336. Special issue: Modelling Environmental, Economic and Social Aspects in the Assessment of Biofuels. http://www.sciencedirect.com/science/article/pii/S0961953409002402 -Brandão M, Clift R, Mila I Canals L, Basson L (2010) A Life-Cycle Approach to Characterising Environmental and Economic Impacts of Multifunctional Land-Use Systems: An Integrated Assessment in the UK. Sustainability 2(12): 3747-3776. Special issue: Life Cycle Sustainability Assessment. http://www.mdpi.com/2071-1050/2/12/3747/pdf -Mueller-Wenk R and Brandão M (2010) Climatic impact of land use in LCA - carbon transfers between vegetation/soil and air. The International Journal of Life Cycle Assessment 15(2) 172-182. http://www.springerlink.com/content/02628184t2q98051/fulltext.pdf -Brandão M (2012) Food, Feed, Fuel, Timber or Carbon Sink? Towards Sustainable Land Use: a consequential life cycle approach. Springer. 125pp. -Brandão M (2012) Food, Feed, Fuel, Timber or Carbon Sink? Towards Sustainable Land Use: a consequential life cycle approach. PhD thesis. Centre for Environmental Strategy (Division of Civil, Chemical and Environmental Engineering), Faculty of Engineering and Physical Sciences, University of Surrey, UK. 246 pp. Appendices 541 pp. -Mulligan D, Edwards R, Marelli L, Scarlat N, Brandão M, Monforti-Ferrario F (2010) The effects of increased demand for biofuel feedstocks on the world agricultural markets and areas. Luxembourg: Publications Office of the European Union. ISBN 978-92-79-16220-6. http://publications.jrc.ec.europa.eu/repository/bitstream/111111111/16193/1/en24464_iluc%20workshop.pdf -Brandão M, Levasseur A (2011) Assessing temporary carbon storage in life cycle assessment and carbon footprinting: outcomes of an expert workshop. Joint Research Centre, European Commission, Ispra, Italy	This comment is a repetition of comment no 32508 and hence not addressed here again.
29544	8	95	20	22		The details provided in the list of references for "Loyds Register and DNV (2011)" should be checked, as it might be useful to clarify that it is a report (of a study by Loyds Register and DNV) available from the IMO under the reference MEPC 63/INF.2	Accept
34518	8	all				General comments: As the latest report of "Review of Maritime Transport. United Nations Conference on Trade and Development" is available on UNCTAD website, all data and conclusion related this publication need to be updated accordingly. The following should be added in Reference: UNCTAD (2012). Review of Maritime Transport. United Nations Conference on Trade and Development, New York. Available at: http://unctad.org/en/PublicationsLibrary/rmt2012_en.pdf	Accept thanks

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26524	8	ALL				General: take out references previous to 2010 where possible, especially in case of multiple references in the same brackets	Reject - aiming to update since AR4 (2007) but in some places older references are needed if a topic not covred earlier.