Expert Review Comments on the IPCC WGIII AR5 First Order Draft – Chapter 8

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
8893	8					When the authors will develop further this table then they should cover all transport modes	Table will be revised for the Second-order Draft.
8897	8					This entire section could be condensed and some more attention on other transport modes besides road is needed plus clearer links with 6.7	This being worked upon with Ch 6
8895	8					How consistent are these scenarios with the transport scenarios from Chapter 6, section 6.7?	This being worked upon with Ch 6
8896	8					How consistent are these scenarios with the transport scenarios from Chapter 6, section 6.7?	This being worked upon with Ch 6
14296	8					Row 3 - "BFs displacing ... jet fuel", column "long-term possibilities" - correct that aviation is likely to be the most significant transport user of biofuels (given lack of alternatives unlike surface transport). However, "significant adoption around 2020" is probably optimistic given need to develop options to scale. Analysis suggests that biofuels in aviation may become viable in early 2020s, with penetration ramping up through the 2020s and reaching more significant levels in the 2030s. See Committee on Climate Change (2011), "Bionergy Review", Chapter 4, p67 (http://downloads.theccc.org.uk.s3.amazonaws.com/Bioenergy/1463%20CCC_Bioenergy%20review_bookmarked_1.pdf).	Agreed. Changed to 2020 to 2030. Will amend.
14297	8					Row 10 - "MS by displacing plane trips through fast-rail alternatives", column "long-term possibilities" - only short-medium distance trips suitable is correct and this means that there is limited emissions reduction potential as majority of aviation emissions are from long-haul flights. Reference is Committee on Climate Change (2009), "Meeting the UK aviation target - options for reducing emissions to 2050", Chapter 3 (http://downloads.theccc.org.uk/Aviation%20Report%2009/21667B%20CCC%20Aviation%20AW%20COMP%20v8.pdf)	Disagree. Any savings worth doing. Alternative assesssments in Satler et al.
14271	8					For the legend, 'Other' should be renamed as 'International aviation and shipping', and 'Aviation' and 'Navigation' should be renamed as 'Domestic aviation' and 'Domestic shipping' respectively.	Will amend
14272	8					I think this chart should come before 8.1.1.a and 8.1.1.b. It gives the context of what has been happening to total transport emissions before getting into the regional breakdown. For the legend, 'Other' should be renamed as 'International aviation and shipping', and 'Aviation' and 'Navigation' should be renamed as 'Domestic aviation' and 'Domestic shipping' respectively.	Moved.
11606	8					Reference? What's MAF? What GHGs are actually included? Before presenting this why not present your decomposition approach first, and then the individual elements? Anyhow I suggest to replace this figure with Ragnhild Bieltvedt Skeie, Jan Fuglestvedt, Terje Berntsen, Marianne Tronstad Lund, Gunnar Myhre, Kristin Rypdal, Global temperature change from the transport sectors: Historical development and future scenarios, Atmospheric Environment, Volume 43, Issue 39, December 2009, Pages 6260-6270, ISSN 1352-2310, 10.1016/j.atmosenv.2009.05.025. This paper is on impacts from transportation, hence much better than just CO2 emissions.	Will be explained.
11610	8					Replace "structure" by the more usual term "mode" or "modal share"	Mode only a part of structure
11612	8					Good references for global consumption shares: Jens Borken, Heike Steller, Tamás Merétei, Filip Vanhove: Global and Country Inventory of Road Passenger and Freight Transportation: Fuel Consumption and Emissions of Air Pollutants in Year 2000. Transportation Research Record: Journal of the Transportation Research Board. Volume 2011, 1, 127-136. DOI - 10.3141/2011-14. http://trb.metapress.com/content/X2223425H545K651 Jens Borken-Kleefeld, Terje Berntsen, and Jan Fuglestvedt: Specific Climate Impact of Passenger and Freight Transport. Environmental Science & Technology 2010 44 (15), 5700-5706	First is too out-dated. Will check other. Most of this additional literature is relevant and could help us elaborate . Alan: Agreed. The figure for rail freight does look rather low. We will review the available data and amend accordingly

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11617	8					When rail runs on 100% electricity it can go down to 0 g CO2/tkm - ask Swiss and Swedish rail for instance. As this figure does not included SLCF I would replace with references above	ADEME figures for French rail freight, assuming nuclear-powered electrified services, also gives carbon intensity factors close to zero. Whole issue of carbon intensity values for freight transport modes needs more discussion in the chapter and the refinement of existing graphs.
11651	8					what about freight?	Would like to increase the freight / logistics content. Agree that freight requires a mention in this section.
4341	8					this table does not include R &D expenditure nor behaviour change for low carbon transport (See Banister, anderton, Bonilla, givoni,Schwanen (2011) (Annual Review of Envirionment and Resources, Vol 36, 247-270	To be amended
6494	8					Table is not clear in the print quality	Accept - only a draft
9911	8					For the ecological evaluation of transportation processes see: Edeltraud Guenther, Vera Greschner Farkavcová, (2010) "Decision making for transportation systems as a support for sustainable stewardship: Freight transport process evaluation using the ETIENNE-Tool", Management Research Review, Vol. 33 Iss: 4, pp.317 - 339	We were not aware of this reference. If it offers important new insights we will consider referring to it.
15345	8					Overall: I'm afraid I'm not a big fan of the 2nd half of section 8.1.1 since it is generic content, and hard to read. The other sections offer some great details, thoughout, however, and they are valuable. To save space, please strike the 2nd half of 8.1.1 (starting from top of p 10).	Accept - being re-drafted
14772	8					Sorry, I only had the time to read the chpater until page 25	Thanks
2780	8					Replace biofuels by renewable fuels.	Accept
2781	8					Add renewable fuels in other transport modes (than "heavy trucks/aviation"). E.g. renewable methane and renewable hydrogen are suitable in all transport forms and modes. They do not need to be based on bioenergy (therefore renewable fuels instead of biofuels).	Accept
2763	8					Potential indicative Technical potential: add RM: 100 % global demand	Numbers will be revised for the Second-order Draft.
2764	8					Potential indicative Technical potential EL: up to 100 % is not possible => change to 30 % (because only rail and urban light vehicles are well suitable, urban buses to some degree and some applications exist in other transport modes, but most of transport energy demand can not be met by electricity) □	Numbers will be revised for the Second-order Draft.
2765	8					Potential illustrative add methane: Pakistan: over 80 % road transport energy use methane (currently natural gas, but RM possible)	Numbers will be revised for the Second-order Draft.
2766	8					Cost-effectiveness best examples add carbon efficiency RM negative and energy efficiency RM negative	Text will be modified for the Second-order Draft.
2773	8					2. replace CNG and LNG => renewable methane (incl. CBG and LBG)	Agreed. Changed.
4076	8					Summary of Sustainable Transport Measures… Even at 150% zoom of the page, the table is difficult to read. Delete this table or make this better to read. There is also duplication of this with material from pages 59-61.	Accept - is only a draft
4051	8					Table 8.6.2 Summary of costs and potentials for the transport sector. Range of potentials are portrayed optimistically as "… up to x% efficiency or emission reduction improvement."	Table will be revised for the Second-order Draft.
4067	8					Item 6. Modal Shift by cycling and Walking. "Rapid short term growth already happening in many cities." "Some growth [walking]." This may be true in some cities in Europe or North America, but the urban form of many cities and the distances for commuting does not enable this.	Disagree. Always short trips even in dispersed cities. Not just commuting which is 30% of transport task.

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4052	8					Figure 8.2.1. If this figure does not provide realistic projections for current and future emissions, then why include this? There is a significant potential for this to be mis-quoted or used by mistake by future researchers. Perhaps a qualitative comparison, ratios, or a pie-chart adapting the data would be better (Unger et al 2010).	Will check
5329	8					No discussion of hydrogen fuel cell HDVs. This is the only way to reduce HDV emissions to zero and could be very cost-effective given greater efficiency of fuel cells and high mileage of HDVs. This is a major omission, even if the authors take the view that technical or economic barriers are prohibitive this technology should be discussed.	Well covered in 8.3.2.2 and elsewhere. I agree….especially given cost reductions for fuel cells
17889	8					5. In large cities in the WHO European Region, air pollution causes 100 000 premature deaths in adults annually[i]. Of these, several thousand are attributable to transport-related air pollution, particularly in urban areas. Exposure to air pollution leads to an increased risk of cardiopulmonary disease and a reduction in life expectancy of 9 months or more for people living in European cities[ii],[iii].	Noted. This issue is now covered in more detail in Section 8.7, particularly the table. Further, this is summarized in Table 6.5 in Chapter 6.
17890	8					5. The health effects of hazardous noise exposure are considered to be an increasingly important public health problem. About 40% of the population in the EU-15 countries are exposed to road traffic noise with an equivalent sound pressure level exceeding 55 dB(A), and 20% are exposed to levels exceeding 65 dB(A) [iv]. Long-term exposure to noise has been associated with a wide range of adverse effects on human health and well-being.	Noted. This issue is now covered in more detail in Section 8.7, particularly the table. Further, this is summarized in Table 6.5 in Chapter 6.
17891	8					5. In the WHO European Region, road traffic deaths and injuries have a heavy public health burden with about 118 000 deaths and about 2.4 million injuries per year. The cost of road traffic injuries to society is estimated to range from 0.4% to 3.1% of a country's gross domestic product.[v],[vi],[vii]	Accept
17892	8					5. The increasing dependence on motorized road transport has also indirect effects, notably by reducing the possibilities for active travel. On the other handHowever, there is great potential for active travel in European urban transport systemscities, 50% of trips by car being shorter than 6 km and 30% shorter than 3 km: in European cities, more than 50% of trips by car are shorter than 6 km and 30% shorter than 3 km, distances conveniently covered by cycling or walking, often at comparable speeds[viii].	Accept
17893	8					5. Promoting active travel for everyday transport has been demonstrated to lead to substantial public health gains:. Studies showed that regular commuters who walk or cycle register a reduction of 20-30% of coronary heart and cardiovascular diseases of 20-30%, of 30% of colon cancer of 30% and of almost one third in mortality[ix],[x].	Accept
17894	8					5. A shift to active transport (walking and cycling) and rapid transit/public transport, combined with improved land use, can yield much greater immediate health "co-benefits" compared withthan improving fuel and vehicle efficiency.	Relate to 8.7.1.2.
17895	8					5. The key to a successful sustainable transport system lies in combining policies that maximize co-benefits for health through a combination of technical and non-technical measures. Action need to be calibrated at the different levels of application, efficacy and scale that can be local, urban, regional, national and international. For air pollution and climate change, all scales are involved.	Relate to 8.7.1.2.
17896	8					[i]. The world health report 2002 – Reducing risks, promoting healthy life (2002). World Health Organization, Geneva. http://www.who.int/whr/2002/en (accessed 29 September 2011)	Relate to 8.7.1.2.
17897	8					[ii]. World Health Organization Regional Office for Europe (2003). Health aspects of air pollution with particulate matter, ozone and nitrogen dioxide: report of a WHO working group, Bonn, Germany, 13–15 January 2003. WHO Regional Office for Europe, Copenhagen.	Relate to 8.7.1.2.
17898	8					http://www.euro.who.int/__data/assets/pdf_file/0005/112199/E79097.pdf	Relate to 8.7.1.2.
17899	8					(accessed 29 September 2011)	Relate to 8.7.1.2.

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17900	8					[iii]. World Health Organization Regional Office for Europe / Convention Task Force on the Health Aspects of Air Pollution (2006). Health risks of particulate matter from long-range transboundary air pollution. WHO Regional Office for Europe, Copenhagen. http://www.euro.who.int/document/E88189.pdf (accessed 29 September 2011)	Relate to 8.7.1.2.
17901	8					[iv]. Berglund B, Lindvall T, Schwela DH, eds. (2000). Guidelines for community noise., World Health Organization, Geneva.	Relate to 8.7.1.2.
17902	8					http://www.who.int/docstore/peh/noise/guidelines2.html (accessed 29 September 2011)	Relate to 8.7.1.2.
17903	8					[v]. World Health Organization Regional Office for Europe (2009). European status report on road safety: towards safer roads and healthier transport choices. WHO Regional Office for Europe. Copenhagen.	Relate to 8.7.1.2.
17904	8					[vi]. Racioppi F et al. (2004). Preventing road traffic injuries: a public health perspective for Europe. WHO Regional Office for Europe, Copenhagen.	Relate to 8.7.1.2.
17905	8					http://www.euro.who.int/__data/assets/pdf_file/0003/87564/E82659.pdf	Relate to 8.7.1.2.
17906	8					(accessed 29 September 2011)	Relate to 8.7.1.2.
17907	8					[vii]. Peden M et al., eds. (2004). World report on road traffic injury prevention. World Health Organization, Geneva.	Relate to 8.7.1.2.
17908	8					http://www.who.int/violence_injury_prevention/publications/road_traffic/world_report/en/index.html (accessed 29 September 2011)	Relate to 8.7.1.2.
17909	8					[viii]. European Commission (1999). Cycling: the way ahead for towns and cities. Directorate-General for the Environment, European Commission, Brussels.	Relate to 8.7.1.2.
17910	8					[ix]. Berlin JA, Colditz GA (1990). A meta-analysis of physical activity in the prevention of coronary heart disease. American Journal of Epidemiology, 132:612–628.	Relate to 8.7.1.2.
17911	8					[x]. Colditz G.A. et al. (2002) Harvard Report on Cancer Prevention, Volume 5: Fulfilling the potential for cancer prevention: policy approaches. Cancer Causes and Control 13: 199–212.	Relate to 8.7.1.2.

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15741	8					General remarks on Chapter 8: A complete list of abbreviations is missing (CO2, BEV, LGV, ICE, EV, FCV …) I like the cautious approach of the authors on the mitigation potential of the transport sector in the short-term. (This has also entered the general summarizing chapter on mitigation options: chapter 6, p.60, line 32 and ch.6, p.76, line 8.) I also agree that, as a consequence, CO2-policies should focus on R&D and other preparatory measures for future changes. At the same time, policies should also speed up incremental developments of traditional road engines in order to help curbing the increase of CO2 emissions by the sector. Finally, I also agree with most of the text. It gives a nice overview of the technological and other mitigation options in the transport sector. However, I miss a comprehensive economic perspective. Information about the costs of different mitigation options is sparely given, and a comparison of cost-effectiveness of measures has not been attempted. In my view this should belong to a WGIII transport chapter (and to all the other sectoral chapters 7 to 12, whereas it seems to be missing everywhere). If no or only a few background studies exist on this topic, the text should try to bridge the gap by at least highlighting the importance of this issue and the need for such studies. This pertains particularly to the intermodal issues: p.30-33 (sections 8.4.2.3 and 8.4.2.4) and p.36 (section 8.6.2). In my opinion, policies aiming at substantial modal shifts (in developed countries) are extremely costly and time consuming compared to policies aiming to reduce the emissions of each mode, particularly the road. The text, in contrast, gives the impression that inducing modal shifts is in general a recommendable policy option. This impression is underpinned by quite extreme numbers on modal shift targets. Particularly the numbers taken from the EU White Paper are completely unrealistic, which is partly acknowledged in the text by the doubtful remarks on the corresponding investment needs (p.32). In fact, it is just as unrealistic as saying that in 2030 a corresponding share of cars will be electrified. A clear distinction should be made between buses and rail, whereas in the text these are often lumped together (especially in the following mistaken titles: section 8.10.1 is labeled “Road transport” but is only addressing cars, section 8.10.2. is labeled “Rail transport” but also addresses light-rail and buses). In my view, modal shifts to the railways should be treated with caution. The rail system suffers from a severe lack of intra-modal (i.e. on-track) competition, and the rolling stock industry cannot exploit the economies of scale and at the same time the high degree of competition as the car / truck / bus industry. As a consequence, the power and potential of the rail industry for realizing innovations (for example for CO2 reductions) is limited in comparison to that of the road industry. For that reason, a policy aiming at substantial modal shifts to the railways is risky in the long term. It is a particular advantage of the roads that they are basically the same all over the world. Moreover, all over the world, roads dominate transport. As a consequence, we find a world industry for cars / trucks / buses consisting of several huge companies in fierce competition. I think it is much wiser to put this powerful industry under pressure to develop less CO2-intensive vehicles, and maybe even spend some public money to help them develop totally new technologies, rather than spending much money for a small modal shift to a much less potent and less dynamic railway industry. Currently we can witness the effects of the powerful road industry: Every car maker is eager to develop new ar	I like this series of comments very much…absolutely right about lack of cost effectiveness perspective…I’m sympathetic to views about modal shift, but this is a battle that must be waged among our group. This is a very long comment addressing a range of issues. Its contentions that substantial shifts in freight modal split towards rail will be relatively difficult and costly and the critical comments about the EU modal split targets are note and may require an adjustment to the text.Agree on freght, but again this is due to the lack of published research on the subject. Several organisations have constructed marginal abatement cost curves for freight transport and reference could be made to this work in the report. Most of this additional literature is relevant and could help us elaborate. the economic perspective is important, but also very difficuklt to give over the time spans we are looking at (a century ahead basically) My feeling from many scenario studies is that economic arguments will not bring us much further as it does not really make a digference whether people or goods are transport by mode A or B as long as the passenger or ton is transported at a certain reasonable cost and time. Many economic studies show the status quo to be the best because chance is costing additional efforts. Furthermore, we must take note
10950	8					I unforunately did not get to read the chapter as I was busy reading other chapters! However, I expect that the emphasis on transport comparisons is based on a Global Warming Potential with a 100 year time horizon. This is a rather significant discussion, and this papers discusses some of those issues: Peters, G.P., Aamaas, B., T. Lund, M., Solli, C., Fuglestvedt, J.S., 2011. Alternative “Global Warming” Metrics in Life Cycle Assessment: A Case Study with Existing Transportation Data. Environ Sci Technol 45, 8633-8641.	Accepted. Report uses GWP-100 from SAR throughout.

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4001	8					Figure 8.3.1: "Fuel Consumption Potential.." has either (1) a mis-leading/incorrect caption or else is presenting a false comparison. The caption reads: "Fuel consumption reduction potential (%) for a range of LDV technology types in 2012 and 2030, compared with a base 2012 gasoline ICE vehicle." Since BEV vehicles are not used in any substantial quanity and FCEV are not commercially available, the correct comparision is to a an advanced gasoline vehicle in the year that the BEV or FCEV would be available. The vehicles should be standardize for size and performance. The caption should either be corrected to note the correct comparison gasoline ICE, or the figure should be re-done with data using an advanced gasoline vehicle. Indeed, we see that a 2030 gasoline ICE is significantly better than a 2012 gasoline ICE. A more fair comparison would be a BEV and FCEV to a 2030 gasoline ICE. As is, this is simply wrong as it now stands. It falsely suggests a greater advantage to non-ICE powertrains which provides mis-leading guidance to policymakers.	I agree we need to normalize for size/performance, which I think we have done, but will check; however I don't see any problem with comparing to an average new gasoline car in 2012, this then allows the comparison to include how much better the best conventional vehicles are, along with new propulsion systems/fuels. The logic of the reviewer escapes me. And incidentally there are plenty of BEVs available commercially in 2012. good comment….having the appropriate baseline for comparison is crucial
4003	8					Table 8.4.1: It might be useful to add a collum to this table showing the GHG intensity of passenger vehicles. As shown in Davis et al. (TRANSPORTATION ENERGY DATA BOOK: EDITION 30—2011, Table 2.13, p. 2-15), for the US the energy intensity per passenger mile for cars is lower than for transit buses, while trucks have a higher energy intensity.	Reject as the tabel is just about mass transit. Due to more confusion about this table may be remove the table and simply refer to the page in IEA ref where idata come from?
7794	8					General comments on the chapter:	Reject. Comment is too general.
7795	8					__ Most of the information in the chapter 8 focusses on the developed world. This provide litte skewness to the useful information provided to the reader. It appears, as one reads through, that most of the alternative actions/options/adaptive/and or mitigations measures may happen in the domain of the developed word. Except at few places, examples from fast growing developing countries like India and China are cited. In India, as well as in other developing countries significant efforts are directed towards climate change related issues. Such as towards GHG emission inventory, infrastructure development etc to address climate change issues. In my opinion a few good examples from these countries could be cited.	Agree
7796	8					India-specific examples:	Reject. Comment is too general.
7797	8					__In 2006, the Ministry of Railways adopted a long-term strategic plan to develop six high capacity (planned to be completed by 2046-47), high speed dedicated freight corridors (DFC) to meet the growing demand for freight transport and induce modal shift of freight traffic from road to rail. One of the DFC, the Delhi-Mumbai DFC (also known as Western DFC) slated to be operation in 2016. This will enable higher operational efficiency in both freight and passenger services since the congestion on existing rail network would reduce significantly. In addition to efficiency improvements, the DFCs would contribute to significant reduction of GHG emissions (hence could claim carbon credits). By 2046-47, the Western DFC project alone would reportedly reduce annual CO2 emissions by nearly 81% under BAU. The cumulative emissions (six DFCs together) over 30 years period (2016-17 to 2046-47) would reduce from 222 million tons CO2 under BAU (without DFC) to 52 million tonnes CO2 under BAU (with DFC) and 18 million tons CO2 under BAU (with DFC) under low carbon pathways (LC). With a potential to reduce 170 million tons CO2 over 30 years.	From road to rail or rail to road? add if find reference. Some useful new data worth incorporating. Interesting points about the efforts to shift freight from road to rail in India. What will be the carbon penalty associated with this new infrastructural development. Could be beneficial to include reference to Indian railway initiative especially as large carbon savings have been calculated.

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7798	8					__In 2007 alone, 772 kt of CNG and 185 kt of LPG was used in road transport vehicles (intra-city buses, taxi and private cars as well as in three wheelers) in India and substituted conventional liquid fuels (diesel and petrol) thereby reduction in resultant GHG emissions. CNG and LPG use in road transportation started in 2001 and 2003 respectively.	Could add but need reference
7799	8					__Transportation sector in India is the 4th largest emitter of GHG emissions after electricity, industry and agriculture and 3rd largest in terms of CO2 emissions. The share of transportation sector to the total GHG emissions in India has increased from 6.5% in 1994 to 8% in 2007 with a CAGR of 4.48%	Could add but need reference
7800	8					__In India, the rise in fuel prices encourage people to shift from one fuel type (petrol) to another (diesel) because significant price differential between petrol and diesel prices exist in the country (due to subsidy). The current diesel LDV share in India is about 20%. All the HDVs in India run on diesel. Diesel prices are kept low because it was the fuel of choice for agriculture, and freight transportation and not for LDVs. But now diesel is also used in LDVs and run generators (due to shortage of electricity)	Could add but need reference - Some useful new data worth incorporating
12110	8					There is a cross sector "energy" system synergies that will bring down the costs of transformation eg: namely the synergy between the transport sector (innovations in electric cars + batteries) and their potential to, through "Smart Grids", work with and enhance the transition the distributed renewable electricity supply. [Refs IEA (2011) Smart Grid Technology Roadmap. IEA at http://www.iea.org/papers/2011/smartgrids_roadmap.pdf + IEA (2011) Electric and Plug-In Hybrid Electric Vehicle Technological Roadmap. IEA http://www.iea.org/papers/2011/EV_PHEV_Roadmap.pdf] I have published on this and can send a summary through if interested.	Noted. Please see Chapter 7 for the integration of transport integration into the wider energy system.
11363	8					Are the changes in the vehicle emission stantards (e.g. EUROIII, IV, V, and VI) worth being pointed out as a mitigation option in this table?	Reject. Thanks for the comment but probably not, as changes in vehicle emission standards should probably be considered part of the baseline.

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8359	8					From the perspective of development the main challenge for the sector of transport is to provide sustainable access to food, work, housing and other resources needed to cope with daily life. In most countries and cities the provision of the basic human needs is a core issue and the role of transport is to deliver access to resources of different kinds to maintain or improve quality of life. Today, living conditions are rapidly changing and systems of transport will have to respond to societal changes to confront deteriorating living conditions for an ever-increasing global population. If not, it is most likely that marginalisation, poverty and social unrest will spread. The growing need for transport facilities, especially in developing countries, and the design of policy and planning measures to reduce polluting emissions is a paramount challenge that merits to be discussed upfront in the beginning of the chapter and, not as now mentioned towards the end of the chapter. There are some comments made towards the end but this is such an important and fundamental issue of global development that it will have to be properly addressed in a report from IPCC. The overwhelming increases in some countries and cities in Africa and Asia with low levels of income and where per capita travel rate is estimated to double and speed lowered interfere with policies that aims at a reduction of greenhouse emissions. Accordingly these issues will have to be presented and discussed up-front and not on the last pages. Moreover, there is no definition of the notion of sustainable transport but there are several definitions that can be applied. One option is to build on the OECD way of defining sustainable transport which has been developed through regional collaboration in Asia under the guidance of UNCRD in Nagoya. See http://www.uncrd.or.jp/env/5th-regional-est-forum/doc/bangkok_declaration.pdf. The final outcome of the analysis is of course depending on the definition and the indicators that are used. This is the reason why exploring the content of various important notions of sustainable transport should be included and outlined as well. It makes a huge difference if the goal is to achieve for instance a low-carbon transport system or if the objective is to implement sustainable transport. To base the analysis on a notion such as low-carbon is not sufficient or good enough to alleviate the problems being brought up in this chapter. The various concepts will lead the different outcomes and hence you will also have to assess strengths and weaknesses of the various definitions that you apply. So far the lead role in this text is given to technical enhancement and its potential to alleviate the problems. This is a core topic but technical fixes are far from enough and the strong emphasis on technical solutions will have to be balanced by stressing the social aspects and its potential together with political and economic regulations, laws and steering measures. About 10 per cent (or somewhat more) of global population are car owners and this chapter puts far too much emphasis on the attitude and behaviour of car owners on behalf of 90 per cent (6 billion persons) of global population. Besides, there are no clear cut responses or fixes ready for implementation that will make a real difference and alleviate current problems associated with motorized mobility. This report will have to explore several other tracks as well. The “closure” around the car-and-road-system and the great success story of the auto-industrial complex in national strategies for development as we have seen in the Asia over the last two decades and earlier on	Noted. Thank you very much for your various thoughts. We have taken them into account in our discussions and have tried to take up a number of the issues raised by you in the new draft, particularly improving the balance of the chapter putting more focus on non-technology aspects. Concerning suggestions on reorganizing the chapter we are bound to the first level structure provided by the IPCC plenary. For definitions of sustainable development and the usage of this term adopted in this report please see Ch.4. Please note that it is not the task of the IPCC to provide "recommendations" but rather to provide an overview on options and possible pathways for different goals. Concerning the nexus of transport and cities, please also see the respective sections in Ch.12.
17965	8					An introductory sentence along the example of Chapter 9 referring to the agreement reached in Wellington (p. 36) might be helpful for readers: "Barriers and opportunities are referred to as conditions that hinder or facilitate the implementation of the analyzed measures."	Accepted. Seems too obvious to put in but happy to do as suggested.
5693	8					Especially "activity" depends on external reason (e.g. economy) and not constant. This may spoil simplicity of this formula but better to suggest its complexity with some annotation. Especially, there's a positive feedback loop between activity and ecomomy.	Accept but aiming at policy makers
3436	8					I suggest removing this table and merging it with Table 8.8.1 - see also my general recommendation for this chapter	Table will be revised for the Second-order Draft.
3425	8					In the interest of shortening the chapter, this figure could be deleted	Will consider
3426	8					Please explain the acronyms of the regions that appear on the top of the graph	To be added

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3427	8					In the interest of shortening the chapter, this figure could be deleted	Rejected. Providing an overview on historic global emission trend is thought to be of great importance.
18903	8					Please consider changing and amending the figure in the following manner: (1) Turn this figure into a pie chart, as it adds up to 100%. Accompany the this pie chart with the following two: (2) Pie chart giving shares of the different transport modes for the same year and (3) Pie chart giving the energy sources consumed [all data is in the above paragraph, which could be the mostly cut.]	To be considered
18905	8					It would be very good to get global data for this!	Noted. This figure was deleted.
18909	8					Giving this in percentages is good to show the shift between modes, please consider to also present absolute numbers which indicate the expected increase of traffic.	Rejected. Sufficient as is to make point in text.
15347	8		6			need a comma before the "of"	Can not be addressed as not stated which page this refers to.
8888	8					This section is too much focused on agriculture and should include other trade besides agriproducts	Not Chapter 8
6495	8					General Comments - a. The main comment of this chapter is that it is written more from the developed countries perspective (except the arguments from 8.9). Arguments and examples from developing countries are lacking (in comparison to developed countries) as travel demand is growing more rapidly in such developing countries than developed countries. Need to strive for balance. Also it would be good to explain the diversity of issues and solutions in developing and developed countries in the initial sections and in solutions. b. The document still needs lot of editing. The arguments keeps getting repeated – for example drivers are mentioned at 8.2.1.1 and 8.4.1.1 and not makes an easy reading. c. The document is relatively silent on two and three wheelers which is the main source of transport for developing countries and current population of such vehicle exceeds more than 200 million . Except a couple of times.. no good argument has been made. d. The chapter can be shortened at 8.3 Mitigation technology options, practices and behavioural aspects , 8.6 Costs and potentials and Sectoral implication of transformation pathways and sustainable development	Noted. The comment is well taken. Please note the unbalance between publications relating to developed and developing countries affecting also the weight in the chapter. We have extended the coverage of 2- and 3-wheelers. Thank you for your feedback on reducing redundancies.
16224	8					I guess it's good to add and spot on electric motor cycle, to encourage people to use this cycle which reduce GHG emissions specially in the high denisty population cities.	Agree. Covered
4397	8					The GDP/cap could be expressed in more recent USD, say 2010. All of the figures would be up to date, even if the trends displayed in the graph remain unchanged.	Agree. All costs to be in USD 2010
8877	8					The sub-chapter focuses too much on shipping and does not include an overview of the indirect GHG emissions from transport. But it does touch upon non-GHG gases that are precursors for GHGs	Amended.
2667	8					Section 8.1.3 is poorly organized. I would recommend that this discussion be combined with the energy discussion and make the distinction there between energy and GHG emissions. A separate section could be devoted to a brief discussion of indirect GHG emissions.	Amended.
17777	8					this section is very good, but very long	Agree
2720	8					This section is very repetitious of other sections. Do you want to discuss general policy options or the specifics of policies that have or could be implemented? As mentioned in comment 49, there should be more structure to how policies are presented - this section does a better job than previously, but please consider how these sections are repetitious of each other. Would be good to lay out the economic rationale for various policies somewhere in the text, and then link these to specific policy options. Section 8.10 could be a place for these specifics.	Amended.

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16225	8					With the call for increased use of transport by rail to reduce overhead transport by road, advice for the development of rail cars for transport of goods to consist of two floors because of its advantages to reduce the cost of transportation, which reduces the burden business and shipping requirements, and the use of electric railway limitsemissions of carbon dioxide and reduces the cost of energy use and limit the use of conventional energy.	Will consider but needs a reference - and double decker trains limited by bridge and tunnel heights in many locations.
16226	8					I guess it'll be good to add a Matrix as a comparison between energy that could be obtained through the application of each type of new and renewable energies compared to the cost of financial investment, and by imposing a best suitable conditions for that and also impose worst, I suppose that comparison will be useful purely for developing countries and least developed countries	Such costs to be covered in 8.6.
16227	8					Talk more and spot on the new Aviation Techniques to enhance fuel effecieny to reduce GHG emission according to ICAO rules and try to match with EU restrictions to reduce GHGs, which made a stress on the Aviation Industry specially in Developing Countries.	Fuel covered in 8.3.1.6 etc. EU ETS discussed
2779	8					Remove "hybrid vehicles" since they are included in the "improved efficiency/all vehicles".	Accept
3438	8					In the beginning of this Section I suggest mentioning that there is a very significant gap in basic knowledge about average distance travelled by vehicle type as well as about total passenger and tonne kilometres, particularly in the developing world. As a result, the effectiveness of future mitigation policies will be hard to monitor. Moreover, there are three additional gaps in knowledge: uncertainty about the difference between test and on-road fuel economy; uncertainty about how much fuel economy regulations will lead to a rebound effect in a wider sense; and lack of knowledge about the lifecycle emissions of alternative vehicle technologies and fuels, which are crucial in order to correctly assess GHG benefits from alternative technological options. For a more detailed but still concise explanation of all this, see the following reference: Schipper L., 'Epilogue – The Future of the Automobile: CO2 May Not Be the Great Decider'. 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. 409-411.	Agree. Should be amended
4000	8					This section: trends and drivers is missing a section on trends in petroleum carbon intensity. In particular, in certain parts of the world (US, Canada, South America, Africa, China), the carbon intensity per barrel (or unit of extracted energy) is increasing as we move to either heavier crudes (Alberta), to deaper off-shore oil (greater energy use in pumping the oil) or coal-to-oil (South Africa, China). This is likely to continue as we deplete easy-to-access conventional oil. This is a major over-looked driver in future carbon emissions and needs to be addressed. I suggest that it be moved to the summary highlight.	Reject - The changes in carbon intensity of crude oil that will be used in future years is a minor driver in carbon emissions. To the degree that this is an important driver should be covered in Chapter 10 as Chapter 8 does not address the production of fuels.
14279	8					This section could be significantly reduced in length. I wasn't sure of the relevance of the "Costs and prices" sub-section to climate change mitigation (especially the first paragraph).	Accept - We will reduce the length of this section but the cost and prices are important drivers in trends that are important to mitigation scenarios
3991	8					This section could be stronger. First, the section correctly notes that transportation costs and prices are major drivers (along with other factors). But, no supporting data is provided: e.g., how much have prices and costs changed in OECD and non-OECD countries; what are the projections for the future? Where's the time trend data? Also worth noting is the major increases in fuel economy standards in the US (in particular), but also in many other OECD countries. This is a major driver in decreasing the use of fuel and, hence, GHG emissions. At the same time, this lowers the cost per kilometre of driving which may exacerbate other driving related externalities such as congestion.	Accept - We will add data

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3994	8					This section could benefit from forward looking impacts from disruptive technology. While perhaps speculative, emerging technologies such as the well-publized driverless car from Google has the potential to drastically lower the time cost of driving (drivers can make their time productive) and hence spur increased driving. The use of advanced GPS and backup safety divices can extend the driving age for older people. The chapter should devote a modest amount of space to looking ahead at technology trends and what they mean for VMT and CO2.	Accept - We can add a few sentences about potential game changers
3996	8					This section on drivers fails to note the large increse is diesel fuel use compared to gasoline in Europe which was and is largely driven by fiscal policies (taxes) that favor diesel fuel. The impact on this shift on fuel economy has been mixed. While diesel engines are an inherantly more efficient drive train compared to gasoline engines, there is some evidence that consumers have purchased more powerful vehicles offsetting the technology gain. See Schipper 2011: "Similarly, the promise of savings from dieselization of the fleet has revealed itself as a minor element of the overall improvement in new vehicle or on-road fuel economy. And the fact that diesels are driven so much more than gasoline cars, a difference that has increased since 1990, argues that those savings are minimal. This latter point is a reminder that car use, not just efficiency or fuel choice, is an important determinant of total fuel use and CO2 emissions." Moreove, this contridicts the opening paragraph of section 8.2.1 of the WGIII "Data suggesting declines in LDV use in OECD cities since 2005 raise the possibility of a significant turning point in transport in developed countries (Goodwin, 2012; Millard-Ball and Schipper, 2011; Schipper, 2011), but this is not expected to offset growth in developing countries." Please update/check the sources.	Accept - This will fit under economic drivers
2813	8					The titles of those sections ("Trends by transport sector" and "Trends by Sector") - are they intentionally differenciated?	Reject - The section and associated titles are fixed and cannot be changed by the chapter working group.
3997	8					This subsection correctly points out expected huge expansion in the LDV sector. The text notes an expected increase from 780 million vehicles to 2 billion vehicles in the next few decades. Actually, there is strong empirical evidence from Wards that we have already passed 1 billion vehicles - this should be updated. But the larger point is correct and needs to be emphasized in the introductory/summary material of this chapter. The world's LDV population is expected to double in 2 or 3 decades - this is a huge factor driving mobility, energy use and emissions. I urge in the strongest possible manner that the authors give significantly more weight to this trend. In some ways it a defining transition that needs to be adequately appreciated and addressed.	Accept - Will update data and references
8881	8					This section seems to be unfinished and is unreferenced.	Accept - Will expand and add referneces
4056	8		26		30	This paragraph has no reference.	Accept - Will expand and add references
4261	8					There are major omissions of section on active travel (walking and cycling) for short journeys in urban areas and on improved urban mass transit systems. Increased physical activity has major benefits for health and there are additional benefits from reduced air pollution	not really something for tech chapter
3412	8					many percentages mentioned to indicate potential efficiency gains, but the reference year is hard to verify.	good point, need to address
4054	8					Section 8.3.1.2. LDV load reduction. How do these recommendations differ from AR4?	Rejected. Due to the significant amount of new publications since AR4 the differences to AR4 are not reflected.
4055	8					Section 8.3.1.3 Medium and heavy-duty vehicles. How do these recommendations differ from AR4?	Added

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11878	8					It is odd that rail is discussed mostly in terms of passenger transport while in many places (like the U.S.) the mode is dominated by freight. Are there trends in rail freight worth highlighting? For example, speed reduction (which is highlighted for ships below). Are there places where the absence of infrastructure means rail doesn't serve freight movements well?	Passenger / freight split for rail clearly varies for countries. Competition for available rail capacity between pass and freight is an important issue. Chap currently mentions the need for more rail infrastructure to accommodate the extra freight traffic required to meet modal shift targets.
8882	8					8.3.2 could be merged with 8.3.1 to save space and the section should be looking at how the incremental changes could contribute to the absolute emission reductions from transport. Also, despite aircraft engines could be 50% more efficient by 2050 this wont be reflected in aviation emissions due to long life-span of aircraft	will look at merging opportunities; aviation - will mention turnover times of each mode
8437	8					The use of electric bicycle is growing very fast and thus some data could be found in literature to underline the importance that this means of transport could have in the future.	yes e-bikes and scooters deserve mention
3992	8					This section describing electric road vehicles can be significantly shortened. This is not the place to go into detail on this technology. The authors should refer to any of the many high-quality desciptions available elsewhere.	Accepted.
3993	8					This section describing fuel cell vehicles can be significantly shortened. This is not the place to go into detail on this technology. The authors should refer to any of the many high-quality desciptions available elsewhere.	Accepted.
8883	8					This section on low-carbon fuels is almost 100% focused on road transport. Discussion on other modes should be added.	Consistent with shortening some bits
3999	8					This section notes CNG's lifecycle GHG advantage at 20%-30% compared to gasoline and diesel. This figure needs to be qualified/updated to take into account newer estimates for CNG from hydrofracturing. Perhaps the text should read something like: CNG from conventional sources...20-30%, but if the rest of the world follows the trend in the US and Canada of sourcing CNG via hydrofracturing, the likely GHG benefit is likely to be ~ 5%-10% etc.	shale gas - will add in estimates there is some controversy about fracking, but I doubt it is anywhere near settled what the GHG emissions from fracking operations are.
3413	8					I believe the considerable disadvantage of hydrogen (low energy density hence voluminous storage prohibiting use in aircraft) should be mentioned in this paragraph, not only in the indirect way that it is done in the next one.	will address this a paragraph on the difficulties involved in transporting and storing hydrogen would be appropriate here
8884	8					8.3.4 should be merged with 8.3.1 as it compares technologies	will look at merging opportunities. do not agree, 8.3.1 is about incremental technologies
2751	8					The single most important quantitative information that the transportation chapter should contain is the lifecycle GHG emission comparison of various fuels, including gasoline and diesel oil and a representative set of alternative fuels. This is, however, not found anywhere in the chapter, although many have been published and are easily available. I recommend to use a German Energy Agency (DENA) bar diagram published in 2011 and available on page 5 of publication "The Role of Natural Gas and Biomethane in the Fuel Mix of the Future", at http://www.dena.de/en/publications/transport/natural-gas-and-biomethane-in-the-fuel-mix-of-the-future.html?tx_dscoverview%5Bliste%5D=1&tx_dscoverview%5Bpluginid%5D=3255.	its because we had trouble finding a good one, we will definitely have something like this in the next round. generally agree, but the range of answers is great

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2752	8					Note that lifecycle energy consumption of BEV and PHEV may not be better than ICEs due to low efficiency of electricity production. Even is CHP is used in electricity production it is important to note that vehicle engines are also CHP engines. Their waste heat is currently used for heating, but it could also be used for cooling utilizing soption heat pumps (they are currently in demonstration stage). Lifecycle (well-to-wheel) emissions (please see DENA bar diagram mentioned in previous comment and EUCAR/CONCAWE/JRC, 2008) are relevant for AR5 instead of vehicle tank-to-whell energy efficiency. Emphasizing the latter is misleading.	both TTW and WTW efficiency (and emissions) matter, for different reasons. We need to show both in appropriate places. Agree that new technologies for ICE vehicles should certainly be in our comparisons and the most promising ones mentioned. We can strengthen this.
8885	8					Again focused on road transport only	agree we want more non-LDV focus
13110	8					Generally, too much explanation for infrastructure modal shift and.	Reject, bit too general remark and no alternative or diection given.
11889	8					General comments: There seems an opportunity throughout the chapter to shorten the text by (1) avoiding repetition within the chapter and (2) avoiding repetition across chapters. For example, there is some overlap in the discussion of urban form and infrastructure between chapters 8 and 12. - Perhaps improved coordination or a clear division of topics addressed in each chapter could shorten both?	fair comment; will address the examples given.
2755	8					Add refueling infrastructure of renewable methane and hydrogen. They were proposed to be required by directive for all Member States of the EU by the EU expert group on future transport fuels report in December 2011.	agree indeed mention this.
2814	8					The objective of this section is not clear. More explanation is needed at the beginning the purpose of this section and the logic of the structure. It might be better to revisit the structure following the "Activity"- "Structure" framework.	Accept - add a short general introduction about the idea (path depency, slow change, sunk cost, LCA, etc)
8887	8					This entire section is too long. Also, the heading should be rephrased - the secton describes modal shifts and path-dependencies and not only in urban environment. The sub-sections on urban transport shoould be merged.	Accept: may be shift the 'urban form' to the current section path dependencies and infrastructure (8.4.2) and rewrite this to e.g. 'path dependencies in mobility and mode choice'.
18908	8					Consider mentioning safety as an incentive to use cars (with respect that protection is greater than using two wheelers or walking and with respect to safety from e.g. robbery)	Noted.
14288	8					Not sure of the relevance of this section to mitigation - it could be deleted.	Accepted. However, the role of car dependce is still a very important feedback driver in GHG emissions.
2697	8					This section could benefit from a fuller discussion that is not just about European freight transport. There are major differences in rail freight between North America and Europe (and this is briefly mentioned), but the policy implications are probably quite different. In all cases, there is probably a need for more capacity as rail freight is at capacity in North America and passenger rail is at capacity in Europe. What is happening in Asia? How feasible is it to actually shift away from road and air freight? The discussion would also benefit from considering freight reduction, mainly through local production and consumption of goods, rather than transporting across large distances.	Noted.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
5696	8					There's no prisnor's dilemma situation in freight. The whole shift can be accelerated by applying information and communications technologies (ICT or IT). There are many patents for optimizing logistic cost using ICT. (e.g., WO2004/018116, WO2004/019242 by Deutsche Post AG) 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.	Accepted.
8889	8					This section should shortened be and merged with 8.5.3 and be on infrastructure and routes for all transport modes and forms	Reject. Will shorten the section. Transport routes as described in this section are susbtantially different to the infrastructure issues dealt with in 8.5.3. A merger would probably not me sensible.
14293	8					Not sure if this fits best here, but an important insight is that decarbonisation itself is likely to reduce freight demand for shipping and therefore reduce shipping emissions as well. This is because a large proportion of demand for shipping is transport of fossil fuels (e.g. 50% in the UK). See Committee on Climate Change (2011), "Review of UK Shipping Emissions", p25 (http://downloads.theccc.org.uk.s3.amazonaws.com/Shipping%20Review/CCC_Shipping%20Review_single%20page_smaller.pdf).	Noted. Taken into account.
2756	8					Rural train transport using overhead power cables is the most vulnerable transport technology to the effects of climate change.	Accepted. See Section 8.5.3
4058	8		29		44	Section 8.5.3 has some assessment of the interactions of mitigation and adaptation actions. What are the potential conflicts? Are there any optimal actions?	Accept. This should be highlighted more clearly.
2757	8					Air conditioning can also be done with waste heat of the vehicle engines using sorption heat pumps.	Taken into account. Partially agree at least for trainstations etc, not for cars. Will mention this.
4059	8					This section is about the interaction of climate change impacts with feedback from vehicle fuel efficiency but also air conditioning demand in transportation. Title of the section should be changed to "Climate impacts on vehicle fuel efficiency and emissions."	Accept.
4060	8		2		13	How will temperature and moisture changes affect Nox, CO2, and PM?	Accept. Will mention this.
8890	8					Too much focus on the urban form and forgetting other transport modes	Accepted. Urban form is one way to reduce demand but other forms do exist as well. We will try to ammend text accordingly.
8891	8					Too much focus on the urban form and forgetting aviation and shipping	Accepted. Urban form is one way to deal with the structure effect/modal shift but other forms do exist as well. We will try to ammend text to also better portray aviation and shipping, if literature allows.
4062	8			40		Table 8.6.2. The range of potentials is portrayed optimistically as "…up to x% efficiency or emission reduction improvement. The range of cost-effectiveness should also reflect a wide-range in order to reflect the higher costs to achieve the higher efficiency or higher emission reductions.	Table will be revised for the Second-order Draft.
4057	8		26		38	Cost of modal shifts are not stated here. Only cost savings per household is stated. What is the net cost?	Accepted. We will try to better reflect this in the text.
8892	8					Too much focus on road transport and forgetting rail and shipping	Accepted. We will try to better reflect this in the text.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
11887	8					The title of this section is strange - what does "effect component" mean? Also, there is quite a bit of repetition with earlier discussions of vehicle technologies - it might be an opportunity to remove some content here.	Title tries to follow the Kaya Identity logic. With respect to possible repetitions, we will try to clearly differentiate this from 8.3.
2758	8					Low efficiency of electricity production and its resulting emissions have not been taken into account. The potential of increasing efficiency by better engine technological properties of many renewable fuels (compared to gasoline and diesel oil) have not been taken into account, e.g. biogas octane value 140.	Accept.
2762	8					Mitigaton options Fuel switch: add renewable methane (RM)	Table will be revised for the Second-order Draft.
14295	8					This section is too long and could be significantly reduced in length. It is not clear to me how relevant many of the sub-sections are to mitigation (e.g. 8.7.1.3 traffic accidents - is this supposed to suggest that reducing demand for travel could reduce deaths as a co-benefit? If so, it needs to cite some evidence in support of that argument. Since the main route to decarbonisation of surface transport is likely to be electrification, rather than reduced demand, I find it hard to believe that reduction in traffic accidents is likely to be a significant co-benefit).	Accept. We will rewrite
6387	8					Chapter 8 needs a discussion of risks and uncertainties, especially with respect to the mitigation benefits of proposed alternatives. Section 8.7 seems to be more about the risks from transport (as is) rather than the risks associated with approaches to mitigation. Co-benefits and spillovers seem to be in reference to mitigation strategies, so it would seem appropriate to discuss the risks associated with these as well.	Acept. We will rewrite
17953	8					Introductory sentences like the ones in Chapter 10 might be a good idea to prepare the reader for the following discussions: "Besides economic cost aspects, several other aspects have implications on the final deployment of mitigation technologies. Co-benefits, co-costs, risks and uncertainties associated with alternative mitigation technologies as well as public perception thereof can affect investment decisions of companies and priority setting of governments."	Accept. We will rewrite
2815	8					"Co-benefits": definition should be provided in the first place as there are still some disputes over the definition. (e.g. see Zusman et al, 2011- which is already in the list of reference).	Accept. We will rewrite
3429	8					This section does not contain very important information in the IPCC context; it should be considerably shortened to become as long as e.g. Sections 8.7.2 or 8.7.3	Accept. We will rewrite
17954	8					Although this paragraph describes the costs of traffic congestion, it does not explain how mitigation would interact with traffic congestion which is crucial to deserve mentioning here.	Accept. We will rewrite
8894	8					Has overlaps with 8.7.3 and should be merged	Accept. We will rewrite
2767	8					Use of methane as traffic fuel has been shown to decrease all public health issues and reduce lost health (measured in DALYs) drastically. Electric vehicles have even higher potential.	Noted
17955	8					This sub-section 'Public health' should be moved to section 8.7.3 which is suitably called 'Environmental and health effects'.	Accept. We will rewrite
2768	8					Electric vehicles, incl. fuel cell vehicles, have potential to increase traffic accidents due to their low noise level.	Accept.
17957	8					Although this paragraph describes the costs of traffic accidents, it does not explain how mitigation would interact with traffic congestion which is crucial to deserve mentioning here.	Accept
2769	8					Renewable electricity, renewable hydrogen and renewable methane always offer these benefits. For liquid biofuels potential is much smaller and in some cases they make situation worse.	Accept. We will rewrite. Not appropriate. Marcio
8376	8					Most of this has already been said in other places. Especially the lines 17-21.	Accept. We will rewrite
17958	8					This sub-section should be moved behind the section 8.7.3 since it builds on results of health issues.	Accept. We will rewrite

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
6490	8					8.7.2 Climate change mitigation as a co-benefit and 8.7.3 Environmental and health effects have contradictory statements. 8.7.2 suggests – "Some policies that aim to tackle the high social costs of urban transport can also result in climate change mitigation being a co-benefit. Air pollution and noise can be reduced by technological advances (such as vehicle building materials) and regulations for vehicles (Section 8.11 but such measures rarely have influence on climate change mitigation." And 8.7.3 - "Strategies that target the mitigation of local air pollution also show potential to reduce GHG (Yedla et al., 2005) and black carbon emissions. In designing mitigation measures to reduce specific pollutants GHG emissions reductions can also occur. For example, measures to reduce PM2.5 particulates to reduce air pollution also reduce emissions of black carbon."	Accept. We will rewrite
6488	8					This section needs improvement/editing. Also PM 25 is PM 2.5.	Editorial
2770	8					Diesel engines are the main culprit in industrial countries. E.g. in the EU the common denominator of all air pollutants, which are not decreasing, are diesel emissions. It can be solved by using gaseous fuels, i.e. bio-DME and renewable methane, in diesel engines. And by increasing the share of other motor technologies. In developing countries 2-stroke engines are the main culprit. It can be solved by using renewable methane in 2-stroke engines and by increasing the share of other motor technologies.	Reject. Beyond the scope of this Section.
4063	8					Technological solutions, improved fuel efficiency, reduction in noise levels may improve environmental quality but mobility problems remain.	Accept. We will rewrite to clarify.
17962	8					The content of this section does not seem to have anything to do with either technological or operational risks which should be discussed in this section according to the agreements reached in Wellington (p. 36). The text has either introductory charachter or relates to biofuel assessment. Please consider a broader discussion of risks and uncertainties along the classification of risks and uncertainties provided in Section 6.7. Please liaise with the other sector chapter LAs to discuss the process by which a more consistent approach can be reached.	Accept. We will adapt the structure of Ch 6.7
8378	8					The challenges of providing access, equity and low carbon transport or sustainable transport for a growing global population is not outlined well. When it comes to defining sustainable transport -basically the developed world and its possibilities to mitigate and adapt to the new realities are highlighted. As a consequence issues of technology advancement and polices of the developed world are well presented and discussed in the text. But the substantial changes yet to come will take place in other and less developed conditions. The overwhelming growth in travelling taking place in most countries and cities in the world merits a better presentation and analysis. PIs pay more attention to this topic and outline ways of handling the issue. For instance what will be the role of transport in the cities in the world? Which are the lifestyle and security issues and opportunities related to modes of transport and emissions? The social activities will define the requirement infrastructure and modes of transport. This part of the chapter is weak. It would be good to present a couple of different cities (as mentioned earlier) and outline the typical mobility issues and how they can be transferred to match the need of low carbon policy or the kind of sustainable transport that IPCC will promote. To increase sustainability a new set of planning models and tools will have to be developed -otherwise modern mainstream transport will continue to greenhouse gases also in the future. □	Its hard to respond specifically as this is a critique of the whole style of the chapter and report. If we did Shanghai as a case study they would be surprised how positive you could be about the future….8 million passengers a day on their Metro after ten years building. But examples can be only anecdotal to data on the whole system.
2772	8					1. barriers: BEV potential only in LDV:s in urban transport (< 20 % of all transport)	Disagree. More than LDVs. But the data is given earlier.

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17967	8					Since the section is called barriers and opportunities, this sub-section should be more about the financial barriers of low-carbon transport than about different policy instruments that should also be discussed in the policy section	Disagree. We do discuss finance but barriers are much more than finance.
17968	8					Sincce the section is called barriers and opportunites, the word 'aspects' in the title of this sub-section should be changed to 'barriers and opportunities' accordingly.	Agreed. Chair will need to agree.
3430	8					I don't think that this section is necessary as a whole. In the interest of shortening the text, I would suggest that a small part of Section 8.9.1 is inclused in Section 8.2 in the beginning of the chapter, and that the rest of Section 8.9 is either deleted or included in other chapters.	Rejected. Sections are fixed within the chapter.
2774	8					It is very worrying and against the decarbonization trend that renewable gases are not included, e.g. renewable hydrogen, renewable methane, bio-DME, bio-LPG.	Accepted. It will be considered
2715	8					Section 8.9.1 was very well and concisely written. One of the best in the report.	Thank you for the comment.
11888	8					This section could probably be shortened without loss of content. Technologies have already been described previously in the chapter, and it seems quite straightforward to indicate barriers/adoption rates, etc. either more concisely in this section or elsewhere in the chapter. Also, the term "bus rapid transport" is used - but "bus rapid transit" is used elsewhere in the chapter. Finally the discussion of modal shifts can be simplified. It seems quite obvious that shifting from bike to metro could increase energy use, so perhaps these possibilities don't need to be explicitly included?	Accept. This session will be subject to changes in SOD comments will be considered.
14298	8					Not sure of the relevance of this section to mitigation - it should be removed. Not to deny the importance of sustainable development, but it is a very separate issue from mitigation with very separate aims and policy implications and the two issues should not be conflated.	Rejected. Sections title is fixed by negotiation of governing body of IPCC.
8438	8					I suggest to move all the box in Chapter 5	(Assume this means section 8.1.1. - not a box) It sets the scene for this chapter 8 so leave here
8868	8					The entire Executive summary needs to made stronger and clearer	Aiming to for next draft
8898	8	0				Chapter 8 generally covers transport and climate change related issues. More focus on transport modes other than road transport is needed. Also there is significant amount of space dedicated on urban transport - this could be condensed. The sections should be better linked to each other and other chapters to avoid unnecessary repetitions and contradictions. The factual accuracy of GHG emissions related sections should be checked. In some places the chapter seems to be a repetation of IEA reports - there must be other sources out there covering the topics. Also very little attention is paid upon future transport GHG emissions scenarios by mode and explaining the feasibility of absolute reductions in GHGs from transport. I am sure that the authors were planning to address some of these issues while preparing SOD.	Agree changes will be in SOD
7400	8	0				provide more assessment of uncertainty, affordability, and spillover impacts related to mitigation and mitigation policies and measures in transport sector, particularly for developing countries.	Agree will do if space is available
4400	8	0				The organization of the Chapter does not appear coherent or easy to follow. For instance, the authors describe heavy goods vehicles, move on to passenger vehicle transport and back to freight transport. There is not much discussion on shipping, rail or aviation. As such, the Chapter is focused on LDV. The Chapter could be shortened by eliminating repetitious statements and combining sections, such as technological advances with costs.	Cannot merge sections which are fixed by IPCC. Agree, in progress, though this partly reflects the relative amounts of research done on the decarbonisation of the various freight modes. There has been a significant increase in the amount of research done on carbon mitigation in the maritime and this needs to be reflected

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
11595	8	0				Chapter difficult to read and to review. It's not wrong, but has several major shortcomings: 1) Lack of focus: A holistic assessment of the full climate impact of transportation today and in the future, as well as its mitigation potential is not done. 2) Lack of balance: Most is on passenger transport, not balanced with the role of freight transport. 3) Lack of comprehensiveness: Results from single studies are highlighted in charts and figures. I would however expect summary charts and tables from a review. Exceptions and hence good examples: Tab. 8.6.2 and Tab 8.8.1 seem to summarize, but are hard to read (even because of bad reproduction quality). These tables seem to be key and should be expanded furhter, better placed highlighted. Figs 8.9.1/2 are very interesting as well, though source is missing. 4) Lack of specifics/too broad brush: Though it is acknowledged throughout the text that there are important regional differences, you do not highlight and distinguish them clearly. Suggestion: Try to identify some (country) case studies for which you pull through your quantitative results. Good countries, standing for larger country groups, could be: US/WEU/JPN; CHN/IND. Here you could nicely illustrate eg. levels of transportation (e.g. as pkm/cap and tkm/GDP; energy intensity; total transprot energy use; total transport emissions of LL and SL GHG; analysis what mitigation options would seem feasible and what impact that might have. Trying to do all at once has resulted in the current stew.5) A lot in this chapter is on energy demand. Translate this to GHG emissions and impacts, then you are better in focus.	very reasonable criticism, although it is quite difficult to do a side-by-side comparison of alternative studies…..there tend to be large differences in timing, underlying assumptions about energy prices and policies, baseline vehicles, etc etc that are hard to normalize. will do case studies if space is available
11596	8	0				Useful but missing references for the whole chapter, individual sections, and particularly for impact assessment: J.S. Fuglestvedt, K.P. Shine, T. Berntsen, J. Cook, D.S. Lee, A. Stenke, R.B. Skeie, G.J.M. Velders, I.A. Waitz, Transport impacts on atmosphere and climate: Metrics, Atmospheric Environment, Volume 44, Issue 37, December 2010, Pages 4648-4677, ISSN 1352-2310, 10.1016/j.atmosenv.2009.04.044. D.S. Lee, G. Pitari, V. Grewe, K. Gierens, J.E. Penner, A. Petzold, M.J. Prather, U. Schumann, A. Bais, T. Berntsen, D. Iachetti, L.L. Lim, R. Sausen, Transport impacts on atmosphere and climate: Aviation, Atmospheric Environment, Volume 44, Issue 37, December 2010, Pages 4678-4734, ISSN 1352-2310, 10.1016/j.atmosenv.2009.06.005. Veronika Eyring, Ivar S.A. Isaksen, Terje Berntsen, William J. Collins, James J. Corbett, Oyvind Endresen, Roy G. Grainger, Jana Moldanova, Hans Schlager, David S. Stevenson, Transport impacts on atmosphere and climate: Shipping, Atmospheric Environment, Volume 44, Issue 37, December 2010, Pages 4735-4771, ISSN 1352-2310, 10.1016/j.atmosenv.2009.04.059. Elmar Uherek, Tomas Halenka, Jens Borken-Kleefeld, Yves Balkanski, Terje Berntsen, Carlos Borrego, Michael Gauss, Peter Hoor, Katarzyna Juda-Rezler, Jos Lelieveld, Dimitrios Melas, Kristin Rypdal, Stephan Schmid, Transport impacts on atmosphere and climate: Land transport, Atmospheric Environment, Volume 44, Issue 37, December 2010, Pages 4772-4816, ISSN 1352-2310, 10.1016/j.atmosenv.2010.01.002.	Will try and include - space permitting
12335	8	0				General comment: Mobile air-conditioning and commercial refrigeration in the transport sector should be cover in more detail. Rationale: Mobile cooling is increasing and choices with regard to the phasing out of existing agents (CFCs, HCFCs anf HFCs) and the alternatives (HFCs, natural agents, natural cooling) will have significant implications on total CO2-equivalent emissions from the sector. The IPCC special report "Safeguarding the Ozone Layer and the Global Climate System - Issues Related to Hydrofluorcarbons and Perfluorcarbons" (Chapter 6 and others), as well as more recent publications, might serve as a basis for this coverage.	Accpeted.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
8558	8	0				"Travel demand and choice of transport mode depend on land use planning interventions that alter density, diversity and design (Cervero and Kockelman, 1997) of urban space can reduce travel demand (Ewing and Cervero, 2010)" COMMENT: Ewing and Cervero calculate an average elasticity of vehicle travel demand of -0.04, which means that when density is doubled, vehicle travel is nearly doubled. This is such a small reduction that the inclusion of this reference can be misleading. Indeed, given the greater traffic intensity associated with higher densities (Ewing and Cervero and others), it is possible that the GHGs would increase from vehicle traffic as a result of the reduced fuel efficiency. This issue should be covered (See also comments 16, 17 and 18)	Rejected. This quote provided here is not part of the chapter, i.e. we do not know what you are referring to.
8559	8	0				MISSING ISSUE: HOW TRAFFIC CONGESTION REDUCES THE IMPACTS OF VKT REDUCTIONS. As Ewing and Cervero (2010) show (there is also volumnous additional literature on this) as urban densities increase, vehicle demand increases. This means that there is more traffic on a road system that is virtually never expanded in such compact city programs. Thus, traffic slows down, and becomes more congested. As this occurs there is a reduction in fuel efficiency and the often presumed one to one relationship between the reduction in petrol consumed and GHG reductions is broken. This yields such strategies less effective and this should be said. See: Transport Canada Environmental Affairs, The Costs of Urban Congestion in Canada, www.gatewaycouncil.ca/downloads2/Cost_of_Congestion_TC.pdf and Treiber, M. A. Kesting and C. Thiemann (2008)," How Much does Traffic Congestion Increase Fuel Consumption and Emissions? Applying a Fuel Consumption Model to the NGSIM Trajectory Data, paper presented to the Annual Meeting of the Transportation Research Board."	Accepted.
8560	8	0				MISSING ISSUE: HOW TRAFFIC CONGESTION INCREASES HEALTH HAZARDS Greater traffic congestion leads to higher air pollution levels at the neighborhood level and negative health risks. For example, research published by the American Heart Association indicates that "air pollution levels vary significantly in urban areas and that people who live close to highly congested roadways are exposed to greater health risks." See: Brook, R. D., B. Franklin,W. Cascio, Y. Hong, G. Howard, M. Lipsett, R. Luepker, M. Mittleman, Jonathan Samet, S.C. Smith, & I. Tager (20040, “Air Pollution and Cardiovascular Disease: A Statement of the Health Care Professionals from the Expert Panel on Population and Prevention Science of the American Heart Association,” Circulation, Vol. 109, 2004, pp. 2655–2671 and USEPA (n.d.b), Health, http://www.epa.gov/air/nitrogenoxides/health.html.	Include in 8.7.1.2
8561	8	0				MISSING ISSUE: HOW COMPACT CITY POLICIES INCREASE TRAFFIC CONGESTION (TRAFFIC INTENSITY). This point emerges from the Ewing and Cervero (2010) research (and others)	Accepted.
15858	8	0				Chapter appears to be more of a qualitative high-level literature review than quantitative analysis that highlights and compares the best ways to reduce transportation GHGs from transportation. This makes it hard to get to a bottom line set of conclusions. Chapter should contain more quantitative analysis that highlights and compares the best ways to reduce transportation GHGs from transportation for all modes and regions	Endeavouring to quantify SOD

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
15860	8	0				There are numerous optimistic, academic statements, e.g., “up to”, “targeted”, “expected”, “if”, “emissions could double…”. These should be tempered by using more pragmatic projections from auto or fuels industries, and perhaps presenting a range of values (P10-P90), and the most probable value in the middle (P50, median). Careful when forecasting expectations on deployment of technologies that are still in R&D (e.g., opposed cylinders). Also, need to clearly state timeframe – what are the reference characteristics (e.g., midsize LDV) and what is the reference year for baseline (e.g., 2010) and projection (e.g., 2035)	Noted.
15864	8	0				•Cost implications need to be better addressed: customers respond mainly to 2-4 yr net paybacks for their vehicles, possibly slightly longer for fleets. If the cost of GHG technology is low and competitive, then consumers may buy it, but if not, it would be a hard to sell. Incentives can help but they generally do not last over the long term. Also, the chapter should focus on lowest $/tonne CO2 reduction options. •There are some examples of new technology penetration due to incentives or regulations, but generally not due to consumer environmental “goodwill”. The e-wheelers in China were generally a result of local government mandates banning gasoline motorbikes, while HEVs in Japan were spurred by incentives. •I would question the realistic potential for large penetration of advanced vehicles in developing world when most customers are upgrading from scooters, bikes to small, simple (nano-type) cars that they can afford. •There is customer balance/preference for vehicle performance (e.g., acceleration, amenities) over fuel economy. This needs to be recognized. Heywood et al (MIT) have studied this in detail.	Bullets 1, 3, 4: Accepted, see Sections 8.3 (behaviour) and 8.10; Bullet 2: Rejected. The transition to e-wheelers in China can be attributable to a combination of economic, technical, and political factors. The substantial driving factors are resident income growth and E-bike price decrease. The banning of gasoline motorbikes is important but not dominating factor. See Jonathan Weinert et al. (2007). The transition to electric bikes in China: history and key reasons for rapid growth.
15868	8	0				•Ch. 8 should also better quantify short term potential for each mitigation strategy, instead of just qualitative discussions • This should be study of studies – there are several examples of graphs pulled from one source (e.g., Fig. 8.4.1). These have the potential to only represent one view. Pull charts from a range of informed sources, not just from one publication, and compile into one chart to show a range. • Cite more “real world” examples (systems already built) rather than potential future projects • Potential sections to shorten: 8.4, 8.5 (overlap with WG2- adaptation?), 8.10.5, 8.10.6, 8.9.2 (some repetition from previous sections), table 8.8.1 • Use more charts and graphs to convey results, esp. in section 8.6.3, 8.6.4	Accepted. Improved quantification and synthesis.
10758	8	0				There are some papers that I think could be useful for this chapter: 1) Berntsen and Fuglestvedt, 2008. Global temperature responses to current emissions from the transport sectors. Proceedings of the National Academy of Sciences (PNAS), 105 (49): pp. 19154-19159. 2) Skeie et al., 2009. Global temperature change from the transport sectors: Historical development and future scenarios. Atmospheric Environment, 43 (39): pp. 6260-6270. 3) Borken et al., 2010. Specific climate impact of passenger and freight transport. Environmental Science and Technology, 44 (15): pp. 5700-5706. 4) Tanaka et al. 2012. Climate effects of emission standards: the case for gasoline and diesel car. Environmental Science & Technology 46 (9), pp 5205–5213 In addition, there are several relevant studies from the EU projects QUANTIFY (www.ip-quantify.eu) and ATTICA (www.ssa-attica.eu).	these don't sound relevant to our task but will check

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
10759	8	0				In a few places in the chapter the unit CO2-equivalent is used without any explanation of what this is, and how it is calculated. It should be made clear that the GWP-100 is used. It should be noted which components that are inlcuded in the calcuations of CO2-eq. In addition, it could be made clear that several studies have shown limtations of GWP in the context of transportation and how alternative metrics could be used. It is important to note that other time horizons and metrics would produce a different result; see figure 2 in Fuglestvedt et al., 2010: Transport impacts on atmosphere and climate: Metrics. Atmospheric Environment 44 (2010) 4648–4677. See also WGI, chapter 8, fig 8.31.	Noted. This will be covered in Chapter 1 and the glossary (Annex I).
10760	8	0				The role of non-CO2 components could be given more attention since these components are important for the total climate impact of transport.	Noted.
10761	8	0				The climate impact of the shipping sector could be given somewhat more attention. In particular the cooling effect (due to SO2 and NOx) and the long term warming effect of CO2. This issue is summarized in a short paper by Fuglestvedt et al., 2009 (ES&T), but also studied and discussed in several other papers in the literature.	Noted. Already covered in 8.2 but could expand.
10762	8	0				The climate impacts of aviation could also be given more attention. There are potentially strong warming effects of contrails and aviation induced cirrus which are very uncertain. There are several papers on this in the literature (e.g. by Ulrike Burkhardt and Bernd Kärcher in Nature Climate Change, March 2011).	Accpeted, added to 8.2
13427	8	0				In the aviation part, we should mention about the impact of the Low Cost Carrier. That business will be getting larger in the world. And its impact will be not so small.	Rejected, as reference is missing.
16947	8	0				I regret I have not had time to review the Sectoral chapters in depth. It may be interesting to illuminate the hypothesis that Transport sector transitions are the most heavily dependent upon “Third Domain” characteristics of system evolution driven by innovation and infrastructural developments, and less dependent upon carbon prices than other sectors. This is the broad suggestion laid out in the structure-setting Chapter 3 of Grubb, Hourcade and Neuhoff, Planetary Economics: the Three Domains of Sustainable Energy Development, Taylor & Francis forthcoming (Chapters 1 – 5 submitted, others in draft available on request). Tranpsort transitions, including relationships to oil and integration with electricty developments, are discussed in chapters 3 and 11 of the book	Rejected. Need reference to be published. Reference is in the book by reviewer Grubb, Hourcade and Neuhoff, Plenetary Economics and the three domains of sustainable energy development (Ch.2), Taylor&Francis 2012. For the Transport sector that its transition depend on third domain (system) may be a good hypothesis difficult to prove or document with the evidence gathered in this chapter.
8350	8	0				I suggest the summary of AR4 and what's new be added like Chapter. 9.	Accepted. Agree that we should call out "what's different" in this section
2724	8	0				Please do not shorten sections 8.3.2. 8.3.3 and 8.3.4 but preferably increase their coveradge. In the other sections shortening possible.	Accepted. Need a balance. agree with this comment

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
11272	8	0				This chapter covers a lot of very important mechanisms to mitigate climate change. In particular it does not only cover technological but also behavioral factors (see figure 8.1.2.b). However, there is still a strong focus on technological mechanisms. In the figure 8.1.2.b the area "activity" refers to all developments in society that, ultimately, affect transport; but these behavioural and structural dimensions, in my point of view, are not considered enough in their potential impact. For instance, it is not only economic wealth and development affecting kilometers travelled by persons. Nor is it sufficiently explained by adding urban form as a factor (though it is a very important factor): examples from Europe (eg. compare Copenhagen, Amsterdam and Zurich on the one side as good practices with other central European cities) show that even on the local level policy may affect "activities" and travel patterns in an important way; researchers discuss the concept of "mobility cultures" meaning that the (non-) dominance of certain modes of transport is a policy outcome (which is not closely related to economic development or other "hard" factors). Addtionally, over the last year a discussion of "life quality" and "happiness" emerged in the angloamerican literature which may shed some light on related questions.	Behaviour to be re-addressed in SOD
13236	8	0				This chapter decomposes GHG emissions into activity, structure, energy intensity and carbon intensity and is grounded to latest academic literature on the subject. However we find that this approach might be counterproductive because it does not fully recognize the systemic nature of cities. It does not recognize that transportation system is fundamentaly linked with activity system. Therefore the question of transportation in not only a technical one (which instruments can lower each category) but also an economic one : to what extent can low energy cost be compatible with sustainability?	This is in Ch 12
13238	8	0				To reduce this chapter, section 8.3 could be reduced from 10 pages to 6 approx. by changing the description of each transportation technology into main challenges ; for instance : energy storage, new propulsion systems, supply chain change. Sections 8.3.4 and 8.3.5. should be kept.	Rejected. Authors don't see how they're going to cut the technology section down to 6 pages without killing off a lot of important detail (and of course many of the comments ask for more detail, especially on freight and non-LDV modes). Authors detect a bimodal distribution of suggestions here
4046	8	0				The chapter on transport offers a virtual encyclopedia of options and possibilities, some already emerging, some are just hints at being possible. The author team did an excellent job in offering such an enthusiastic and comprehensive treatment of "transportation." At the same time, there will be places in the chapter where shortening and reformatting much text into succinct tables and graphics would help not only with understanding but also page limits.	Agree. Moving into tabular format will certainly save space…the question is, will readers actually READ the tables….I know that I tend to focus much more on text.
4047	8	0				Transformation of transport is possible, but can we transform the whole system in major regions of the world in time -- especially in the context of achieving the 2 degree C rise -- by the end of this century.	probably not….but it's our responsibility to show how it might be done

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4048	8	0				Chapter 8 needs to convey more explanations about the key differences in outlook or projections from AR4 to AR5. For example, has the assessment of projections in technology advances and needed changes in policies assessed in AR4 become facts in AR5? Perhaps a succinct table of such items would help the reader understand the challenges and barriers in one glance. What are the drivers for or hurdles against such changes? For example, page 10, statement about AR4 begs the question about what has changed?	I agree….we really do need to define what's different…not only technology and policies adopted, but also our emphases (e.g., more emphasis on behavior and planning).….some ideas about technology and policy change: the latest round of U.S. fuel economy standards...VERY ambitious, and encouraging....stop start systems in Europe with large penetration.....more encouraging news about fuel cell costs...etc.
4049	8	0				Asking about the differences between AR4 and AR5 is another way of asking whether we are heading for and looking at second-best, no-longer-ideal scenarios and projections. I think that this question is important and needs to be posed and addressed.	As above (comment 4048). we should also, in this light, track what's happened on automobile sales since AR4
4050	8	0				There is too much text that describes data. Putting the data into tables or graphs could help reduce page length. For example: pages 11 and 12 (sections 8.1.2 - 8.1.3; page 13 (section 8.2.1)	Agree
3576	8	0				Freight mitigation solutions are underrepresented.	Agree. would like to increase the freight / logistics content.
3577	8	0				Freight being responsible for about 35% of all transport ghg emissions, at least 20% of WGIII AR5 transport chapter authors, text length, citations, references, policies and costs statements should be also allocated to freight solutions. Now it is about 5%.	Agree
3578	8	0				Only one of the CA of Chapter 8 is a recognised international freight expert. At least 2 authors should be recognised freight experts.	Agreed. Brought in further freight experts (Allen McKinnon).
3579	8	0				I strongly disagree with the merging of freight and passenger mitigation statements. The types of policies might be similar, the way of implementing them is radically different and need specific approach and comments.	Not clear which section this refers to. would like to increase the freight / logistics content Most of this additional literature is relevant and could help us elaborate . This is partly true. There is certainly a need for greater harmonisation of the measurement and reporting of carbon emissions from freight transport. This should be mentioned in the report. On the other hand, there is an emerging consensus on the key measures that should be applied to cut freight-related emissions. The particular mix of measures will vary with a country's level of development, size, industry structure, resource endowment etc

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
3580	8	0				There is almost no science on climate change mitigation in freight and logistics that is also mentionning passenger transport, and vice-versa. So what does not exist in reality should not be suggested in a IPCC report.	Much too negative. Under-estimates the amount and rigour of research done on this topic.
3581	8	0				There is an abundant literature on freight solutions that has not been mentionned or cited. Main authors, books and articles that would need to be cited: McKinnon Piecyk: Internalisation of external costs 2008; OECD: transport and globalisation 2010; McKinnon et al: Green Logistics 2012; Leonardi & Baumgartner TRD 2004; Rizet et al, TRD 2012; Allen et al, IATSS 2012;	To include. Agree, but this is due to the lack of published research on the subject. Several organisations have constructed marginal abatement cost curves for freight transport and reference could be made to this work in the report. we should be including these
3582	8	0				There is almost no literature and data on comparative costs per tonne of CO2 savings of different freight and logistics solutions.	Agree that there is a lack of published research on the subject. Several organisations have constructed marginal abatement cost curves for freight transport and reference could be made to this work in the report.
3583	8	0				Therefore, the focus of policy oriented search for innovative solutions is on testing and trialing new technologies or organisation forms, and assessing their mitigation potential. This approach allows us to go from the idea over the trial to the industry scale diffusion of innovation without being obliged to wait for a complicated political strategy development.	Point unclear. Maybe follows on from point above (comment 3582)
3584	8	0				No common understanding on how to measure CO2 mitigation effects in freight: too many approaches and assessment methods are competing. No universal standard of CO2 calculation. Solution: try to organise a universal ISO standard on CO2 calculation for goods and passenger transports.	Noted. We see your argument but the task of the IPCC is to assess existing research and other data.
3585	8	0				Load factor and vehicle occupancy are too low. The effects of efficiency measures on increasing vehicle load factors have been poorly recorded. New attempts of slow logistics, waiting for more goods to be distributed before starting the round trips, are promissing, and at zero additional costs.	Agree that we could say more about opportunities to improve load factors in freight vehicles. There is very little macro-level data available, particularly outside the EU, to permit assessments of current loading and the potential for improvement. Very little is known about the cube utilisation fo freight vehicles. The best example of 'slowing logistics' is 'slow steaming' in the maritime sector - which merits more discussion in Chap 8.

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3586	8	0				Clean electric freight vehicles and city logistics consolidation centres are currently tested in several urban freight trials in Europe (project documentations are available at SUGARLOGISTICS.eu, BESTFACT.net, SMARTFUSION.eu, STRAIGHTSOL.eu, etc). The assessments that include ghg mitigation criteria show mostly a positive cost-benefit situation. This type of solution involves behaviour change, new technologies, logistics efficiency, data collection and analysis, local policy support, European subvention at the trial stage, and involvement of manufacturers and software providers. The integrated case study approach currently in use is therefore a radical contradiction to this Chapter 8 structure that separates the different policy activities into an artificial set of different solutions.	Noted.
3587	8	0				The attempts to develop a European Logistics Strategy that would be mitigating climate change have failed in 2006-2007. There is no international concerted action or strategy on mitigating clinate change in freight. The most recent EU white paper however, have taken some elements on board, that could be useful for other countries. Most prominent is the support of electric vehicle use.	Chapter already refers to the EU White Paper's ambitious freight modal split target. Could reinforce references to freight transport policy in other parts of the world. The European 2006-7 initiative is presumably the Logistics Action Plan. Some aspects of this plan have been implement and are likely to be yielding carbon savings.
3588	8	0				There is also a pressing need for dedicated policy departments /experts dealing with freight and logistics at different governmental levels.	Need literature to support this point. There is evidence that governments around the world are attaching greater importance to logistics, though not always developing policies to address its environmental impacts. Raises wider governance issues that need to be co-ordinated with other chapters of the report.
3597	8	0				Cite the new EU white paper "33. A strategy for near- 'zero-emission urban logistics' 2030 □ Produce best practice guidelines to better monitor and manage urban freight flows (e.g. consolidation centres, size of vehicles in old centres, regulatory limitations, delivery windows, unused potential of transport by river). □ Define a strategy for moving towards 'zero-emission urban logistics', bringing together aspects of land planning rail and river access, business practices and information, charging and vehicle technology standards. □ Promote joint public procurement for low emission vehicles in commercial fleets (delivery vans, taxis, buses…) "	Chapter already refers to the EU White Paper's ambitious freight modal split target. Could summarise other freight policy initiatives in this white paper as they have a clear climate change focus. Need also to bear in mind other comments that chapter is already too EU- and US-centric.
7801	8	0				The chapter repeatedly writes "black carbon and aerosols". The need to focus specificly on black carbon is understandable. However, as black carbon is also an aerosol species, I would suggest writing "… and other aerosols" or just "aerosols".	Need to clarify this.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
12878	8	0				The chapter offers a wide perspective on climate-related transportation issues, in particular a wide range of technological and system-wide perspectives. Elaborations on policy instruments to tackle a carbon-intensive transportation path together with means to is financing do however not make up a large part of the chapter. Thus, a separate section on policy instruments and relevant studies is suggested. Changing the order of section 8.9 and 8.10 may be recommended. Strenghtening sections 8.9 and 8.10 may also benefit the chapter. Several citations are missing in the reference list.	Section 8.10 is on policy so point not clear.
18649	8	0				Readable The exsum readable and gives a real overview (not hidden in the FAQs)	Noted.
18650	8	0				Indirectly indicates that the investment boom that will come with decarbonisation can be challenging (seen from a shorter term emissions perspective?)	This comment could not be addressed as it is unclear to which part of the chapter it is referring to.
18651	8	0				Trade? Discussed an earlier chapter – should be coupled with some of the content in this chapter.	This comment could not be addressed as it is unclear to which part of the chapter it is referring to.
18652	8	0				Reuse? Recirculation?	This comment could not be addressed as it is unclear to which part of the chapter it is referring to.
18653	8	0				Interesting section/annex on waste – could be expanded into something more general	This comment does not refer to Chapter 8 and hence has not been addressed.
18654	8	0				Less known but seems partly depressing. Harder to estimate the full (and long-term) potential?	This comment could not be addressed as it is unclear to which part of the chapter it is referring to.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
5187	8	0				The whole chapter might be more system-based. Scenario analysis might be helpful to draw general tendencies, feedbacks, rebounds, and major policies and to what exten these policies should be integrated. While this chapter could be a systemic synthesis of existing knowledge, it now tends to be more a long list of all sorts of measures that might help to reduce emissions, without showing the many interrelationships between policies that might anhance or reduce the effectivity of the individual policies. Examples are: investing heavily in road infrastructure, while campaigning to get more commuters in public transport is not effective; same for investing in cheaper air transport (liberalisation of air market) and at the same time investing in high speed rail without really improving the economics of this latter system. Such contradicting policies will make it very difficult to make the mitigation progress needed. Scenario based refs: Åkerman, J., & Höjer, M. (2006). How much transport can the climate stand?--Sweden on a sustainable path in 2050. Energy Policy, 34, 1944-1957. Banister, D., & Hickman, R. (2012). Transport futures: Thinking the unthinkable. Transport Policy, In press. Bristow, A. L., Tight, M., Pridmore, A., & May, A. D. (2008). Developing pathways to low carbon land-based passenger transport in Great Britain by 2050. Energy Policy, 36, 3427-3435. Dubois, G., Ceron, J. P., Peeters, P., & Gössling, S. (2011). The future tourism mobility of the world population: emission growth versus climate policy Transportation Research - A, 45, 1031-1042. Girod, B., van Vuuren, D. P., & Deetman, S. (2012). Global travel within the 2º C climate target. Energy Policy, 45, 152–166. Gurney, A., Ahammad, H., & Ford, M. (2009). The economics of greenhouse gas mitigation: Insights from illustrative global abatement scenarios modelling. Energy Economics, 31, S174-S186. McCollum, D., & Yang, C. (In press). Achieving deep reductions in US transport greenhouse gas emissions: Scenario analysis and policy implications. Energy Policy, Corrected Proof. McJeon, H. C., Clarke, L., Kyle, P., Wise, M., Hackbarth, A., Bryant, B. P., & Lempert, R. J. (2011). Technology interactions among low-carbon energy technologies: What can we learn from a large number of scenarios? Energy Economics, 33, 619-631. Meyer, I., Kaniovski, S., & Scheffran, J. r. (2011). Scenarios for regional passenger car fleets and their CO2 emissions. Energy Policy, In Press, Corrected Proof. Meyer, I., Leimbach, M., & Jaeger, C. C. (2007). International passenger transport and climate change: A sector analysis in car demand and associated CO2 emissions from 2000 to 2050. Energy Policy, 35, 6332-6345. Peeters, P. M., & Dubois, G. (2010). Tourism travel under climate change mitigation constraints. Journal of Transport Geography, 18, 447–457. Scott, D., Peeters, P., & Gössling, S. (2010). Can tourism deliver its 'aspirational' greenhouse gas emission reduction targets? Journal of Sustainable Tourism, 18, 393 - 408. Sgouridis, S., Bonnefoy, P. A., & Hansman, R. J. (2010). Air transportation in a carbon constrained world: Long-term dynamics of policies and strategies for mitigating the carbon footprint of commercial aviation. Transportation Research Part A: Policy and Practice, In Press, Corrected Proof. Sterner, T. (2007). Fuel taxes: An important instrument for climate policy. Energy Policy, 35, 3194-3202. Yang, C., McCollum, D., McCarthy, R., & Leighty, W. (2009). Meeting an 80% reduction in greenhouse gas emissions from transportation by 2050: A case study in California. Transportation Research Part D: Transport and Environment, 14, 147-156.	Noted. System aspects are particularly discussed in Section 8.9.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
5214	8	0				The social drivers to (international) transport as outlined in Chapter 10 (tourism section) are missing here. The problem is that tourism is developing into a system highly depending on long distance air transport, while currently air transport covers only less than 20% of all tourost trips, while long haul in the order of 5%; but still causing up to 80% of all emissions (Peeters, P. M., & Dubois, G. (2010). Tourism travel under climate change mitigation constraints. Journal of Transport Geography, 18, 447–457). When air transport is considered on its own, demand falls out of the equation, because the aviation sector can not be asked to reduce its own demand. Therefore it is important to integrate analysis of torism and transport and show the large opportunities to reduce only small segments of ourism (mainly long haul) to significantly reduce demand for air transport. The same seems truye for other parts of transport where current transport demand seems to be taken as a given, making it extremely unlikely to find enough mitigation opportunities.	Noted. Tourism and the effects of its demand is covered in Ch.10.
8016	8	0				"Policy and decision making for transport development in non-OECD countries are instrumental to meet urban sustainability and climate goals" from p64, l.11 is worth being mentioned in the Ex. Summary	Agree but space constrained.
8021	8	0				"Without policy intervention, projected incremental improvements in fuel, vehicle and system efficiencies will be surpassed by annual growth in transport demand." from p.58, l.42 is worth being mentioned in the Ex. Summary	Agree but space constrained.
8024	8	0				"However, a number of technology options, such as second-generation biofuels, electric- and hydrogen-powered vehicles will still require time to make substantial contributions to climate change mitigation efforts in the transport sector", "Historical analysis suggests that it takes 30-70 years to fully implement new infrastructures" and "It is likely to take the introduction of 5-10 million vehicles over 15-20 years for both BEVs and FCVs to break even in costs with ICEs" from 8.9.2 on p.55 (l.15f, l.19 and l.36f) should be mentioned in the Ex Summ.	Agree but space constrained.
8025	8	0				"Achieving a 2oC stabilisation level will require major mitigation contributions to come from the transport sector over the next two decades" from p.55 l4f should be mentioned in the Ex Summ. (same for p.52, l.26)	Agree but space constrained.
8029	8	0				"In turn, a transformation towards a sustainable transport system requires simultaneous changes in non-transport domains, e.g. in relevant public institutions" from p.29, l.29f should be mentioned in the Ex Summ.	Agree but space constrained.
8034	8	0				"Recent trends suggest that current economic, social, or cultural changes alone will not be sufficient to mitigate global increases in atmospheric CO2 concentrations, and policy instruments, incentives, or interventions will be needed to reduce global CO2 emissions" from p.15, l.20f is worth being included in the Ex Summ.	Agree but space constrained.
8036	8	0				The constant travel time budget (see p14, l. 4f: "Urban travel time budgets averaging around 1.0 hour per person per day or 1.1 – 1.3 hours per traveller per day (Zahavi and Talvitie, 1980; van Wee et al., 2006) have been found to occur in all cities where data is available, including developed and developing economies") is a fundamental rule for transport planners and thus should be mentioned in the Ex Summ.	Agree but space constrained.
3162	8	0				This is hard to review because it is so far over limit.	Aiming to shorten
3163	8	0				It would be useful to have more links between this chapter and others, notably on the choice of policy instrument (a topic addressed in several chapters) and on how transformation pathways play out in the transportation sector. (IN this sense, chapter 9 offers a useful model. Here is a copy of a comment I made on chapter 9 in that regard: "Section 9.9.1 is a good model of what's needed in other sectoral chapters—a link back to chapter 6 so that readers can see how a common set of transformation pathways affects each sector. ")	Have many cross-references already throughout text. Can add more. good point

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
5692	8	0				Technologies that contribute to green transportation are not limited to energy saving. IT (Information Technologies) can reduce emission by inproving efficiencies of logistics.	Agree. Covered already but can expand
18765	8	0				Please consider discussing planned obsolesence in context of sustainability or reference Ch.10 where this might be centrally discussed.	Unclear what this refers to.
18962	8	0				General Comment: Storyline. The chapter still lacks a storyline. A storyline should take the following aspects into account: (1) The transport sector is the most difficult to decarbonise. In order to avoid dangerous climate change also the transport sector is required to significantly contribute to mitigation. This requires dramatic changes – this does not come across when reading the chapter. The chapter should clearly address this challenge and outline different pathways to solve the problem. I.a. they should cover how a rebound effect can be avoided. At the current state of the chapter implications of trends and options do not become clear to policy makers. Develop own back-of-the-envelope scenarios to convey estimates for different options, e.g. illustrating expected total emissions for different scenarios (i.a. expected BAU increase of LDVs modest technological progress vs. different mitigation cases). (2) What is the potential of the respective pathways? What do they cost? (3) What are the policy instruments that can facilitate this? What is the role of policies in different scenarios? E.g., should the sector be included in carbon pricing? Assessment of experience with different policy instruments is needed. (4) What are the trade-offs? (5) Further, better carve out the barriers that hinder potentials being realized. (6) Ensure that the approach you take on this is compatible with the other sectoral chapters to enable comparison and possible synthesis.	Noted.
18963	8	0				General Comment: Redundancies, structure and synthesis. The chapter presents a lot of data, but in large parts lacks synthesis – this is needed, though, to substantiate key messages. The Kaya identities are used in several parts of the chapter but improvements are needed in using it as structuring element (particularly as common reference point throughout the chapter) and for synthesis (outlining key strategies, how much each component can contribute [differentiated by regions] – also quantitatively [not only for examples as in Section 8.6]), e.g. "Transportation has a low to medium reduction potential for demand reduction (0-30%), a medium potential through modal shift (X%-20%), for energy intensity reduction a potential of Y% for air travel, Z% for shipping incl. waterways, A% for rail and B% for roads. The carbon intensity can be reduced by ...".	Agree. We will amend.
18964	8	0				General Comment: For all sectoral chapters there must be more clarity about what is covered in the section “Costs and Potentials” (8.6) and in “Sectoral implications of transformation pathways and sustainable development” (8.9). The coming meetings (SIE-3, LAM3) should work on this.	Agree. We will amend.
18965	8	0				General Comment: In order to improve the flow of the text numbers should be moved from the text to tables and/or (better) figures. The text should focus on giving the context and interpreting.	agree…especially in early sections, too many numbers
18966	8	0				General Comment: Focus. There is still too much focus on technologies (vehicle types and propulsion technologies)	Don’t agree as the balance has been discussed
18967	8	0				General Comment: Length. The chapter is well beyond its page limit.	Agreed
18968	8	0				General Comment: Linkage. A strategy needs to be developed of how to synthesize and possible aggregate data (incl. costs) that will function as a counter part to scenario data from Chapter 6. Explicit references to Chapter 12 are needed and clarification what is covered in this chapter and in Chapter 12	Chapter 12 already X-referenced widely.
18969	8	0				General Comment: Costs. Concerning costs, a common metric should be established, LCCEs provide such a metric.	Agree section 8.6

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
18970	8	0				Please consider adding a discussion on land-use, land prices and its implications to the chapter, including land area used by different modes (per passenger per time), differences of costs between running public transport underground or on the ground.	Rejected. Relevance not clear. Addressing such issues is not feasible given the limited size of the chapter.
18971	8	0				Concerning policies consider discussing the consequences of ownership of land and/or transportation infrastructure for the ability to implement policies (e.g. ownership of rail networks).	Rejected. What relevance to transport mitigation? Maybe in Ch 12 and/or Chap15
11605	8	0	0			Chapter difficult to read and to review. It's not wrong, but has several major shortcomings: 1) Lack of focus: A holistic assessment of the full climate impact of transportation today and in the future, as well as its mitigation potential is not done. 2) Lack of balance: Most is on passenger transport, not balanced with the role of freight transport. 3) Lack of comprehensiveness: Results from single studies are highlighted in charts and figures. I would however expect summary charts and tables from a review. Exceptions and hence good examples: Tab. 8.6.2 and Tab 8.8.1 seem to summarize, but are hard to read (even because of bad reproduction quality). These tables seem to be key and should be expanded furhter, better placed highlighted. Figs 8.9.1/2 are very interesting as well, though source is missing. 4) Lack of specifics/too broad brush: Though it is acknowledged throughout the text that there are important regional differences, you do not highlight and distinguish them clearly. Suggestion: Try to identify some (country) case studies for which you pull through your quantitative results. Good countries, standing for larger country groups, could be: US/WEU/JPN; CHN/IND. Here you could nicely illustrate eg. levels of transportation (e.g. as pkm/cap and tkm/GDP; energy intensity; total transprot energy use; total transport emissions of LL and SL GHG; analysis what mitigation options would seem feasible and what impact that might have. Trying to do all at once has resulted in the current stew.5) A lot in this chapter is on energy demand. Translate this to GHG emissions and impacts, then you are better in focus.	Repetition of comment 11595, see answer there.
10442	8	0	0			The new technologies that create the savings in Co2 are exciting, but I do not see an explicit connection spelled out here between these green technologies and exact impacts on the environment.	Noted. Section 6.9 is meant to provide a systems perspective showing the respective share of technologies in scenarios.
10443	8	0	0			Need more developing country focus	Agree.
7393	8	0	0	0	0	This chapter should include a section (and a statement in the executive summary) that considers and discusses the role of GHG metrics (GWPs etc) for transport, particularly for lifecycle assessments of transport emissions. E.g. Peters et al, EnvSciTec 2011; Azar and Johansson ClimChan 2012; Fuglestvedt et al, AtmosEnv 2010. Such information is highly policy relevant especially for policy approaches that try to consider short-lived as well as long-lived forcing agents (an issue that also seems to have received very little attention in this draft; e.g. for regional approaches to limit transport emissions, and for lifecycle assessments). This discussion could link with Section 3.10.3 but build on it by demonstrating the particular instances where metrics are important in the transport sector.	Noted. The choice of GWPs etc. is covered in the framing chapters. We added a reference.
3437	8	0	0			You write about demand reduction in Sections 8.6.1 and 8.10.1. You write about modal shift in Sections 8.4.2.3 & 8.4.2.4 and in Section 8.6.2 (and ignore modal shift in Section 8.10.1). I understand that Sections 8.4, 8.6 and 8.10 deal with different aspects, however all this multiple reference to the same topics is confusing.	Demand reduction is more than modal shift.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
3443	8	0	0			You write about demand reduction in Sections 8.6.1 and 8.10.1. You write about modal shift in Sections 8.4.2.3 & 8.4.2.4 and in Section 8.6.2 (and ignore modal shift in Section 8.10.1). I understand that Sections 8.4, 8.6 and 8.10 deal with different aspects, however all this multiple reference to the same topics is confusing.	Accept. Chapter will be revised and repetitions will be avoided. However, in some cases, because different aspects of a same issue have to be dealed with from a different perspective in the different sections of the chapter, the same issue can be discussed more than once, provided that new information is presented.
3444	8	0	0			General comment: Obviously the chapter contains essentially all the important information about the transport sector - especially with regard to passenger transport with which I am more familiar. The authors are experts in the field and are very well aware of the literature. However, the organization of the chapter could be improved in my opinion because I found it confusing from Section 8.4 onwards. Therefore, when writing about mitigation costs and potentials, opportunities and barriers, I suggest following the ASIF structure shown in Figure 8.1.2.b: Adrress one Section to each one of the four parameters of the equation - demand reduction, modal shifts, changes in energy intensity and changes in carbon intensity respectively. The latter two parts are very well covered by the excellent Section 8.3. Subsequent sections and subsections dealing with behavioural aspects, urban form, infrastructure, costs etc. could be grouped together in line with the ASIF structure; this would greatly improve the clarity of the messages of this chapter. Policy options should be described in a similarly structured and clear manner. Table 8.8.1 could be extended to include potentially more policy options plus a column on cost-effectiveness of each measure, and thus it would become the key summary table of the whole chapter.	worth considering but cannot change level 1 sub-headings as set by IPCC Plenary.
17778	8	1				somewhere in the text there should be a mention of the EPA 2017-2025 light duty vehicle rule - does t discourage alternative fuel use?	Accept - will need a reference
17779	8	1				For the executive summary - consider the formats used in chapters 16 and 10	This version based on past IPCC reports. To be standardised
13872	8	1		100		Authors often refer to future when estimating the interest/potential of a specific measure, then it may be useful to clearly define which kind of baseline is used. + It could also be useful to better define "Cities" (versus urban area) and to link the definitions used with chapter 12 (Human settlement) + There is no need to start (as always) with technology first as a solution: to avoid main emissions in the future through urban form should be stronger emphasized. □	Accepted. Please note, though, that as chapter is based on various studies, it is not possible to refer to a consistent baseline throughout and that using one would also be not inspirit of a comprehensive assessment (assessing i.a. various baselines).
11183	8	1	1	1	1	Chapter 8 is well-organized and very informative. It contains many new important subjects.	Agree
2438	8	10	10		13	This definition is a good one - but accessibility is not mentioned again (apart from passing - p29 and 38) - until the end (p58) and then not in terms of sustainable mobility - issues of affordability, equity and efficiency are also not referred to again in the context of this definition.	Accept.
17708	8	10	10			Is transport about mobility or access? The chapter emphasizes the first rather then the second. But surely mobility is a means to an end, rather than a value in its own right? There is little in the chapter that tackles explicitly what might be done to reduce travel (without reducing welfare).	Both. I thought there was quite a bit about density and urban planning
15320	8	10	13			I think "between" will sound better as "across". :-)	Accept
15321	8	10	14			"whereas" needs a comma in front of it.	Accept
15322	8	10	15			open parens in front of Zegras should be removed.	Accept

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
15323	8	10	16			"Diminishing" should probably be "Reducing" (since that is a more active/appropriate verb & is simpler to read & quickly understand).	Accept
8871	8	10	2			Not sure that HDVs are used in urban regions only	Agree. sentence doesn't say this
11607	8	10	2	10	2	HDV increase in urban areas. What's the evidence?	Amended. good question
15805	8	10	20	10	25	suggest omitting this paragraph. Does not add much value	To be considered in next draft. agreed…unless we add something later on
15324	8	10	20			"assessing" should be "assess"	Accept
14751	8	10	20	10	20	Please name indicators. Furthermore a lot of transport indicators are uncertain (travel activity, load factors, on-road fuel economy) and data collection needs improvement (especially on-road fuel consumption) to obtain a better picture of todays transport system	Accept
15325	8	10	21		23	all those references need to be in one set of parentheses	Amended
15326	8	10	25			citation is imperfect (should only have one last name, no initials, etc.)	Amended
15327	8	10	26			cross cutting needs a hyphen	Accept
15330	8	10	26		35	I am not sure why a "this chapter does this & this" paragraph suddenly shows up in the middle of all these paragraphs. It is out of place (& those "this chapter" refs can probalby be deleted, since they're a bit generic). Of course, an intro to a chapter's contents is always nice to see (but that should be plainly in the chapter's intro).	Moved
14752	8	10	26	10	35	Something like this should maybe occur at the beginning of the chapter?	Moved
2809	8	10	26	10	30	What this sentence intends to convey is not clear. This para seems to explain the structure of the chapter. Then, the sentence should be rewitten to indicate that this chapter first discusses a system-based framework of indicators. It would further need what specifically mean "a system-based framework of indicators"	Amended
5186	8	10	26	10	30	I feel the "system-based framework" is not very well presented nor developed. Such a framework should make use of systems thinking and show, e.g. through causal loop diagramming, the feedback mechanisms between transport quality, transport cost, transport speed, energy efficiency, spacial structure and transport volumes (a tourism related sample in Peeters, P. (2010). Tourism Transport, Technology, and Carbon Dioxide Emissions. In C. Schott (Ed.), Tourism and the Implications of Climate Change: Issues and Actions (Vol. 3, pp. 67 - 90). Bingley (UK): Emerald. Furthermore my suggestion would be to mch more base this chapter 8 on the many scenario based literature and its conclusions (see general chapter remark nr 6).	Agree that this paragraph doesn't work here, and it's not clear we've used a system based framework. Tourism in Ch 10.
15328	8	10	28			comma needed before "including" & this whole sentence (which is very confusing & unusually long) should be overhauled (& shortened, to get to the point)	Amended
15329	8	10	31			comma missing before "along with"	Amended
12884	8	10	34	10	35	This sentence is not very comprehensible and should be elaborated. It could help to refer to the chapters where the subject/the distinction is implemented. Or is it meant that behavioural aspects of mitigation in the transport sector are treated marginally, e.g. chapter 8.3.5 is just about one to two pages in contrast to several pages of technological options? Please clarify.	Amended. and technology doesn't belong in a sustainable perspective? This sentence shows a distinct bias against technology
11609	8	10	36	10	49	You miss behavior change and demand reduction among the mitigation options.	Amended
15331	8	10	36			colon is needed after "factors" (rather than a comma)	Accept
14753	8	10	36	10	49	Why fuel switch is always mentioned first? I would start with vehicle efficiency measures as these include cost efficient, near term action.	Is no ranking order intended. not important

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
4290	8	10	36	10	37	Three main factors, carbon intensity (CO2eq/MJ), energy intensity (MJ/km), and activity (km/capita) are correct. However, actual vehicles transports the passenger or freight fewer than a capacity. Transport efficiency (road factor) affects the GHG emissions per capita or per ton. Therfore, I propose next decompose. GHG emissions = carbon intensity (CO2eq/MJ) × energy intensity (MJ/capacity-km) × activity (man-km, or ton-km) / road factor(real number of passenger/capacity, or real tons of freight/capacity)	Good point included. This is correct for freight and reflected in the current references to carbon intensity in the chapter. worth considering
16279	8	10	37	10	37	Energy intensity is usually defined in terms of MJ per passenger-km (pkm) or MJ per tonne-km (tkm), and activity is usually defined in terms of pkm or tkm.	Amended
15332	8	10	38			Bongardt should not have a parenthesis in front (both citations' years should be in parens, but not the author names, in this case).	Accept
15333	8	10	39			I'd remove "(energy carriers)". There's on need for it here & it's not a term I would use. (A carrier is usually a freight carrier, sent by a shipper. So energy carrier reminds me of a system or firm to carry energy, not a material or substance. ;-))	Common term for fuels etc. Editorial. the term "energy carrier" usually refers to electricity or hydrogen, not to all fuels, I believe
5396	8	10	39		40	why would varying carbon intensity affect activity? Perhaps this would be true once a strong carbon tax were in place, but otherwise why would this matter?	eg limited range of electric vehicles but deleted
15316	8	10	4			"as" should be ", since".	Accept
15334	8	10	40			"on" should be struck in *both* instances. I also don't understand why a fuel type would affect activity (though I realize that a battery limits range, so BEVs don't really allow for long-distance vacations, for example). Specifics are importnat throughout this chapter. There is too much generic info on this page, I feel.	Editorial. Deleted. Agree
15335	8	10	40			"therefore" should be struck	Accept
15336	8	10	42		43	the "thereby" clause should be struck ("switching modes" is the only change in the list that has a specific example, and it's rather obvious why switching modes could be helpful, so no example is needed).	Accept
16280	8	10	42	10	43	The phrase "thereby reducing the shares of less efficient modes" is redundant and should be deleted.	Accept
15337	8	10	44			"whereas" needs a comma in front of it. Please seek & replace throughout the chapter. There may be other instancesI'm not catching.	Accept
15338	8	10	45			comma belongs after the parenthetical (not before)	Accept
15339	8	10	46		47	comma needed after "chapter" (this is a long sentence, and the reader needs a breath break here ;-)) Or you can just remove the "in order to give…" clause.	Accept
15340	8	10	48			"on" should be struck	Editorial
15317	8	10	6			"public transport" should be "use of public transport" (to be consistent with other items in sequence), and "systems, related" should be "systems and related".	Accept. Editorial
15318	8	10	7			"intensive" should be removed.	Editorial
8872	8	10	9	10	10	unfinished sentence	Amended
14273	8	10	9	10	25	Not sure of the relevance of these two paragraphs - they could be removed without affecting the narrative.	Accept
11608	8	10	9	10	35	Suggest to delete. You don't need the SD debate here - and you don't take it up later anyway.	Accept
15319	8	10	9		10	This odd first sentence of the paragraph should be removed (or overhauled).	Amended
14750	8	10	9	10	19	Please re-phrase	Amended or eliminate
12883	8	10	9			The second paragraph of this page begins with a sudden onset of the term "sustainable transport". It would help the flow of the text if the term was introduced.	Defined there. or deleted
5185	8	10	9	10	19	Suggest to add reference to e.g. Åkerman, J. (2005). Sustainable air transport - on track in 2050. Transportation Research - D, 10, 111–126 and Åkerman, J., & Höjer, M. (2006). How much transport can the climate stand?--Sweden on a sustainable path in 2050. Energy Policy, 34, 1944-1957. This is also linked to my comment number 2.	Agree. to include

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
17167	8	10	1	10	8	Good to highlight what the AR4 was saying; would be good also to show to what extent and how the AR5 is different	Will add
6475	8	10	1	10	2	Not sure as to why “urban” is indicated. Heavy duty trucks ownership and VKT has increased due to high rate of growth of expressways and road construction in rural areas when compared to improvement of railways and thereby road freight movement increasing its share and tonnage.	Agree. There is an important inter-urban dimension to road freight traffic growth which needs to be mentioned. This growth has not only be due to the expansion of road expressway capacity, however. needs to be verified….presumably, our version does have justification in the data, but I'm not sure
2663	8	10	1	10	2	Implication in this sentence is that the cause of freight transport growing more rapidly than passenger transport is 'the use of HDV in urban regions and ships for international movement of freight'. Please rephrase this sentence.	Agreed. There is a need for a more comprehensive explanation of why freight traffic volumes have been growing. rephrase only if our version is incorrect
2665	8	10	26	10	35	The discussion of sustainability indicators (other than co-benefits of GHG mitigation) seems out of place and unnecessary.	Amended
8362	8	10	35			PIs define what you mean by sustainable transport here (alt give a reference to the place in this report where you define it) and highlight the implications of sustainable transport on freight services. Otherwise the reader cannot follow your arguments and understand the separate meanings related to the technological perspective versus a sustainable transport perspective. And when implemented -what kind of results will the two different strategies lead to?	Agree, though this is clearly a matter of opinion and only one reviewer has made this point with reference to freight transport. A distinction is made between technological and sustainable transport perspectives. It is assumed that the reviewer is using the latter term to describe behavioural initiatives. It is probably true that, relative to the discussion of behavioural options for carbon mitigation in the freight sector, technological advances are given too much weight, but this bias can be corrected by saying more about the former. or listen to other reviewers, and delete
2666	8	10	44	10	45	"…whereas sustainable transport options, including behaviour, tend to focus on activity and structure." There are multiple definitions of 'sustainability', 'sustainable transport', etc. I disagree with how this is being defined and would recommend that this be deleted to avoid confusion.	agree
13875	8	10	45	10	49	Life Cycle Analysis should be considered for teh different transportation modes. See articles of Dr. Arpad Horvath (Professor, University of California, Berkeley) and Chester, Mikhail, UC Berkeley Center for Future Urban Transport)	Add to 8.1.3
2664	8	10	9	10	25	These paragraphs seems out of place. Suggest this be deleted.	Amended
17760	8	100				33 pages of references, two-third of the chapter is references, just too many. Some references are of lttle significance.	It is a review of the literature. probably a a fair comment
8873	8	11				It might be better to use a 2D graph here. Current figure seems to suggest that there is some passenger transport using pipelines going on.	Editorial. there's no reason for the 3-D effect

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
2439	8	11				The key figure here misses one element - occupancy: either in terms of load (is the freight full or empty) or in terms of passengers - activity is only looked at here as a measure of distance - not what is going to be done at the destination - the figure needs rethinking.	Accept - amended in text. Allowance should be made for vehicle loading. good point
4336	8	11				need emissions data for passenger only	Noted. Figure was replaced by different one.
4337	8	11				need to provide original source: this is from Schipper (various IEA publications)	Assume this refers to Fig 8.1..2b but to be reviewed
11274	8	11		11		I like this figure for disentangling certain mitigation options in 4 steps; however, there are some negative feedback mechanisms that may occur and that are not covered with this scheme (eg. Reductions in energy intensity may induce reductions in travel costs and, thus, increase the total amount of travel, as mentioned later in the report); moreover, the "activity" dimension could be elaborated further, see remark No. 1	- rebound effect to be included. don't agree that negative feedback is not "covered"….it just isn't called out explicity, but nothing says the four factors are totally independent
14755	8	11	-	11	-	The share of rail seems very small, compare e.g. ETP 2012, chp 13, fig 13.1	To be revised. worth checking
8351	8	11	1			Kaya identity is shown almost in every sector such as transport (Ch.8), building (Ch.9) and industry (Ch.10). Therefore I think figure 8.1.2.b is deletable for shortening the volume.	Is outlined in detail in an earlier chapter. Here it will relate only to transport (figure to be replaced). if there is a discussion early on in the report, I agree
5188	8	11	1	11	1	This figure, though in itself correct, is too linear, actualy stating that activity is a given, while activity (pkm, tkm) is a function of mode choice, energy source and associated cost, system efficiency (speed, cost), infrastructure development and maintenance, social sructure, car and biycle (and airplane) ownership. Furthermore, most of these parameters have feedbacks to the activity and to each other. By making the current figure the basis of the chapter, you run the risk to be unable to show many opportunities as well as threats to the success of mitigation policies, (including strategies aiming at car ownership and bicycle ownership policies and also season tickets for public transport; large shifts in infrastructure investments, road transport speed policies (increased recently by the Dutch government, which simply adds some 5-10% of emissions to the system).	Noted. We agree with the concerns - ASIF is used as a structuring element only.
4291	8	11	1			For a reason same as the above, Total GHG emissions = ∑Structure(% share of mode) × carbon intensity (CO2eq/MJ) × energy intensity (MJ/capacity-km) × activity (man-km, or ton-km) / road factor(real number of passenger/capacity, or real tons of freight/capacity)	Accept - new figure amended. This is correct for freight and reflected in the current references to carbon intensity in the chapter. Same as comment 457. we DO need to account for load factor….although it may just be embedded in the efficiency component, if we measure that component in terms of ton-km or p-km, not vehicle km or capacity*km
8430	8	11	10	11	10	Please specify in a note that LDV include both passenger cars and light commercial vehicles, since in a lot of references on road transport emission assessment (i.e. Copert program) the term LDV is used only for light commercial vehicles.	Accept. we should have defined LDV up front
15341	8	11	10			I'm not a big fan of "modal choice". I would never state it that way; I would just say "mode choice".	Editorial
14754	8	11	10	11	12	Re-phrase please	Accept

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
17168	8	11	14	11	14	The energy demand for rail freight is higher than for passenger rail according to IEA/UIC stats, figures needs to be updated for rail	The UIC Railway Handbook 2012 of Energy Consumption and CO2 Emissions (Figure 23), this is not true provides a break-down of rail passenger and freight energy use and CO2 by country and region but does not give global estimates. Perhaps the UIC / IEA can provide this.
15342	8	11	15			I don't know what "indicative" means; I'd strike that from the title.	Accept
15343	8	11	17			IEA reference needs parens removed & semicolon added	Accept
8874	8	11	18	11	22	these are tonnes carried and not t-km carried	Rejected. t-km is correct
11613	8	11	18	11	22	Good references: Jens Borken, Heike Steller, Tamás Merétei, Filip Vanhove: Global and Country Inventory of Road Passenger and Freight Transportation: Fuel Consumption and Emissions of Air Pollutants in Year 2000. Transportation Research Record: Journal of the Transportation Research Board. Volume 2011, 1, 127-136. DOI - 10.3141/2011-14. http://trb.metapress.com/content/X2223425H545K651 Jens Borken-Kleefeld, Terje Berntsen, and Jan Fuglestvedt: Specific Climate Impact of Passenger and Freight Transport. Environmental Science & Technology 2010 44 (15), 5700-5706	Noted. Most of this additional literature is relevant to freight and could help us elaborate .
11614	8	11	18	11	22	Only freight ? Add traffic volume figures also on passenger transportation.	Aiming to do that
16281	8	11	18	11	18	As shown in Azar et al. (C. Azar et al., 2003. "Global Energy Scenarios Meeting Stringent CO2 Constraints - Cost-Effective Fuel Choices in the Transportation Sector." Energy Policy 31, pp. 961-976), freight movement is dominated by international shipping.	Noted.
8038	8	11	19	11	19	I doubt if the '5100 bn tkm per year for global road freight' is correct, and I know that 'rail is moving globally 350 bio tkm' is wrong: In China alone in 2008 2500 bio tkm freight have been moved, in US and in Russia a similar number of tkm per year. This is 6000 or 7000 bio tkm freight by rail in these three countries alone. From wikipedia I learn that in 2010 9.281 billion tkm were transported on rail.	The statistics quoted in the chapter need to reviewed and if necesssary amended. as earlier comments noted, they think this is tonnes carried, not tonne-km. Agree. The rail transport volume is 9,281 billion tkm in 2010 globally (see world bank statistics). The original statement seems problematic. As in China, freight transport by rail is larger than by road.
14274	8	11	20	11	21	The average distance of international shipping cargo is known, and was around 4500nm per tonne in 2006. Reference is Committee on Climate Change (2011), "Review of UK Shipping Emissions", Figure 4 p19 (http://downloads.theccc.org.uk.s3.amazonaws.com/Shipping%20Review/CCC_Shipping%20Review_single%20page_smaller.pdf). This is calculated as global tonne-miles/global tonnes shipped.	The statistics quoted in the chapter need to reviewed and if necesssary amended. UNCTAD's annual review of Maritime Transport may be another authoritative source of shipping data. check and use
15344	8	11	21			The "and" should become a semicolon.	Accept
2440	8	11	23			A figure of 980 million LDVs is used here - on p15 li11 a figure of 780 million is used	Accepted.
14275	8	11	23	11	30	The information in this paragraph could be very usefully represented in a graph - this would make it easier to digest.	Agree

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
15807	8	11	23	11	30	Might mention that petroleum demand is leveling off in OECD nations but increasing in devleoping world	Reference? thought we did say this
11615	8	11	30	11	30	Cities don't consume, only people and their machines. Mind the language, as it transports images and possibly perpetrates concepts, for better or worse.	Accept
12885	8	11	7			The sequence of 'passenger' and 'freight' transport is opposite to that in the main heading 8.1 . As passenger shares of total transport demand are greater than for freight, passenger transport should figure first, as well in the main headline.	Accept
11611	8	11	8	11	13	marine shipping has as high a share as aviation. Hence single out and don't hide in rest. Besides, it unusual to lump agric., construction machinery into this. These categories do neither show up in Fig. 8.1.3, hence correct and delete	Agreed. Need separate energy estimates for each mode and exclusion of agric, construction and machinery.
15806	8	11	8	11	13	are %'s quoated here on energy, mass or volume basis - should specify	Energy shares. I think it's adequate as it is, % of oil consumption
18902	8	11	8	11	13	Consider making figure from data in this paragraph, for details see comments to Figure 8.1.3	Accept. worth considering….this whole section uses too many numbers in the text
4398	8	11	20	11	20	The lack of data to compare shipping freight t-km to road, rail and air is a severe. While normalizing measures hide absolute behaviour, this work is unable to compare the impacts of shipping to other modes of freight transport.	Is a work in process. Drawn attention to some new data-bases some which we should use for the next draft. The comment is unclear. Improving tonne-km data for the various modes is a work in process. Rather negative view on the ability to compare impacts of shipping with those of other modes
4399	8	11	30	11	30	Is the per capita energy use in cities for transport services only or all energy?	Transport demand quoted. good catch….text is unclear, will improve
6477	8	11	18	11	18	“Although data are uncertain, freight movement is dominated by road transport” - the same can be said about passenger transport activity and emission numbers atleast from the developing countries perspective	Agree though this may not be correct…freight ENERGY USE is dominated by roads, but rail and shipping are awfully important in total tonne-km.
8363	8	11	25	26		Aren't the numbers for China and Africa referring to average numbers of cars in Chinese and African cities and not countries?	Country data. The numbers for China and Africa are country average but not urban average.
6476	8	11	8	12	8	Maybe it’s good to suggest that freight energy demand exceeds passenger energy demand in many Asian developing countries and diesel consumption exceeds gasoline. The trend is different in different regions based on the penetration of the road passenger vehicles.	Agree but needs references and access to more hard data on the relative energy use by freight and passenger services in Asian cities. not clear how to respond
4404	8	11	23	15	12	Inconsistency between the current 780 million LDV in line 12 and 980 million LDV in 2009 in line 23, page 11	Accepted.
8431	8	12				I would delete this figure and substitute it with a more comprehensive figure (or table) showing average GHG emission factors for different means of transport, both passenger cars and freight. These data are of a great importance	Agree. Also need aviation Comment 528. agree…figure contains too little info to justify a separate figure

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
8545	8	12				OUT OF CONTEXT (AND POTENTIALLY MISLEADING) CHARACTERIZATION. TEXT READS "there is a clear but non-linear association between higher densities and greater public transportation use, with the largest effects taking place at up to 70 people per kilometre, beyond which returns are marginal (Rickwood et al., 2008)." COMMENT: This characterization omits an important qualification in the very next sentence.... Here is the complete quote from (Rickwood et al, 2008, 18): there is also a clear, and non-linear, association between higher density and greater public transport use, with the largest effects taking place at up to 70 people/ha, beyond which returns are more marginal. However, given that population densities typically decrease with distance from the central business district (CBD), the true underlying effect may partly or wholly relate to distance from the CBD, rather than density. As in comment #1, the issue may be distance from the CBD, rather than density. □	Noted. Comment can not be addressed as there is a discrepancy between the reference provided and the content.
8546	8	12				IMPORTANT ISSUE MISSED (AS IN RICKWOOD COMMENT, LINE 2)The CBD qualification by Rickwood, et al (2008) is further supported by Turcotte (2008) of Statistics Canada, who finds that "Above 10 kilometres from the city centre, however, the impact of neighbourhood density on automobile use dwindles until it almost vanishes" http://www.statcan.gc.ca/pub/11-008-x/2008001/article/10503-eng.pdf	Noted.
15808	8	12				Missing Air (planes) emissions	Agree
8037	8	12				The broad range of specific emissions for freight rail is not helpful. Suggestion: Please insert a table including the big rail freight countries (China, Russia, US, India) and others and numerating the CO2 emissions per tkm for these countries.	The UIC / IEA Handbook for Rail 2012 Energy Consumption and CO2 Emissions provides a break down of railfreight energy use by country and region. Including this data will provide a more comprehensive picture. . even that would be problematic, given the differences in the type of cargo transported…U.S. numbers greatly aided by the huge volume of coal transported, I suspect. Agree. This suggestion can be accepted if emission intensities for freight rail in these countries are available (The average CO2 emissions for freight rail in China is about 13.4g/t-km in 2007.)
17767	8	12	10			there is no mention of "well-to-tank" in chapter 7 at present	Noted.
16255	8	12	10	12	13	Transparent links to other chapters. However, not all of the aspects listed here are explicitly addressed in the mentioned chapters. E.g., roads, ports, and airports are not treated individually in Chapter 12. Coordination needed.	Links being covered.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
11616	8	12	14	12	19	You miss the impact from SLCFs, most important for aviation and shipping. Hence these references are not sufficient here. You find much better values in Jens Borken-Kleefeld, Terje Berntsen, and Jan Fuglestvedt: Specific Climate Impact of Passenger and Freight Transport. Environmental Science & Technology 2010 44 (15). or Jan Fuglestvedt, Terje Berntsen, Gunnar Myhre, Kristin Rypdal, and Ragnhild Bieltvedt Skeie: Climate forcing from the transport sectors PNAS 2008 105 (2) 454-458; published ahead of print January 7, 2008, doi:10.1073/pnas.0702958104	Noted. The central historic emission database used covers the Kyoto gases.
3819	8	12	14	12	14	Replace "100GT" by "100kt".	GT is gross tonnage. refers to line 7, I believe….check
4401	8	12	15	12	23	Reconcile the statements in lines 15 and 23 as it relates to total GHG emissions from transport. In the former, it is assigned to LDV at 45%. The latter statement assigns 45% of GHG emissions from transport to freight (assumed not LDV?)	Freight is part of LDV, all of HDV, some aviation, some marine, some rail and pipeline. no contradiction….other 10% is "other passenger transport, mostly air"
14756	8	12	17	12	17	Please cite more up-to date source, e.g. IEA ETP 2010, IEA ETP 2012	Accept
11618	8	12	20	12	22	see also Elmar Uherek, Tomas Halenka, Jens Borken-Kleefeld, Yves Balkanski, Terje Berntsen, Carlos Borrego, Michael Gauss, Peter Hoor, Katarzyna Juda-Rezler, Jos Lelieveld, Dimitrios Melas, Kristin Rypdal, Stephan Schmid, Transport impacts on atmosphere and climate: Land transport, Atmospheric Environment, Volume 44, Issue 37, December 2010, Pages 4772-4816, ISSN 1352-2310, 10.1016/j.atmosenv.2010.01.002.	Noted.
8876	8	12	24	12	25	the 13% here is not correct	Accepted. Corrected.
18227	8	12	26			It is suggested to conclude line 26 with a reference to the IMO. All information until the full stop does nothing for the document drafting. If the volume of CO2 emissions by small fleet and fishing vessels is already supported with statistics, it is not relevant to stress that data of small boats is hard to gather and, therefore, uncertain.	Stats are crude. reasonable comment
4292	8	12	27	12	28	About Figure 8.1.4, we should write the reason there is a difference in the amount of CO2 emissions by Road and Rail and Shipping. Because the scope of the modal shift would have been limited, the possibility of a new mode of transport would have been rejected. The main reason is explained by the following. The difference by the transportation mode of rolling resistance and water resistance, air resistance due to the drag coefficient (CD) and moving speed, gross weight / net weight.	Noted. Figure was replaced.
17169	8	12	29	12	29	fig 1.6 in IEA, 2009a provides a more complete picture for this graph, including aviation	To be updated. worth examining
14276	8	12	3	12	8	Make aviation and shipping comparable (i.e. for aviation, need to state how much fuel in Mt or EJ, with international and domestic split, rather than % in each region).	Accept
15346	8	12	3			need to remove first initial of author	Accept
14277	8	12	34	13	5	Not sure that this paragraph is needed - it's just an intro to section 8.2, but that section already has a perfectly suitable intro. So I would suggest deleting this paragraph.	Noted.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
11619	8	12	34	13	5	For aviation you need to discuss contrails and cirrus clouds, as the main effects. D.S. Lee, G. Pitari, V. Grewe, K. Gierens, J.E. Penner, A. Petzold, M.J. Prather, U. Schumann, A. Bais, T. Berntsen, D. Iachetti, L.L. Lim, R. Sausen, Transport impacts on atmosphere and climate: Aviation, Atmospheric Environment, Volume 44, Issue 37, December 2010, Pages 4678-4734, ISSN 1352-2310, 10.1016/j.atmosenv.2009.06.005. For shipping you should mention the cooling effect of SO2 aerosols. Cf Shipping Emissions: From Cooling to Warming of Climate—and Reducing Impacts on Health. Jan Fuglestvedt, Terje Berntsen, Veronika Eyring, Ivar Isaksen, David S. Lee, and Robert Sausen. Environmental Science & Technology 2009 43 (24), 9057-9062	Agree
5189	8	12	34	12	40	Be very careful with the Fuglestvedt reference in this context: this study gives only the long term climate impacts of current (cumulative) emissions and tells nothing about the impact of nitrogen and methane in case transport activities are growing at current or increased levels. Actually, the paper's results are based on a scenario where all transport emissions would stop now for the next 100 years. This is interesting from a scientific point of view, but of not much practical use in a mitigation policy context. Please remove here (or at least thoroughly explain the context).	Accepted.
11874	8	12	36	12	36	Methane is referred to as a long-lived emission here (which I believe is correct) but in Chapter 7 it is referred to as a short lived climate forcer. I suggest that someone verify how the IPCC wants methane referred to and ensure it is consistent throughout the chapters in the report.	Noted. Here correct.
10766	8	12	37	12	37	The effect on stratospheric ozone is small and this effect does not need to be mentioned here. See papers from the ATTICA assessment for a good overview of effects of transport on climate. See: www.ssa-attica.eu	Rejected.
8712	8	12	38	12	38	Emissions of black carbon are particularly damaging in Polar Regions where they may accelerate melting of snow and ice. The rate of Arctic summer thaw has increased to the point where new shipping lanes are now considered viable. (IMO, 2009. Shipping GHG study)	Accepted. See Section 8.5
8875	8	12	6			what did shipping consume? Heavy oil? Diesel?	A fuel mix. Added. mostly heavy oil….worth saying
12886	8	12	9	13	5	The chapter 8.1.3 omitts GHG emissions that derives from mode-specific infrastructure and infrastructure maintenance; they should be indicated here. The relevant literature should be cited, e.g. Mikhail V. Chester, Arpad Horvath, Samer Madanat (2009), Comparison of life-cycle energy and emissions footprints of passenger transportation in metropolitan regions, and/or a reference to section 8.4 should be given. Additionally it is not clear, why GHG emissions/tkm are indicated but GHG emissions/pkm are omitted?	Noted. Section restructured/rewritten.
7714	8	12	20	12	22	The emissions of F-gases are mainly from refrigerants' are understandable but the amounts of around 10,000 metric tonnes of leakage look like too large. Please confirm the amounts come from emission or consumption.	Accepted.
10772	8	12	9			This paper could be relevant here: Peters et al. 2011: Alternative 'Global Warming' Metrics in Life Cycle Assessment: A case study with existing transportation data. Environmental Science & Technology, 45: pp. 8633-8641.	Accept
7802	8	12	9	13	5	Suggest changing the title of the section. The section is confusing as is also covers emissions of NOx and aerosols, which are not GHGs. The section also does not give values for indirect emissions from transport.	Indirect included. Nox/ aerosols moved to 8.2. I see no problem with title…..comment on indirect emissions is valid

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
17768	8	13				consider changing the title to "Current emission trends and drivers"	Reject - The section and associated titles are fixed and cannot be changed by the chapter working group. no…..no discussion of drivers…but also, no actual discussion of the future
8549	8	13				RESEARCH NOT INDICATIVE OF ACTUAL TRENDS "A rising fuel price combined with stagnating incomes can force people to abandon their LDVs. (Newman and Kenworthy, 2011b) suggested that increased fuel costs have led to the major shift from LDVs in developed countries." The use of the terminology "major shift" is an exaggeration. There has been, at best, a modest reduction in vehicle travel in developed countries, and no major "shift" has been documented. It would be fair to suggest that there has been a leveling off of vehicle use (or in some countries a slowing down of the rate of increase). It should also be noted that this effect has been in the context of the worst downturn in the economy since the 1930s (and may well have been deepened by the rise in petrol prices themselves.). This conclusion of the cited research is an exaggeration and the reference should be deleted. □	Accept I agree….and note that the discussion illustrates only past trends, does not discuss what will happen in the future
18524	8	13				In this section it may be useful to refer to the discussions on tourism that appear in Chapter 10 (particularly section 10.3.3), which discusses e.g. international and domestic air travel in more detail.	Accept - We can add references to Chapter 10 if possible
16283	8	13	12	13	23	In Section 8.2.1, the definition of CO2 emissions should be clarified, e.g., by replacing the phrase "CO2 emissions" with total CO2 emissions, transport CO2 emissions, etc.	Accept - Will define and use consistently in Chapter
8878	8	13	13	13	14	It should be mentioned that these are transport co2 emissions	Accept - if true….needs clarification. Will make this explicity clear
14278	8	13	13	13	14	These are annual growth rates (the 4.3%, 1.2%)? If so, make clear.	Accept - Will check and update numbers
16282	8	13	13	13	13	The phrase "at a rate of 4.3%" should be modified to "at an annual rate of 4.3%".	Accept . agree…or 4.3%/year
10767	8	13	2	13	2	Stratospheric cooling is not an important element of mitigation policies and this may be left out here.	Reject - We need to address climate change mitigation and not only emissions that have positive forcing. These trends are important to understanding the impacts of transport.
3439	8	13	20		23	The possibility for 'peak travel' in developed countries is mentioned (with the same words and same references) many times in the whole Chapter 8. Please consider revising to avoid duplication.	Accept
14757	8	13	24	15	4	Maybe restructuring, beginning with travel time budget, travel money budget, costs&prices esp. the fuel cost influence	Accept

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
2977	8	13	25		26	Income should figure as the main driver, this is used in nearly all models as key driver (see: a Schafer, 'The Future Mobility of the World Population', Transportation Research Part A: Policy and Practice, 34 (2000), 171–205 <doi:10.1016/S0965-8564(98)00071-8>; Lew Fulton, Pierpaolo Cazzola and François Cuenot, 'IEA Mobility Model (MoMo) and Its Use in the ETP 2008', Energy Policy, 37 (2009), 3758–3768 <doi:10.1016/j.enpol.2009.07.065>; Page Kyle and Son H Kim, 'Long-term Implications of Alternative Light-duty Vehicle Technologies for Global Greenhouse Gas Emissions and Primary Energy Demands', Energy Policy, 39 (2011), 3012–3024 <doi:10.1016/j.enpol.2011.03.016>; Andreas Schafer and others, Transportation in a Climate-constrained World (Massachusetts: MIT Press, 2010); Bastien Girod, Detlef P van Vuuren and Sebastiaan Deetman, 'Global Travel Within the 2 Degree Climate Target', Energy Policy, 2012.). In contrast travel time budget is not a driver but a constant (see also next comment).	Accept - We discuss income in the context of costs and prices. strongly agree!...sort of implied in "economic drivers,"
11620	8	13	25	13	26	Substitute: "costs and prices" against "costs and prices versus disposable income"	Accept - May need to wordsmith. not necessary IF income is recognized as the key driver
11621	8	13	25	13	26	This seems to have passenger transprot in mind. I suggest that you identify drivers for passenger and for freight transport explicitely.	Agreed. Would like to increase the freight / logistics content
15809	8	13	25	13	26	"costs and prices" and "economic" are same drivers, not different - might argue that drivers are are all related to economics (fuel and tehcnology costs, costs of time), social trends (also impacted by economics), vehicle km traveled, and technology advances	Reject - Need to separate Macro-enocmic factors and drivers of personal preference. perhaps….but defining income as a key driver will do a lot to resolve things, make a better structure obvious
2442	8	13	27		47	The income question needs to be clearer - and elasticities of income - less importance of costs as incomes rise.	Accept - See comments above
11622	8	13	27	13	31	Delete from "Capital costs…" to "….(Rolon, 2008)."	Accept - Need to re-write this paragraph. agree…doesn't seem to serve the purpose of this report
3989	8	13	27	13	31	The sentences: "Capital costs…..,2008)" is confusing and can be eliminated.	Accept - Need to re-write this paragraph. Ditto
5190	8	13	31	14	23	Cost/price is important but really shaping transport is transport speed and travel times, certainly for passenger transport, to some extend also for goods transport. I would replace the order of this section with the next one about travel time budget. TTB is leading. See extensive literature on TTB from Schafer, and e.g. Metz, D. (2008). The limits to travel. How far will we go? London: Earthscan.	Accept - Will change order of sub-sections and emphasize travel time budget and other drivers over costs and prices. perhaps, but rising incomes seems to be the key driver
11623	8	13	36	13	47	This section suggests that fuel price and oil price are linked. But in countries with highest fuel efficiencies the fuel price is dominated by taxes. Hence mention this important measure that governments have!	Accept - Need to better address fuel pricing. worth stressing this
11624	8	13	36	13	47	Too much emphasis on prices, given that transport demand is relatively price insensitive	Accept - Will restucture as noted above. But certainly not for freight….don't agree, even for passenger
15810	8	13	36			add" or shift to more fuel efficienct vehicles" after "LDVs"	Accept. well, yes, but basically reviewers feel this whole point is quite exaggerated
14758	8	13	36	13	47	This paragraph needs to be reworked substantially. LDVs, HDVs, rail, ships and aircrafts are kind of mixed up.	Accept

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
5397	8	13	36		38	Has there really been a "major shift from LDVs in developed countries?" Not clear what this refers to? Even in Europe, car share, as a fraction of total pkt, is very high	Accept - Need to make that include better coverge of the literature
3990	8	13	36	13	37	The statement: "A rising fuel price combined with stagnating incomes can force people to abandon their LDVs. (Newman and Kenworthy, 2011b) suggested that increased fuel costs have led to the major shift from LDVs in developed countries." Is generally not supported by the literature. Except for a very brief period (2 years?) the trend is for increased kilometres driven in OECD countries. The reference supporting this statement is a valid reference, but it stands alone in the literature against significant evidence that does not find this effect. This statement should be removed or supported with additional per reviewed evidence. At the very least the broader trend towards greater driving should be noted as a major challenge.	Accept
3995	8	13	40	13	42	Is there something wrong with this sentence: "(Rubin and Tal, 2008) estimated that the cost of transporting a single unit container from Shanghai to Columbus, Ohio, increased by 265 %, from USD3,000 to USD8,000, when oil rose from USD20 to USD130 per barrel." In particular, is the price rise really $20 - $130? Really $20? If this is correct, then this sentence seems unbalanced (not relevant) since the consensus estimate on oil prices has them in a more narrow band of $80 - $150 for the foreseable future.	Accept - We will check primary reference and other reference to get a better sample of data. I agree that the statement says little about shipping charges in the range of likely futures…plus, what else happened during this period?
15811	8	13	43			after 'engines", add "smaller vehicles"	Accept
8714	8	13	45	13	45	However, given that fuel costs are a relatively high share of total aviation costs, improving fuel efficiency makes good economic sense. Fuel costs also account for a significant proportion of operating costs for maritime transport, and periods of high fuel costs have led to spontaneous uptake of GHG abatement options such as speed reduction and hull coatings (AEA, 2008) - AEA, 2008. Greenhouse Gas Emissions from Shipping: Trends, Projections and Abatement Potential.	Accept - We can add a statement to this effect but the capital costs of aircraft has a large impact on fleet replacement. good addition, although we're not supposed to be adding
8713	8	13	47	13	47	Replace "reasons" with "sense"	Accept
4402	8	13	13	13	13	The rate of emissions growth is per year or over the 2000-6 period?	Accepted. It is per year.
4403	8	13	21	13	23	The notion of peak travel exists for km travelled/GDP, rather than absolute transport demand. As before, such a normalized metric hides the growth in km travelled in OECD countries, even if it is not as fast as GDP.	Accept - Need to make this point clear. whole issue of peak travel must be clarified
9070	8	13	6	16	30	8.2 New developments in emission trends and drivers can be deleted due to limitations on the nos of pages	Reject - We will shorten but not eliminate this section as this provides an important framing of the chapter.
6478	8	13	13	13	14	It would be good to show the latest data sets as the current information from 2000 to 2006 is relatively old	Accept - We will obtain updated data
6479	8	13	24	13	26	Maybe suggest that there are other major drivers also – urbanization, infrastructure, motorization, ageing of society/demographic changes, Globalization.	Accept - these need to be explained in the context of the current drivers and not added as new drivers.true….though motorization is a result, not a dirver
13900	8	13	25	15	4	I would strongly recommend to include the ASIF framework here (The total activity (A), mode share (S), fuel intensity (I), and fuel type (F) (ASIF) framework(Schipper, L., Marie-Lilliu, C., Gorham, R., 2000.)Flexing the link between transport and greenhouse gas emissions: A path for the WorldBank. International Energy Agency) is the world recognized methodology to break down the influence of urban policies on transportation energy consumption drivers. See also Zegras, C., 2007. As if Kyoto mattered: The clean development mechanism and transportation. Energy Policy, 35.	Accepted.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
13896	8	13	33	13	35	Elasticity of car use to fuel price should be discussed, notably because it can be very low: see Ewing, R., K. Bartholomew, et al. (2008). Growing Cooler: The Evidence on Urban Development and Climate Change. Washington, DC, Urban Land Institute: elasticities of VMT to real fuel price = -0,17 in US and -0,11 in California; See Rodier, Caroline. U.C. Berkeley, Transportation Sustainability Research Center, "A Review of the International Modeling Literature: Transit, Land Use, and Auto Pricing Strategies to Reduce Vehicle Miles Traveled and Greenhouse Gas Emissions," August 2008; See Weidner, T. and S. Seskin (2001). California Smart Growth Energy Savings MPO Survey Findings, Parsons Brinckerhoff Report P600-01-021F, California Energy Commission. Sacramento, CA;	Accepted.
3463	8	13	36	13	47	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	Accepted.
8364	8	13	25	26		In this part the implications of the modem urban lifestyle should be outlined because the urban social activities (work, school, family life and so on) set the agenda of travel demand and where, when and how individuals need to travel. The modern lifestyle is rapidly spreading affecting millions of families (and billions of individuals) on all continents. Mobility is not an end activity in itself but an expression of the social life of a person and when it comes to define needs for travelling and the actual travel patterns the social activities often overrule other drivers (technical, economic, safety concern and environmental values). Depending on the socio-economic status of a family the income might also be decisive in defining the transport mode of a person. Age and sex are other determinants decisive for travel patterns as well as modes of travelling since it largely defines the activities of a person. An example: In some cultures or social classes women's options of transport are decided by prevailing social norms. This means that in some places women cannot go by bicycle, are not supposed to walk alone or, do not have enough money to buy a car impeding on their choices of means of travelling. In other parts of the world walking and bicycling is seen as a healthy and positive exercise for females of all ages. Cultural norms and socio-economic conditions are closely related to number of travels and distances travelled as well as modes of travelling.	Accepted. As too large of a topic to address fully in this section focussing on clarifying importance of lifestyle and providing references.
13880	8	13	25	14	51	Regarding urban transportation, real estate and housing markets are also recognised in the littérature to have a structuring effect on mobility and transport infrastructure deploiement. See Bertaud, A., Renaud, B., 1997, Socialist Cities without Land Markets, Journal of Urban Economics, vol.41, n° 1.; Bertaud, A., 2004, The Spatial Organization of Cities: Deliberate Outcome or Unforeseen Consequence?, World Development Report 2003, Washington, DC.: World Bank, Background Paper, http://alain-bertaud.com; Lefèvre, B., 2008, Visión a largo plazo e interacciones "transporte-urbanismo", los excluidos en el éxito del SBR TransMilenio de Bogotá, CIUDAD Y TERRITORIO Estudios Territoriales, XL (156); Ascher, F., 1995, Métapolis. L'avenir des villes, Éditions Odile Jacob; Ascher, F., 1998, La République contre la Ville : essai sur l'avenir de la France Urbaine, Edition de l'Aube.	Accepted. Incuded as a driver linked to urban form under social and cultural drivers.
2980	8	14				This figure is very misleading, it can be read as that radiative forcing from aviation could be negative by 2020, which is against all robust model projections (a Schafer, 171–205; Fulton, Cazzola and Cuenot, 3758–3768; Kyle and Kim, 3012–3024; Andreas Schafer and others; Girod, van Vuuren and Deetman.).	Noted. Wrong page, but important comment.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
2441	8	14	1		23	The travel time section is weak on a variety of counts: Is aviation used in the 60 minute budget? The city is not one hour wide - as journeys are return, so it would only allow travel to the city centre, not across the city; Where is the evidence on needing space between where you live and other activities? Perishable freight products have the same limitations? What is infrastructure development - does it include management as well as investment? But overall the links made between cities and travel time is far too strong - cities have not developed on the basis of travel time - but for many other more important reasons.	Noted.
2978	8	14	1		13	The travel time budget is very relevant for future GHG emissions, but not as a key driver, since travel time budgets are more or less constant they do not drive travel demand. It is a passive anthropological invariant, which makes that lower price and higher speed lead to rebound effects (cf. Bastien Girod, Peter de Haan and Roland Scholz, 'Consumption-as-usual Instead of Ceteris Paribus Assumption for Demand', The International Journal of Life Cycle Assessment, 16 (2011), 3–11 <doi:10.1007/s11367-010-0240-z>; Andreas Schafer, 'The Global Demand for Motorized Mobility', Science, 32 (2010), 455–477; Mathias Binswanger, 'Technological Progress and Sustainable Development: What About the Rebound Effect?', Ecological Economics, 36 (2001), 119–132 <doi:10.1016/s0921-8009(00)00214-7>.). In addition the combination of travel time budget with the constant travel money budgets (constant in share of income but increasing in expenditure) causes a shift towards faster transport modes with increasing income (Girod, van Vuuren and Deetman; Andreas Schafer and others.). But again here income is the driver. The whole section should shifted to trends in the transport sector (next section), to explain the shift towards faster transport modes, which is very relevant for GHG emissions because faster transport modes are also more GHG intensive (Girod, van Vuuren and Deetman; Andreas Schafer and others.).	Rejected. The fact that travel budget is constant is an important driver for GHG emissions.
11625	8	14	1	14	23	Urban travel is about 1/3 of total pasesnger travel. You need to address long-distance travel as well.	Accept
11626	8	14	1	14	23	This does not explain anything on freight	Noted. Increased the freight and logistics content.
2810	8	14	1			"Travel time budget" - this word should be firstly defined.	Accept. sort of self explanatory
13239	8	14	11	14	13	Travel speeds of 20-30 km/h for transit and 40-50 km/h for cars are announced without acknowledgment of the variability of travel speeds between countries, and between cities within a country. We suggest to write : "at speeds of around 5 km/h for walking, 10-40 km/h for transit and 30-60 km/h for LDV, the latter values being subject to great variability among cities" - database from UITP, 2001 (Union Internationale des Transporteurs Publics) show these ranges.	Accept. seems reasonable
17710	8	14	12			In the history of cities, did the use of different modes of transport lead to variations in land use (as suggested here), or was it the other way round?	Noted.
14281	8	14	13	14	15	Sentence beginning "Road infrastructure..." does not seem relevant to travel time?	Rejected. Increase of average speed improves travel time.
8210	8	14	15	14	16	This section (and the whole chapter) is lack of considering "internal congestions", meaning the impact of congestions within public transport modes (e.g. congestions in bus and subways). The impact to the public health due to in-mode internal congestions in some developing ciites could be huge. Please add this concern and do more literature reviews.	Rejected. Not directly relevant for the topic of this chapter and not a prominent issue in the scientific literature.
12887	8	14	16			What is walking/bicycling congestion?	Accept - awkward, but self explanatory, I guess. We will make this clearer

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
14282	8	14	18	14	20	Sentence beginning "The basis of..." does not seem relevant to mitigation. Also, it is too black and white - road rage does not automatically set in once a certain threshold has been passed!	Accept - Agree that this is not well connected to the section. statement does seem a bit extreme…in terms of relevance to mitigation, it's relevant if it means getting work and home closer together would be thwarted by this "need"….of which I'm dubious….perhaps that's why people stop at bars on their way home?
5331	8	14	18	14	19	Reference to biological or psychological need. Biological need seems very unlikely. What is the confidence that there is a psychological need, and what is the evidence? Alternative explanation of better house prices and living conditions further from employment centres seems more plausible.	Accept. I think we're hand waving on this "need"
5399	8	14	18		19	The biological or psychological basis for travel times seems unlikely to be an established fact or based on strong analysis…..sounds like speculation	Accept - Need to rework this section
2979	8	14	22		23	I also strongly disagree with this sentence. Using more time can result in a shift towards slower transport modes, which are generally less energy and GHG intensive (Girod, van Vuuren and Deetman; Andreas Schafer and others.). The crucial point is how many money is spend with in the travel time, hence income is the main driver (see comment above).	Accept
14283	8	14	22	14	23	Last sentence beginning "Travel time..." does not seem relevant to mitigation - in a decarbonised transport system, whether travel time remains within budget is irrelevant to climate change.	Rejected. Travel time is directly indicative for fuel/energy used and might have effect on amount of usage.
11627	8	14	22	14	23	Last sentence normative and incomprehensible. Delete!	Accept . I'm sypathetic, but travel time budgets may limit options….but we need to be more robust about the real limitations on travel time
2443	8	14	24		51	Missing elements here include population growth - one of the main drivers of increased mobility - and the changing population structure, including the ageing of the population.	Accept
11628	8	14	24	14	29	Good! Very succinct.	Thanks,
12888	8	14	24	14	26	This sentence reads as if growing female job participation is repsonsible for growing transport demand, in particular together with the following sentences that starts with the word "shopping". Changing the formulation is recommended as it is foremost rising income (GDP) that drives demand for transport.	Accept - We will rewrite to avoid such implications. rising income IS the primary driver…but if we have evidence that female participation in the job market is important, then OK
5191	8	14	24	15	4	The problem with these social drivers seems, to my humble opinion, that it actually is the quality and cost of the transport system itself that allows for most of these social drivers, so they are not the drivers perse, but mainly the result of the transport system and sometimes mutally part of a positive feedback loop. Just imagine we can only walk, what would then be the shape of our social networks, emancipation, urban areas design, etc, etc? The drivers to travel larger distances as soon as transport speed allows, seem pretty fundamental in humans, but are not at all well understood from a psychological point of view and only to some extend from an evolutionary point of view.	Reject - he does have a good point but such a discussion would not fit in this section. This section seeks to explain drivers and not to critique social drivers.
17711	8	14	26			Is there any information on the effect of the growth in internet shopping on travel?	Noted.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
14759	8	14	30	14	51	In my opinon this is too much detail and could be significantly shortened.	Accept - This section needs to be re-written given comments above and will potentiall not be shortened but will add additional information.
5245	8	14	33	14	51	Again no recognition that in rural areas, even in industrialised countries, 4X4 vehicles are a necessity if winter road conditions are to be faced safely. This paragraph needs to be explicit about the full range of 'social factors' - including decisions to seek to safeguard the lives of the driver and family.	Accept - We will acknowledge these drivers but these driver are not a large driver of personal transport in most nations or globally. I'm not convinced this is a crucial point
17712	8	14	34			There is no mention here of the role of industry in promoting the "symbolic and affective functions" associated with motorized 2-, 3- and 4-wheelers. There is plenty of literature on this, from the time of Henry Ford onwards.	Noted. See section 8.4.
11629	8	14	37	14	44	Delete from "In some societies…" to "…Bamberg et al. 2011)."	Rejected. This is social driver that should not be ignored.
14280	8	14	4	14	8	Line 4 refers to a travel time budget of 1hr per day, but it's not clear whether line 8 ("1hr for commute between work and home") is per day or just one way.	Accept - Will clarify and update numbers
15812	8	14	4	14	5	1 hr per person and 1.1-1.3 per traveler seem to refer to same data. This is confusing.	Accept - Will clarify. this sounds like time/capita and time/actual traveler, e.g. the latter leaves out babies, the infirm, etc.
5285	8	14	46			ADD: While comfort also plays a role, a study in Lyon, France shows that time constraints and complexity of itinerary associated to work are fundamental factors At issue is the fact that daily mobility is in a very large part structured by work which is difficult to modify for climate purposes. (S. La Branche. « Les déplacements quotidiens face à la schizophrénie écologique. Le cas de Lyon ». special issue Vertigo. 2011.)	Accept. interesting but we have too many space limitations
3440	8	14	46		48	You could add here: "For example, detailed mobility surveys have revealed a clear change in mobility preferences in German cities among younger generations, where people under 30 years old show a declining ownership and use of cars (Chlond 2012). The reference is: Chlond (2012), Making People Independent from the Car - Multimodality as a Strategic Concept to Reduce CO2-Emissions. 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. 269-293.	Noted. Too much detail.
11630	8	14	50	14	51	I doubt, but if really growing then please provide more evidence.	Accept - We will provide a more balance and supported perspective. I might agree that young people might have different habits….but people prepared to change…I doubt it also.
17709	8	14	6			lots of old references in this paragraph (pre-2007)	Accept
5330	8	14	7	14	9	Need to clarify whether 1 hour commute is 1-way or 2-way. City is 1 hour wide if 1 hour commute is 2-way (i.e. 30 minute one way from outer suburb to centre).	Accept - Will Clarify. but in most cities, the suburbs to center model no longer holds
5398	8	14	7		9	The logic of a 1 hour wide city is not clear….if one considers the development of cities, they tend to grow in physical space at the same time that traffic slows from congestion….so they should be expanding in "time space"	Accept - This section needs to be re-written and better supported. agree….logic isn't clear for our 1-hour city

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
2668	8	14	1	14	23	Most transport researchers discount the idea that travel time budgets are fixed. These are usually seen as being sensitive to the generalized costs of travel, which include primarily monetary cost and time cost, but can also include various more difficult to quantify effects, such as reliability, aesthetics, comfort, etc. Of most relevance for this report is how these concepts affect the design of policies, such as road or fuel pricing and policies that increase or decrease infrastructure. I would refer the authors to the literature on induced travel, specifically the following papers: Noland, Robert B., and Lewison L. Lem, "A Review of the Evidence for Induced Travel and Changes in Transportation and Environmental Policy in the US and the UK", Transportation Research D (Transport and Environment), 7(1), (2002), 1-26; . Noland, Robert B., "Relationships between Highway Capacity and Induced Vehicle Travel", Transportation Research A (Policy and Practice), 35(1), (2001), 47-72.; and, Robert Cervero (2003), "Road Expansion, Urban Growth, and Induced Travel: A Path Analysis." Journal of the American Planning Association Vol. 69, No. 2, pp. 145-164.	Accepted. Added this perspective.
2669	8	14	48	14	48	Reference to Parkany et al. is incorrect. This study did not analyze social media and transport behaviour.	Accept - Will review and correct
8365	8	14	51			This point is far too vague and sharper formulations are required. The paragraph continuous on the next page and the argument needs to be further outlined here. I am aware of the shortage of suitable statistics but you can refer the spreading of the urban lifestyle and link it to the presentation of economic growth in Chapter 1 Section 1.2.1.2. The world macroeconomic situation, pp 7, 8 and so on and connect the analysis to the part on urbanisation and trend in Chapter 14, Section 14.2.3 page 20 line 7 and on. I miss linkages between the social aspects related to transport and mobility and the other chapters in this report. There are many more highly relevant connections to make as to strengthen the argument put forward in the text. Which are the dominating location trends for the growing middle class? In successful city planning such information is compiled together with preferences, estimations about future changes, fruitful scenario building and so on. The analysis of social trends can be divided into different areas for instance: lifestyle changes, changes in family structure and size, employment patterns and so on. □	Accept. not sure what to do with this…..though clearly deserves attention
12889	8	15	10	15	14	Add literature to IEA citation, e.g. Meyer, Ina; Scheffran, Jürgen, Kaniovski, Serguei (2012), Scenarios for regional passenger car fleets and their CO2 emissions, Energy Policy, 41, 66-74; Meyer, Ina; Leimbach, Marian; Jaeger, Carlo C (2007), International Passenger Transport and Climate Change: A Sector Analysis in Car Demand and Associated CO2 Emissions from 2000 to 2050, Energy Policy, 35, 12, 6332-6345	Accept
3820	8	15	11	15	11	Here the reference year is 2009, implying in 780 million LDV. At the begin of the paper the figure quoted is 980 million in 2009. Check consistency.	Accept - Will check and update numbers
8035	8	15	13	15	13	you may include also Germany (e.g. http://www.germanwatch.org/klima/mt07stag.pdf)	Accept
14285	8	15	14	15	16	For air transport, it is not just US, Canada and Australia where demand has continued to rise. Demand is increasing across all world regions as it is strongly linked to income growth. Fastest growth is in developing countries (e.g. India, China), but demand is still growing in developed countries as well (including UK) although some short-term falls due to the recession.	Accept
14761	8	15	20	15	23	This seems to be a quite random phrase	Accept - We will edit to make a stronger connection to the section. This is a key point and needs to be explained better.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
12890	8	15	20	15	23	Well, in the recent economic and financial crisis 2007/08/09 emissions in particular from freight transport dropped substantially in several countries. The sentence must thus be reformulated.	Accept - The key point is that decreased do to the econimic downturn will not lead to long term mitigation of GHG from transport. Alan: The recent recession has dramatically used freight volumes, particularly for air and sea freight, though in both cases volumes 'bounced back' quite quickly on many routes and services. Sentence will be amended. Steve: irrelevant….recessions hopefully will not last forever. Alan: in the ASIF framework that we have adopted, A stands for avoiding transport, but I would agree that the chapter does not adequately explore the various ways in which companies and economies decouple freight demand from output. Reference should be made, for example, to the 'transport prevention' part of the EU's Marco Polo II program for freight transport.Some useful suggestions which will be separately evaluated and would be worth incorporating e.g. need more discussion of the impact of just-in-time and the opportunities of relaxing it to cut energy use and emissions.
11634	8	15	24	16	15	For aviation you need to discuss contrails and cirrus clouds, as the main effects. D.S. Lee, G. Pitari, V. Grewe, K. Gierens, J.E. Penner, A. Petzold, M.J. Prather, U. Schumann, A. Bais, T. Berntsen, D. Iachetti, L.L. Lim, R. Sausen, Transport impacts on atmosphere and climate: Aviation, Atmospheric Environment, Volume 44, Issue 37, December 2010, Pages 4678-4734, ISSN 1352-2310, 10.1016/j.atmosenv.2009.06.005. For shipping you should mention the cooling effect of SO2 aerosols. Cf Shipping Emissions: From Cooling to Warming of Climate—and Reducing Impacts on Health. Jan Fuglestvedt, Terje Berntsen, Veronika Eyring, Ivar Isaksen, David S. Lee, and Robert Sausen. Environmental Science & Technology 2009 43 (24), 9057-9062	Accept
8879	8	15	25	15	28	Jump from methane and n2o to f-gases. How much ch4 and n2o are emitted by transport globally?	Accept - Will clarify
17769	8	15	25			state what are the non-CO2 pollutants, should include NOx	Accept - Will clarify what is included and why

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
11875	8	15	25	15	27	It isn't clear why methane is listed as a significant agricultural GHG for biofuels production. Methane emissions from agriculture are dominated by rice cultivation and ruminants - neither of which are significant sources of biofuels.	Reject - Fuel production is included in Chapter 10 and is not included in Chapter 8. Not appropriate
5332	8	15	25	15	25	Needs re-wording. Currently reads as if methane arises from production of vehicles.	Accept
3998	8	15	25	15	26	I found this sentence mis-leading: "Methane emissions are largely associated with leakage from the production and filling of natural gas powered vehicles." In the context of transportation emissions this is probably true, but I do not think it is correct at face value: methane emissions from CNG vehicle refueling etc. dwarf agricultural and landfil sources of CNG. Please check and verify that this is correct. Plus, the source appears to be the USA; what is true for the USA is not likely to be correct for the world as a whole.	Accept - Will clarify this statement
12336	8	15	27	15	28	The sources of transport-related f-gas emissions should be mentioned.	Accept
8211	8	15	28	15	28	"EPA, 2006": this source is old.	Accept - We will find updated references
10768	8	15	29	15	29	It should be made clear that significant positive forcing applies to the direct effect of BC. Thus, I suggest adding "direct" after "significant". (And "have" should be changed to "cause")	Accept . no on direct, yes on "cause"
14745	8	15	29	15	34	Include IEA ETP 2012 Figure 13.7 p.437, rates of dieselization?	Accept but trying to CUT
14760	8	15	29	15	34	You might include IEA ETP 2012 Figure 13.7 p.437, rates of dieselization?	Accept
3442	8	15	3		4	The fact that absolute and relative emissions from transport rise with rising incomes is mentioned several times in the whole Chapter 8. Please consider revising to avoid duplication.	Accept. I'm not concerned….this relationship is crucial, I don't believe we've overdone it
2811	8	15	31	15	34	The reference is old-dated (2004). I would recommend to refer to the UNEP's report on SLCF. The overview of emissions of black carbon can be found in para 2 of page 9 of "Near-term Climate Protection and Clean Air Benefits: Actions for Controlling Short-Lived Climate Forcers: A UNEP Synthesis Report (2011) <http://www.unep.org/pdf/Near_Term_Climate_Protection_&_Air_Benefits.pdf>	Accept. worth looking at this source
15813	8	15	32			2004 refernece may be old - US has now reqiured ultra low sulfur diesel (<15ppm S) which has reduced diesel related PM emissions significantly	Accept. as has Europe….we need to be sure we're not outdated here
11631	8	15	33	15	34	Delete sentence	Reject - This sentence helps from BC emissions from transport.
4037	8	15	34			after "(Bond et al. 2004)." add the following text: "It is essential that the relative proportion of black carbon and organic carbon in diesel road transport and off-road diesel emissions is very low (0.2–0.8) as compared to other sources. Therefore measures to reduce black carbon emissions in this sector will almost certain reduce net anthropogenic forcing (UNEP and WMO 2011)." Source: UNEP and WMO (2001). Integarted Assessment of Black Carbon and Tropospheric Ozone. Available at http://www.unep.org/dewa/Portals/67/pdf/BlackCarbon_report.pdf	Accept- Will include this point but not necessairly this wording. too much detail….
15746	8	15	35		39	As far as I have understood, the role of aerosols in general is two-sided – they contribute to the green house effect, but they also lead to stronger reflection of sun radiation. In WGI of AR4, aerosols are qualified as having a net cooling effect (like volcanic ashes). This paragraph refers to “aerosols that do not absorb light“ and contribute to warming. There should be a footnote on this and, if possible, a reference to WGI where these different sorts of aerosols are discussed. Also, the following Figure 8.2.1 seems to imply that the aerosols from aviation have a cooling effect; maybe this should be taken up in the paragraph.	Accept - We do not seek to restate what is stated in WGI but need to reference what is presented by WGI.
5400	8	15	35		39	no mention here of whether these emissions have positive or negative feedback….quite important, obviously	Accepted.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
17713	8	15	4			The statement that rising wealth is associated with increased emissions from transport should be qualified, I suggest. This relation has applied in the past, but as a consequence of a particular pattern of development. There is no necessary link between wealth and emissions from transport. A comparison of North American countries with Europe would demonstrate this.	Accept - This is an important point that needs to be clarified. ouch….probably true once full industrialization has been achieved, e.g. Europe/US comparison….but CERTAINLY true when talking about income growth in the developing world
11632	8	15	40	16	3	Unger et al. 2010 miss the biggest part for aviation, namely AIC & contrails. Hence this figure is misleading. Better replace by figures from Skeie et al. AtmEnv 2009 (43), see above.	Accept - We will find a different presentation of this data to show the relative importance of emissions in the short and long term horizons. investigate….if Unger does have this shortcoming, we shouldn't use their figure
10769	8	15	40	15	48	It should be made clear that the various effects not only differ in sign (i.e. warming and cooling) but that they also operate on very different time scales (see e.g. figure 1 in Berntsen and Fuglestvedt, PNAS, 2008, vol 105 no 49. This is also shown in a recent paper by Aamaas et al. for the response in temperature and not only RF. See http://www.earth-syst-dynam-discuss.net/3/871/2012/esdd-3-871-2012.pdf. In addition, see figure 8.32, 8.33 and 8.34 in WGI.	Accept - This point needs to be made better
10774	8	15	40	15	51	It is not the relative contributions that are shown in fig 8.2.1. Thus, delete "Relative".	Accept
12891	8	15	41	15	42	Why does the study not provide realistic projections?	We will replace this graph and add new text
3821	8	15	41	15	41	What is the definition of "perpetual constant emissions from 2000".	Accepted.
14762	8	15	43	15	46	The list of climate forcing gases and pollutants might be redundant	Accepted.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
5192	8	15	46	16	3	The use of Unger, 2010 is not vey useful, could even be misleading, in this context for two reasons. (1) If we want a realistic outlook on total RF in 2100, we cannot escape the use of realistic emission scenarios. (2) if we want realistic outlooks we will have to include contrail and contrail induced cirrus for aviation (as clearly outlined in Lee 2010, you refer to, but also in ten-twenty recent papers (since 2009) about contrails and cirrus and resulting from the QUANTIFY study. With respect to (1): the impact of non-carbon RF of aviation has been shown to be very much depending on the growth scenario chosen. This is clearly explained in my double blind reviewed book chapters Peeters, P., & Williams, V. (2009). Calculating emissions and radiative forcing: global, national, local, individual. In S. Gössling & P. Upham (Eds.), Climate change and aviation: Issues, challenges and solutions (pp. 69-87). London: Earthscan and Peeters, P., Williams, V., & Gössling, S. (2007). Air transport greenhouse gas emissions. In P. M. Peeters (Ed.), Tourism and climate change mitigation. Methods, greenhouse gas reductions and policies (Vol. AC 6, pp. 29-50). Breda: NHTV. To give some examples (see figure 3.2 in the 2009 reference): the current best estimate of RF multiplier is 2.1 and will be reduced to 1.2 in the case of constant aviation emissions, meaning that by 2100 the historic cumulated carbon will dominate aviation's RF and total 2100 RF in your figure needs to be increased by 20% of the carbon part of it. However, in a more realistic scenario, with 4% aviation volume growth but less emission growth due to a more efficient fleet by 2100) the multiplier (excluding average cirrus) will reach a level of 3.3. Of course the carbon related amount of aviation in 2100 in your figure would incease extensively under 4% aviation growth per year, roughly by a total factor of 3.7, thus causing overall in 2100 an additional RF of a factor 8.5 higher than your figure thus some additional 360 mW/m2. So, while the Unger calculations have theoretical value and are correct, the politicy relevance is rather limited. Based on the above rough calculation aviation would almost equal road RF in the same graph (and road carbon emissions are not growing by far as much as aviation is). The priority to reduce aviation impacts would be much more clearly shown based on real RF scenarios. My strong advice: first give a clear overview ofemissions and RF in 2100 based on real scenarios, not these constant, yotally unrealistic, figures, because only then it is possibble to valuate the size of the mitigation assignment in transport and specifically in aviation with its technical limitation to reduceemission by at most some 50% there is no way to accomodate aviation's volume in the long term future (see e.g. Bows, A., Anderson, B., & Peeters, P. M. (2009). Air transport, climate change and tourism. Tourism and Hospitality: Planning & Development, 6, 7-20).	Accepted. Replaced this with a different graph to show the relative short term and long terms impacts of different transport related pollutants on radiative forcing.
10775	8	15	47	15	48	I think the effects of aviation need to be better explained. And for many readers the RF number given here does not give much information. See Skeie et al., 2010 (Atmospheric Environment) for effects of aviation in terms of temperature (and contributions to total man made warming) - which is easier to understand for many readers.	This is Working Group I's role. WG III is dealing with mitigation.
14284	8	15	7	15	8	Demand for transport of goods and people is increasing in line with increasing incomes.	Agreed. Recent TR D paper contains a graphs which shows clearly how freight tonnes per capita rises with per capita income. Worth mentioning. not clear what this reviewer wants
3441	8	15	7			With regard to reference Bleijenberg (1993): A more recent article by the same author, enriched with much more recent data and policy suggestions, 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. Therefore I suggest changing the citation to Bleijenberg (1993) to Bleijenberg (2012).	Accept. sounds reasonable

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
13876	8	15	3	15	4	"As people become richer, absolute CO2 emissions from transport rise, as well as their relative share of total emissions" suggest a correlation which is at least debatable. As Litman and Laube(2002) show: "Many wealthier regions have balanced transportation systems while porrer are quite automobile dependent. The differences result from public policies that affect transport choices and land use patterns" (Litman, T., Laube, F., 2002, Automobile Dependency and Economic Development, Victoria Transport Policy Institute)	Noted. Statement is about absolute emissions and shares relative to other sectors.
4405	8	15	12	15	17	These sentences repeats the earlier sentiments from p13, line 21. My criticism from above and suggested caveat remains.	Accept - Need to make this point clear. repeats earlier criticisms
6480	8	15	20	15	22	I am not sure if this is written based on developing Countries or developed Countries perspective. In developing Countries – changes In economic, social and cultural factors are driving the increase In emissions	Accept. correct, but not clear what should be changed
3464	8	15	6	15	17	There is a very importan 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
2670	8	15	25	15	26	production and filling of natural gas powered vehicles' - I believe this should read: 'production of natural gas and filling natural gas powered vehicles'	Accept. yes…and it's "production and distribution"
7715	8	15	27	15	28	The emission number 350 Mt CO2-eq is consistent to the amounts 10,000 metric tonnes?	Accept - We will double check the numbers
7803	8	15	29	15	29	Suggest adding "direct" after "significant" as the magnitude and even sign of the net effect of black carbon including all indirect effects is highly uncertain.	Reject - We will leave this debate to WGI and use these assessment of BC as to the efferct and uncertainty.
6923	8	15	29	15	39	Please provide a more specific reference to WGI AR5.	Accept
6481	8	15	33	15	34	“Black carbon emissions are also significant in parts of Asia, but mainly stem from biomass and coal combustion and not from transport (Bond et al. 2004)” – This statement is not entirely true. The BC emissions from poorly regulated vehicle fleet especially in Asia having lax emission standards are a major source of BC emissions. The intensity and magnitude of emissions are high in Asia. Its quoted in many reports now including - http://nexleaf.org/surya/papers/USAID%20RDMA_Black%20Carbon%20Emission%20in%20Asia%204-2010.pdf Overall, the transportation sector is the third largest source of black carbon emissions in Asia and it is expected to become the second largest source by 2030. □	Accept - Agree that future impacts of transport will be greater with reduction in biofuels and coal combustion emisisons. assuming this is correct, we need to revise
7804	8	15	35	15	39	The effect of contrail-cirrus from aviation should be included here, as current best estimates give a strong positive RF from aviation induced cloudiness (see e.g. Burkhardt & Kaercher (2011). Global radiative forcing from contrail cirrus. NATURE CLIMATE CHANGE Volume: 1 Issue: 1 Pages: 54-58 DOI: 10.1038/NCLIMATE1068. I could not find any mention of this impact in the chapter.	Accept
7805	8	15	40	15	41	This figure does not give contributions relative to CO2 (as in CO2-equivalents or Global Warming Potential), but the absolute impact in mW/m2	This is correct. For reasons stated above, we will repalce this figure with a different presentation. agree…..most readers will have no idea how to interpret mW/m2
7806	8	15	46	15	47	This is an important point and more should be said here (e.g. Berntsen & Fuglestvedt (2008). Global temperature responses to current emissions from the transport sectors, PNAS Volume: 105 Issue: 49 Pages: 19154-19159 DOI: 10.1073/pnas.0804844105 and Fuglestvedt et al. (2009). Shipping Emissions: From Cooling to Warming of Climate-and Reducing Impacts on Health. ENVIRONMENTAL SCIENCE & TECHNOLOGY Volume: 43 Issue: 24 Pages: 9057-9062 DOI: 10.1021/es901944r. .	Accept - Will add these references. probably needs to be left to the other report
7807	8	15	47	15	48	Is this including contrail-cirrus? Using the same emissions? Should be made clear.	Accept - We will clarify

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
7808	8	16		16		This figure gives absolute RF, not relative contributions as stated in the text.	Accept - We will be replacing this figure with a differnet presentation but will be clear. and RF not especially useful to the average reader
8033	8	16				To me it seems that contrails and cirrus clouds from aviation are not included in the global radiative forcing shown in this figure. Neglecting them does not map a good comparison of the different modes. This should be changed (see literature e.g. of David Lee, compare p.15, l.47 - 48)	Accept - We will address this issue
3166	8	16	1			figure 8.2.1 might usefully have an insert that has information on shares of mobility by mode.	Accepted.
14286	8	16	12	16	15	Not sure of the relevance of this paragraph to transport? It could apply to all sectors.	Accept - We will revise text to make it clear how this is relevent to transport mitigation pathways.
11635	8	16	12	16	15	You better cite: Drew Shindell, et al. Simultaneously Mitigating Near-Term Climate Change and Improving Human Health and Food Security. Science 13 January 2012: 335 (6065), 183-189. [DOI:10.1126/science.1210026]	Accept. worth citing
11636	8	16	12	16	15	You need to mention problem of time scales of actions and of impacts; problem of appropriate metric and partial trade-offs.	Accept - This cannot be addressed in depth but we can add a statement. this should be handled elsewhere
12892	8	16	12	16	15	Give an example what kind of strategy this could be.	Rejected. Insufficient space to go into examples.
5194	8	16	12	16	15	I would recommend to use a scenario approach to found this statement on; unclear where the F-gases come from, why they are relevant in this context and whether there is not e more recent reference to say something abot trends (this one is 12 years old).	Rejected. Due to space limitations. F-gases also covered in other chapters (Ch.1, Ch.5).
11362	8	16	12	16	14	It could be mentioned here that the climate mitigation requires one to strike a balance between the abatement of long-lived climate forcers (e.g. CO2) and that of short-lived climate forcers (e.g. black carbon) (e.g. Berntsen et al., 2010, Climatic Change Letters, 10.1007/s10584-010-9941-3).	Noted.
14764	8	16	16	16	24	Needs to be rephrased. Redundant list of climate forcing gases and pollutants	Accept
5195	8	16	17	16	24	Drivers for contrails and cirrus are important but missing here. Please add from the recent Quantify studies.	Accept - Clearly we need to address aviation better
2812	8	16	18			Local air quality reculations do not seek only human health. For example, the US has secondary standards to protect vegitation. The phrase "that seek to protect human health" should be modified.	Accept - We can revise to read "human health and human welfare," but the point is that these are not directed at climate change mitigation.
11637	8	16	25			Add referneces	Accept
14765	8	16	25	16	30	Needs to be dropped or some actual trends by sector	Accept
15814	8	16	26	16	27	after "drecrease", "per vehicle" - overall emissions might be increasing if vehicle fleet increases	Accepted.
14763	8	16	4	16	8	Needs to be rephrased	Accept
5401	8	16	4			seems like an odd statement; how can non-CO2 emissions be impacted by "the same carbon intensity?" This is possibly true for black carbon, but that's about it, I think.	Reject - The BC issue is the prime example andor ozone as well.
8880	8	16	9	16	11	Any references to support this statement? Might be worth looking at Woodcock et al., 2009, The Lancet, Volume 374, Issue 9705, Pages 1930 - 1943, doi:10.1016/S0140-6736(09)61714-1	Accept
11633	8	16	9	16	11	reference?	Accept. needed!
4053	8	16	9	16	10	How did the authors quantify the phrase "…largely offset these [fuel efficiency] penalties?"	Accept - Will add quantititve numbers to be specific

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2671	8	16				Section 8.2.2.1 seems unnecessary and lacks detail as currently written.	Accept - Will be re-written to add detail
7809	8	16	23	16	23	There has been a lot of focus on this lately; is it possible to find more recent references?	Accept
2672	8	16				Section 8.2.2.2 also seems unnecessary.	Accepted. Restructured section.
12893	8	17	1			It is recommended to include a table in chapter 8.3. that gives an overview of all the mitigation strategies/technologies offered.	Noted.
2444	8	17	11			Are the units GJ/km?	Confirmed.
12895	8	17	14			Full electric vehicles and LNG/CNG vehicles are omitted and should be added for the sake of completeness.	BEVs are included later under new propulsion systems. full electric vehicles are hardly "incremental"
11638	8	17	22	17	24	You can mentino that there is a big spread, with models emitting less than 95 g CO2/km already on the market today!	Yes the range of available vehicles is important. good point
15815	8	17	22			25% w.r.t. what?	A base vehicle, we will clarify. good point…wrt preceding model
15772	8	17	27		28	What has driven this? Are the vehicles priced to encourage hybrid sales, or is there a govt mandate of some sort?	Noted. Text was edited, does not contain this anymore.
15816	8	17	27	17	28	is hybridcars.com peer reviewed? Probably not. 20% HEV penetration in japan is mostly due to incenitves, might explain this	Accepted. Replaced with better substantiated reference.
15817	8	17	29			Might show a table of $/mpg improvement vs. mpg improvement (or kpg) for each of technologies mentioend to make this more practical. Check SAE papers , Heywood, Fulton, Duleep, etc	Noted.
15869	8	17	32	17	33	The “strong increases in efficiency” for opposed cylinder engines may be overstated; more testing of these engine in actual vehicles is needed to be certain about this.	Accepted. Restated using "with lab results …"
3594	8	17	4			replace high duty with heavy duty	Accepted.
5333	8	17	4	17	4	HEAVY duty vehicles	Accepted.
12894	8	17	4			heavy duty vehicles (not high duty)	Accepted.
16284	8	17	4	17	4	The phrase "high duty" should be modified to "heavy duty".	Accepted.
2445	8	17				This is one Section that can be reduced in length - it is all about the potential and not the reality - what progress has been made since AR4? It is also mainly targeted at the long term and not the next 10 years. The importance of LCA is made, but it does not come through in terms of the energy and carbon sunk in the system - the infrastructure, the maintenance, the vehicles and the processes - the potential transition costs to any new technological system is vast - issues relating to niche markets (not replacements), the lead time required, the necessary conditions for economies of scale, and market penetration do not come through - these are just as important as the technological - there also needs to be comment on where the potential 'big hits' or 'low hanging fruits' are - where are the low risk and high return technologies. This means that several of these Sections could be reduced in length - and perhaps comment made on their risks and returns.	Noted.
13901	8	17	1	26	48	Simlarly, it is supprising that the Avoid, Shift and Improve strategy (See Dalkmann, H., Sakamoto, K., 2011, Transport, Investing in energy and resource efficiency, UNEP Green Economy Report) is not mentioned here.	Noted. ASI (or ICCT's new ASIT, that adds "transformation" to "Improve") is worth a discussion at the start of the chapter.
13902	8	17	1	26	48	It is strongly recommended to refer to the ASIF framework as a key reference and ground breaking work in the field of transportation. Schipper, L., Marie-Lilliu, C., Gorham, R., 2000. Flexing the link between transport and greenhouse gas emissions: A path for the WorldBank. International Energy Agency; Zegras, C., 2007. As if Kyoto mattered: The clean development mechanism and transportation. Energy Policy, 35.	Done

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
13903	8	17	1	26	48	This section could effectively mention the three-pronged investment strategy proposed in the Transport Chapter of UNEP Green Economy Report (Dalkmann, H., Sakamoto, K., 2011, Transport, Investing in energy and resource efficiency, UNEP Green Economy Report) : promote access instead of mobility; shift to less harmful modes of transportation; and improve vehicles towards lower carbon intensity and pollution	Noted. These comments seem to refer to whole chapter, not technology section
11284	8	17	1			Studies should be done here before we talk about increased use of automobiles in developing countries. Who are using cars? Is there a gender- and income sensitive documentation on this? Normally in the developing world it is not "the man in the street" that is the owner of the car. Low in-come people or people with no income has a bicycle (if they can afford it) and risk their life every day in the traffic. It is normally people in the middle class, organizations or governemet officials that are owners of cars. The large group of low/no-income people using bicycle are very seldome taken into consideration when new roads and transport systems are planned and implemented. In example there is only one bicycle lane functioning in East-Afrika and that is in Nairobi at UN-Avenue. Bicycle lanes and footpaths should always be a part of the road-profile when new roads are implemented, even in fragile states or in emergency situations as well as in the developed world. Decition makers, governments, organizations and large companies should encourage their employees to use a bicycle and also think of the signal effect when people at the very top, bike to work, instead of driving a car. For reference, see the bicycle lane project in Guatemala City implemented by Design Without Borders at: http://norskform.no/en/Themes/Design-as-development-aid/Avsluttede-prosjekter/Cycle-lanes-and-bus-stops/	Noted. These comments seem to refer to whole chapter, not technology section
8366	8	17	3			In the introduction to this part the role of transport to make it possible to cope with daily life and the human basic needs should be stated. In modem societies access to food, medical care, schooling and other community activities often means that individuals study or work away from home and need to go from A to B. Besides sleeping, eating, basic protection and so on the lifestyle of person is defined somewhat different depending on religion, social norms, cultural belongings and so on. An understanding of the crucial impact of social norms and for instance how the reproductive social role of women is linked to travel pattern is left out but it needs to be included. In chapter 8 too many of the social aspects and their impact on travelling and emissions is missing impeding on a realistic analysis of travel needs, increases and the demand management.	Noted. These comments seem to refer to whole chapter, not technology section
15866	8	17	1			Show more summary plots: levelized all in costs in $/km (where costs include 1st cost (capex), opex, fuel, GHG taxes, …), well-to-wheel CO2e (gCO2e/km, BTU/km), $/gge for fuels Each technology section is not consistent in content – some show more details than others, some include costs, others, not □ should standardize content. Opportunities for technologies discussed, but also need to include balanced discussion of challenges	I agree with this one - we need about 4 really good tables/figures that synthesize stuff. good comment. same as the above, not relevant here
2673	8	17	11	17	11	compared to a 2010 base vehicle' - would this be a base US or EU vehicle as the base would be quite different as would the estimate of potential percent reductions from that base. This comment applies in many other parts of this section.	It is generic, but yes we should define it clearly - probably use a couple of models as examples. technology not so different, except for diesels…key difference is vehicle size, plus somewhat power
4406	8	17	9	17	12	The estimate of 40-50% improvement is dependent on the base vehicle, the driving cycle and how the drivetrain is hybridized. The extent of improved energy intensity may not be the same across all vehicle sizes.	Noted.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
4407	8	17	31	17	31	I'm not sure if HCCI qualifies as a new thermodynamic cycle. It may be implemented to address the temperature of the fuel-air charge at combustion, addressing NOx formation.	Noted. HCCI got deleted in new draft when rewriting.
4408	8	17	38	18	7	It is worth mentioning the effect of mass decompounding in the discussion of reducing vehicle mass. Specifically, reducing body in white mass means that other gross vehicle mass dependent components can be reduced. Examples include suspension, tyres, engine, gearbox and so on. Therefore, for each 1kg saved, a further 1.04 kg of secondary mass can be avoided. Reference: C. Bjelkengren. The Impact of Mass Decompounding on Assessing the Value of Vehicle Lightweighting. PhD thesis, Massachusetts Institute of Technology, Massachusetts, June 2008 (http://msl.mit.edu/theses/Bjelkengren_C-thesis.pdf).	yes, worth mentioning….though 1.04 factor is one of many estimates
12337	8	17		26		This chapter should also deal with issues related to the cooling agents used in air-condition equipment and commercial refrigeration in the transport sector. Rationale: Mobile cooling is increasing and choices with regard to the phasing out of existing agents (CFCs, HCFCs anf HFCs) and the alternatives (HFCs, natural agents, natural cooling) will have significant implications on total CO2-equivalent emissions from the sector.	Noted.
11876	8	18	1	18	1	Might be worth noting magnesium which already plays a significant role in lightweighting in vehicles, and will likely also play a lareger role in the future.	perhaps. This will be discussed in 8.2, not here
16285	8	18	10	18	11	The word "GJ" should be modified to MJ. The term "fuel economy" is usually used to refer to MJ/km. Throughout this chapter, the definition of "energy intensity", "energy efficiency", "vehicle efficiency", "fuel efficiency", "fuel economy", and "fuel use/consumption" seems confusing. It is better to clearly define these terms at the beginning of this chapter. To aboid confusion, I propose that the terms "energy intensity" and "fuel economy" be used and other similar expressions (e.g., vehicle efficiency) not be used.	good point
16287	8	18	10	18	12	First, in this sentence, the phrase "or more" is used twice, one of which should be deleted. Second, the phrase "vehicle energy" is ambiguous, so other concrete expression (such as on-road fuel economy) should be used. Third, it is better to modify the expression "if there are breakthroughs in weight reduction technologies" to "if breakthroughs in these weight reduction technologies would be achieved."	Noted. Changed "vehicle energy" to "vehicle loads"; "about 25% in vehicle loads, or considerably more if…."
15774	8	18	11		12	This is very speculative, i.e., "if" there are breakthroughs...	Rejected. It is the opposite of speculative, refuses to predict whether breakthroughs will happen.
16288	8	18	12	18	14	This sentence should clearly describe which types of LDVs could reduce their fuel economy by up to half by 2025 comared to 2005, gasoline ICE LDVs, global average new LDV, or others.	Rejected. We chose not to detail this specific issue but have gone into more detail about this issue otherwise.
14766	8	18	17	18	23	You might include IEA ETP 2012 Figure 2.25 p.91, Light-duty vehicle fuel economy and new vehicle registrations, 2005 and 2008, by region. In non-OECD coutries the inverse trend towards higher fuel consumption due to a shift to larger cars can be examined	Noted.
17715	8	18	19			suggest change to "the size distribution of vehicles offered to consumers"	disagree…ultimately, companies offer what is desired
15775	8	18	20			"Preference" comes down to payback period for the increased cost of fuel economy technology. If the consumer doesn't see a payback in 2-4 years, they are unlikely to select the more expensive technology.	correct, but this is the wrong place to expound on this

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
11877	8	18	25	18	27	This seems like a very U.S.-focused section. For example, is it true that most long haul trucks have "streamlined spoilers" around the world? Maybe it's OK to have a section that uses mostly U.S. data if it is all that is available, but it seems like that should be made explicit.	well, we said long haul trucks "often" have spoilers….didn't claim "most" do….but critic is probably correct, this is somewhat U.S. focused…I'm not sure what Europe has…..probably should at least say this is in OECD markets
16289	8	18	25	18	25	According to Fulton & Eads (L.Fulton and G.Eads, 2004. "IEA/SMP Model Documentation and Reference Case Projection."), 60% of medium-duty trucks and 100% of heavy-duty trucks were estimated to have diesel engines at the global level. Reflecting this, the phrase "Modern medium and HDVs" should be modified to "Over half of medium-duty vehicles and almost all of HDVs".	I agree. In Europe, most of big trucks have spoilers, but there is a difference in the length of tractors, since the USA regulates the length of the trailer but not the whole vehicle (taractor+trailer), which is regulated in Europe..
4293	8	18	25	18	38	I suggest that as improvements of Midium and HDVs, add the following case. ・ Study in Sweden highways, Trolleybuses and Trolleytrucks, by Svenska Elvägar AB's project. <http://www.nordicgreen.net/startups/transportation/svenska-elv-gar-ab> Without installing expensive and heavy batteries, electric load can be achieved. ・ Inner city electric cargo train system in Utrecht, Netherlands. <http://www.cargohopper.com/> By reducing the air resistance and the gross weight, improve energy efficiency. We can also combine these to make up trolley convoy.	Noted.
11639	8	18	27	18	27	55% thermal efficiency? Pls clarify!	Not addressed as not clear what reviewer was referring to.
8715	8	18	30	18	42	Some of the sources quoted are rather old and may benefit from using some newer sources. For example: Technologies in the drivetrain and vehicle categories have the potential for the greatest impact on fuel consumption. However fuel consumption benefit is highly dependent on vehicle duty cycle. While some technologies can provide benefit across a range of vehicle duty cycles, others have much greater benefits for some cycles and none for others. For vehicles operating on urban duty cycles with frequent stop/start behaviour, hybrid vehicles offer the most potential with benefits of between 20% and 30% reduction in CO2 emissions. For vehicles with a large portion of constant high speed operation, aerodynamic aids such as aerodynamic trailers and fairings can offer the greatest benefits of up to 10% reduction in fuel consumption. Source: AEA & Ricardo, 2010. Reduction and testing of Greenhouse Gas Emissions from Heavy Duty Vehicles http://ec.europa.eu/clima/policies/transport/vehicles/docs/ec_hdv_ghg_strategy_en.pdf	Accepted.
16290	8	18	34	18	34	Same as the comment No. 22.	Accepted. Clarified tat NRC report refers to US trucks.
16291	8	18	34	18	35	This sentence should clearly describe which types of medium and heavy-duty trucks can achieve a reduction in fuel consumption per km of 30-50% by 2020, diesel ICE trucks, global average new trucks, global truck fleet, or others.	ditto….report is referring to U.S. trucks
8214	8	18	36	18	36	rolling resistance tires	Accepted. Improved wording of sentence.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
15776	8	18	39		40	True, but heavy-duty hybrid technology is very expensive. Here and elsewhere: very optimistic statements need to be balanced with a rational discussion of costs and technology readiness. It serves no purpose to have this chapter appear to be an advocacy piece.	Noted. Yes, it's expensive, but lots of fleets are buying this technology….not only saves fuel but also reduces emissions and reduces brake repairs….it would be nice to add stuff on economics, but we do not have the space.
13240	8	18	45	18	46	No mention is made on the fact that reducing train speed may also reduce energy consumption. Therefore no clear recommendations can be derived from that section : what technology is more appropriate to reduce energy consumption, considering physical characteristics of the train, and travel speed.	Noted.
15773	8	18	5		7	At what cost? This has got to be very expensive.	Rejected. Actually, not so much….though perhaps the real cost is shifting away from the production equipment needed for conventional unibody construction.
15818	8	18	9			need to consider new vehicle penetration rates base don fleet turnover of 7-8% per year (see US DOT data for typical vehicle lifetime and VMT per yr)	Rejected. This is relevant for establishing scenarios of total LDV energy use and emissions….but not relevant in this section
17714	8	18	9			More efficient on-board appliances would reduce loads; so would doing without features such as air conditioning.	Rejected. More efficient appliances already discussed….doing without a/c would improve fuel economy but probably not a practical strategy
2674	8	18	13	18	14	Again, in comparing reductions from 2005 to 2025, what is the base of the new vehicle? Is it US or EU?	Rejected. Discussed above.,…Bandivadekar source refers to 2035 LDVs, not 2025…..considers both US and EU, but US results are more optimistic
3428	8	18	17			"Test" fuel economy should be explained with a short phrase	Accepted. Rephrased.
2675	8	18				This section should mention speed limitation devices on trucks being required in EU.	Noted.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
12111	8	18	24	18	42	Medium and heavy-duty vehicles - additional strategies not covered in this subsection include 1) Improved Driver behaviour and practices + review speed policy of fleets - "Reducing speed can yield significant fuel savings. Aerodynamic drag increases exponentially and becomes the major contributor to power requirements at speeds faster than 80 km/h. Reducing highway speed from 100 to 90 km/h can reduce fuel use by nearly 10%, and can lower tyre wear and crash risk." see refs at Australian government's road tranport site http://eex.gov.au/industry-sectors/transport/road-transport/opportunities/#Review_highway_average_speed_policy) 2) Load Consolidation 3) Replace ancillary equipment with more efficient models 4) Optimise gear settings 5) Solar panels – For details + refs please see official Australian government peer reviewed web portal at http://eex.gov.au/industry-sectors/transport/road-transport/ to save you time, I can send you refs for each of these- michaelh.smith@anu.edu.au	Agree. Reference needs to be made to these other ways of cutting CO2 emissions from the movement of freight in medium and heavy goods vehicles. Again, speed reduction is not a technology, it's a policy or behavior….2 and 3 seem to have been covered…..4 and 5 seem interesting . In Europe all trucks have their road-speed governors set by the factory to a specified value which is determined by law. (NRC,2010:Technologies and Approaches to Reducing the Fuel Consumption of Medium- and Heavy-Duty Vehicles)
17770	8	18				indicate one example form Chinese fast trains	Agree. The major improvement of China's rail system is the shift from non-electric rail to electric rail and high speed rail. The utilization of electric rail and high speed rail makes CO2 emission intensity of China's rail system decline by 86.7% from 1975 to 2007. (He et al., Energy Consumption of locomotives in China Railways during 1975 and 2007, Journal of Transportation Systems Engineering and Information Technology (in Chinese))
12112	8	18	43	19	8	Rail - virtually no attention and coverage for specific GHG mitigation opportunities for Freight Rail. Strong recommendation to cover both passenger rail and frieght rail here separately. Here are the major GHG mitigation strategies for freight rail 1) Fuel efficiency strategies (driver assistence software, speed management, idle management devices, weight reduction, aerodynamics, double staking, auxillary power systems, electronically controlled pneumatic brakes) and Alternative Drivetrains (Engine Switching Locomotives, AC Traction, Hybrid Drivetrains, Dynamic Breaking, Battery Storage) - Ref Rare Consulting Pty Limited (2011) Potential Energy Efficiency Opportunities in the Australian Road and Rail Sectors– Supplementary information for EEO participants. The Commonwealth of Australia Department Of Resources, Energy And Tourism Available at http://eex.gov.au/files/2012/03/Fuel-for-Thought.pdf This report has undergone alot of peer review + industry peer review.	This and the following comments are good - we will add a paragraph on GHG mitigation for rail. Alan: Agreed. Technological opportunities for reducing rail freight emissions need separate discussion for the reasons mentioned. Most of this additional literature is relevant and could help us elaborate . Much of the literature to which we refer present overall values for transport as a whole.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
16293	8	18	43	19	8	I propose that large differences between passenger and freight railways (such as the current electrification rate, required investment in complete electrification, etc.) be mentioned in this section.	Agreed. There are important distinctions between passenger and freight rail operations which need to be brought out more clearly in the chapter.Would like to increase the freight / logistics content. Agree, though this partly reflects the relative amounts of research done on the decarbonisation of the various freight modes. There has been a significant increase in the amount of research done on carbon mitigation in the maritime and this needs to be reflected. Some useful new data worth incorporating. maybe refer GEA report, where lots of options for train are shown as a table..
7716	8	18	43			Regarding the railway situation, the case study in China should be necessary because of the recent rapid expantion of Shinkansen-type trains in China.	Agree. In fact, the China case was introduced at page 62 line 1. Difference between countries is more large.
12161	8	19		39		All the section 8.10.4 should be rewritten , after all, the text sounds weak and simplistic to the AR5.	Noted.
8716	8	19	10	19	13	Note that shipping is only efficient if load factors are high - while this is true for any mode of transport, the enormous carrying capacity of large ships means that it is a much more important factor. Suggested rewording: Shipping is a comparatively efficient mode of freight and passenger ferry transport in terms of fuel consumption per unit of work.	Accepted.
8717	8	19	10	19	13	Do the currently referenced projections account for the new IMO measures? See the following: In 2011, the International Maritime Organization adopted new regulations which make mandatory, for new ships, the Energy Efficiency Design Index (EEDI) and the Ship Energy Efficiency Management Plan (SEEMP). An annual reduction of about 600-1000 million tonnes of CO2 is foreseen in 2050 due to the EEDI. For SEEMP, an annual reduction of about 103-325 million tonnes of CO2 is foreseen by 2050. Source: IMO, 2011. An Assessment of IMO mandated energy efficiency measures for international shipping. http://www.imo.org/mediacentre/hottopics/ghg/documents/report%20assessment%20of%20imo%20mandated%20energy%20efficiency%20measures%20for%20international%20shipping.pdf	Rejected. More explicit reference needs to be made to the projected impact of EEDI and SEEMP on energy consumption and emissions (e.g. In recent study by Lloyds for the IMO).
16294	8	19	11	19	12	The phrase "increase by 50% or more to 2050" should be modified to "increase by 50% or more from XXXX to 2050".	this is good information, but situation is still fluid. But the projection in our draft is derived by accounting some policy interventions such as the IMO new regulation.
17772	8	19	15			what is the reference (“Chapter 4- Ship Structures,” 2008)	will check. from 2007
16295	8	19	20	19	22	The phrase "reduce CO2 emissions by up to 43% per t-km by 2020" should be modified to "reduce CO2 emissions by up to 43% per t-km from XXXX to2020".	Will amend to clarify time scale. Anthony F. Molland, 2008: The Maritime Engineering Reference Book, Elsevier, 920pp

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
11640	8	19	22	19	27	Section 8.3.1 is on technology, not on operational changes. Either enlarge scope of section or move to appropriate place.	Interesting point - operational interactions with technology is important and there is no where else for it but we will consider this.
12897	8	19	22			Alternative drive trains and alternative fuels do not play a role in emissions mitigation in shipping?	they do - will add
15819	8	19	29			Might describe fleet - e.g., small vs large planes, gasoline vs jet. Also give some concrete examples such as savings of B787 over B757 or A380 over a A340 or B747, etc… Might also quote recent biofuel jet trials and the cost of these biofuels (not cheap)	Accepted. But large commercial aircraft dominate fuel use. Can compare new models to old.
12898	8	19	29			Alternative fuels may play a role in air transport but are missing in the text.	in different section (biofuels) but will try to make this clearer
14767	8	19	3	19	3	Please emphasize that rail emissions heavily depend on the level of electrification and the primary energy source for power generation	okay - but large commercial aircraft dominate fuel use. Can compare new models to old, yes. Alan: : Obvious point. Could be clarified
8032	8	19	37	19	40	It is worth to mention that the design decision on the range of a plane (there is a trend that planes can fly on long distances) has negative impacts on efficiency (if the aircraft is designed for longer ranges fuel consumption is higher). As well as if they are designed for lower speeds (then the fuel consumption decreases).	can mention this if room
11641	8	19	39	19	40	I think you mean "potential to reduce CO2 emissions _per passenger_, but it sounds like absolute reduction. Clarify and correct!	will do
12159	8	19	39	19	40	My recommendation is include "a broad ranging integrated air traffic control system", because this strategy is very effective in terms of emission reduction as I showed, with the cooperation of) in the paper doi:10.1016/j.enconman.2004.06.017 ("The Brazilian air transportation sector in the context of global climate change: CO2 emissions and mitigation alternatives"...this paper was published in 2004 in Energy Conversion and Management" and the co-author was Prof. Roberto Schaeffer, CLA of the present Chapter 8). So, my suggestion is to use "...The use of larger airplanes (and hence less flight frequency), the implementation of a broad ranging integrated air traffic control system has the potential...".	okay will do
11642	8	19	45	20	2	ATM for contrail avoidance! That's the biggest and immediate mitigation potential. Check results of REACT4C project.(http://www.react4c.eu/)	okay will do
5193	8	19	5	19	8	What is missing here is the very low abatement cost of electric rail (see e.g. Table 3 in Peeters, P. M., & Dubois, G. (2010). Tourism travel under climate change mitigation constraints. Journal of Transport Geography, 18, 447–457.), as that equals the abatement of reducing carbon intensity of electricity production combined with one to reduce energy intensity of the rail transport itself. As rail is still in many places a declining secto and with a very large emphasis on commuting, causing very high peak hour factors, occupancy rates are currently generally much lower than could be achieved in ascenario where non-commuters are added to the system and the system is growung, i.e. lacking in capacity, and thus much better used. When a real modal shift would take place that would also reduce peak loads and improve occupancy and thus emissions per p-km. I suggest to add the link with electricity production, abatement costs and efficiency impact of total share of rail (the more you shift the more you also save per unit of transport activity pkm, tkm).	agree

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
5196	8	19	5	19	8	The remark about the modal shift, though true in itself, should not be posed in a way that further decarbonising of the rail system is less urgent. The point is that electric rail has the potential to be zero emissions with current technology (e.g. the Swiss railways run almost zero carbon; SBB. (2007). SBB environmental topics - energy. SBB CFF FFS. Available at: http://mct.sbb.ch/mct/en/umwelt/umwelt-umweltbereiche/umwelt-umweltbereiche-energie.htm). As the challenge; reduce emissions of transport by some 80% this century while transport volumes globally grow by a factor of 3 to 6 is almost impossible to realise so any chance to go to really zero carbon systems, which is most cheaply the case for electric rail, should be given high priority (electric cars are given high prioity, but, as cars are not grid-connected, this causes large technical and efficiency challenges due to the need for batteries, large amounts of resorces for those, much energy loss due to conversions of energy a several places, etc).	agree
16292	8	19	5	19	6	It is better to modify the phrase "the biggest" to significant. I can't understand the scientific basis of the view that this modal shift can make a "biggest contribution".	agree
5694	8	19	6	19	8	The reviewer strongly agree with the idea.	okay
12896	8	19	8			…and the energy source of electricity (whether it is of renewable or fossil nature).	okay
2676	8	19	4	19	4	Note that carbon-free rail travel by 2050 is highly dependent on carbon-free electricity generation.	agree
12113	8	19	10	19	27	Shipping - A number of strategies for GHG mitigation missing here 1) Passenger Ferry - big savings from lightweighting. "Significant energy is used by ferries to push against the drag caused by water. This drag increases exponentially as the speed of ferries increase. Therefore, the light-weighting of high speed ferries has been shown to yield significant fuel efficiency savings by reducing the submerged surface area of the ferry. Over the lifetime use of a ferry, light-weighting results in energy savings in the range of 1,400 GJ for a 100 kg weight reduction. This is about ten times higher if compared to rail vehicles, but considerably lower as for aircrafts" Reference - Helms, H (2006) The Potential Contribution of Light-Weighting to Reduce Transport Energy Consumption. International Journal of Life Cycle Analysis, available at http://www.ifeu.org/verkehrundumwelt/pdf/Helms%282006%29_light-weighting.pdf	ferries use a tiny amount of fuel compared to int'l shipping but can mention this.
12114	8	19	10	19	27	Shipping - A number of strategies missing for GHG mitigation - 2) Anti-fouling coatings : antifouling coatings can increase fuel efficiency by preventing organisms such as barnacles and weeds adding additional resistance to the ship's progress through the water - REF- Pianoforte, K. (2008) 'Marine coatings market: Increasing fuel efficiency through the use of innovative antifouling coatings is a key issue for ship owners and operators', Coatings World, May	no room to mention lots of specific measure but will try to highlight a couple
12115	8	19	10	19	27	Shipping - a number of strategies missing - 3) Air floatation (15 per cent): by pumping air through cavities along the bottom of a ship, ships can effectively float on a thin bed of air, rather than water. Dutch company DK Group is investigating ways in which to reduce the frictional drag of water on large ocean faring vessels, estimating that fuel consumption can be cut by 15 per cent, while consuming only an additional 1 per cent of the ship's power. The first demonstration ship is being built, and it is predicted that this system would add approximately 2–3 per cent to the total cost. Ref - Kleiner, K. (2007) 'The Shipping Forecast', Nature, 20 September, vol 449, pp272–273	I agree air floatation is a great one, needs mention.
12116	8	19	10	19	27	Shipping - a number of strategies missing - 4) Renewable energy for ships in port (90 per cent): renewable energy from onshore can be used for essential functions and services, such as lighting on ships while they are in port, potentially avoiding almost all emissions. Usually ships use onboard power generation by auxiliary diesel engines. In Göteborg Port in Sweden, renewable wind energy is being used to run essential services on ships in port, cutting emissions by 94–97 per cent.	okay

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
12117	8	19	10	19	27	Shipping - a number of strategies missing - 5) Wind propulsion systems (up to 30 per cent in larger freighters): kites can act as parafoils and provide lift and propulsion to reduce fuel consumption by 10–30 per cent, with a return on the initial US$700,000 investment of 3–5 years. (Reference at Kleiner, K. (2007) 'The Shipping Forecast', Nature, 20 September, vol 449, pp272–273)	yes kites is a good one to mention. some useful suggestions which will be separately evaluated and would be worth incorporating e.g. need more discussion of the impact of just-in-time and the opportunities of relaxing it to cut energy use and emissions.
12118	8	19	10	19	27	Shipping - Wind propulsion systems (up to 70 per cent for small freighters): highly efficient designs are emerging, capable of powering cargo freighters. Wind propulsion systems have been available for more than two decades. The Maruta Jaya, a 63m long freighter is able to rely on its indosail rig to provide up to 70 per cent of its propulsion, in combination with a diesel-electric engine. The Greenpeace schooner Rainbow Warrior II uses an indosail rig, consuming 40 per cent less fuel. (Reference at Kleiner, K. (2007) 'The Shipping Forecast', Nature, 20 September, vol 449, pp272–273)	yes kites is a good one to mention. some useful suggestions which will be separately evaluated and would be worth incorporating e.g. need more discussion of the impact of just-in-time and the opportunities of relaxing it to cut energy use and emissions.
8212	8	19	9	19	27	The authors need to refer the IMO regulation, policy measures, reports, documents, etc. and use into this section (Shipping)	Agreed. More explicit reference needs to be made to recent initiatives to cut CO2 emissions from shipping (not just by the IMO) and related research on the subject.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
5197	8	19	28			I have some fundamental comments on this section: 1. In most literature the 'new aircraft' fuel efficiency development is given by a certain percentage per year improve,ent (generally between 0.7% and 1.5% for future projections). However, most authors acknowledge that this percentage is not a constant over time, but reduces itself due to the fact that the efficiency of engines and aerodynamics are reaching physical limits (see e.g. Peeters, P. (2010), costs are increasing as wll as develomen: times. Tourism Transport, Technology, and Carbon Dioxide Emissions. In C. Schott (Ed.), Tourism and the Implications of Climate Change: Issues and Actions (Vol. 3, pp. 67 - 90). Bingley (UK): Emerald). A better regression, that has no arbitrary transfer years for going from reduction per year a to reduction per year B is given in Peeters, P. M., & Middel, J. (2007). Historical and future development of air transport fuel efficiency. In R. Sausen, A. Blum, D. S. Lee & C. Brüning (Eds.), Proceedings of an International Conference on Transport, Atmosphere and Climate (TAC); Oxford, United Kingdom, 26th to 29th June 2006 (pp. 42-47). Oberpfaffenhoven: DLR Institut für Physic der Atmosphäre, which is based on the data given in the IPCC special report on aviation (Penner, J. E., Lister, D. H., Griggs, D. J., Dokken, D. J., & McFarland, M. (1999). Aviation and the global atmosphere; a special report of IPCC working groups I and III. In. Cambridge: Cambridge University Press). From this regression it also can be learned that halving the emissions of the 2000 new aircraft standard, by 2100 is about the best to be achieved with current engine cycles and fixed wing aircraft and within current constraints of cruise speed, safety, range, etc. (see also Peeters, P. M. (2000). Annex I: Designing aircraft for low emissions. Technical basis for the ESCAPE project. In ESCAPE: Economic screening of aircraft preventing emissions - background report. Delft: Centrum voor Energiebesparing en Schone Technologie and Dings, J., Peeters, P. M., Heijden, J. R. v. d., & Wijnen, R. A. A. (2000). ESCAPE: Economic screening of aircraft preventing emissions; main report. In (pp. 57). Delft: Centrum voor Energiebesparing en Schone Technologie). One reason for the slowdown of efficeincy improvement per year is the very strong increase of the aircraft development time between manufacturer launch and first delivery: from data from Boeing, Airbus, Jackson, P. (1998). Jane's All the world's aircraft 1998-1999. In (Vol. 89, pp. 847). London: DPA and several jet aicraft wikipedia sites it can be learned that the first jets (with exemption of DC-8 and B707, being new concepts and having to wait long times for launching orders of the rather conservative airlines) required 3.5 years for B727, DC9 and B737, which now has increased to nine years for the B787 and ten years for the A350. If this exponential trend continues, the last new aircraft to be launched in this century would take 30-50 years from drawing board to delivery and bring improved fuel efficeincy develoment almost to a standstil 9generally new arcraft are 10-205 at most better than the aircraft they replace. 2. The cost of fuel of direct aircraft operational costs ranges between 22% and 38% (Airbus. (2011). Delivering the future. Global market forecast 2011-2030. In. France: Airbus S.A.S) and might become even higher with carbon trading costs added (ETS), which means that halving fuel cost means that cost of flying will reduce by between 10-20% causing increased demand. On short-medium haul fast rail does compete with air, but reducing rail's energy consumption has much lower impact on its cost because energy is only a few percent of rail cost (Smith, S., Chan, E., & Wainwright, S. (2006). Air and rail competition and complementarity. Final Report. In. London: Steer Davies Gleave, page 38). Therebound here is that, assuming an equal energy reduction for rail and air, rail will have a competitive disadvantage with respect to air causing a shift towards air and further reducing the economic basis for (high speed) rail. Such feedbacks cause serious rebounds of efficiency measures ar	Thanks for all the suggestions and possible sources, will try to reflect this in the revisions
2677	8	19	45	19	45	Discussion of air traffic management policies should note that these can also be aimed at reducing contrails and contrail-cirrus from aircraft, and more specifically that there are trade-offs between CO2 emissions and contrails. See, for example: 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.	agree

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
2976	8	2				The structure of the chapter should be revised and structured according to equation in Figure 8.1.2.b. 1.Global and regional GHG emission trends from transport 2. Service demand projections, including mode shares. 3. Energy use and energy efficiency 4. Carbon intensity, and different available fuels.	Rejected. Sub-headings fixed by IPCC Plenary
11146	8	2	1	106	50	I am surprised that I can find no section/mention on vehicle mobile air-conditioning which is a major source of HFC emissions and under which there is EU legislation.	It is discussed in several sections.
14739	8	2	4	-	-	The table of content is too detailed, paragraphs with five lines only (e.g. 8.2.2.2) occur in the TOB. The chapter is too scattered - restructuring? There's also some reducdancy, 8.2-8.3	Chapter structure set by IPCC Plenary.Contents to be standardised. Redundancy to be reduced.
8436	8	20				The use of electric bicycle is growing very fast and thus some data could be found in literature to underline the importance that this means of transport could have in the future.	Noted. Mainly in China, but worth mentioning. Especially in China, this is a significant transport mode.
11879	8	20	10	20	12	The phrase "very low vehicle and fuel-production emissions" is ambiguous and confusing. It implies that vehicle production emissions are low, but that is not true. Suggest stating something like "...very low vehicle operation emission when low-carbon electricity is used for vehicle battery charging".	I agree…this is a better phrasing
15821	8	20	13			Min PHEV range is closer to Prius PHEV of only 18km (not 20) , but in reality could be lower.	yes, the EPA rating is 18 km….but 50 km is sort of low on the high side; the Volt's range is 61 km on the EPA cycle, 52 km EU….and can be quite a bit higher under ideal conditions.
14768	8	20	14	20	15	Better to mention this before line 23 on the same page.	Rejected. Earlier is better for this.
15777	8	20	16			Comparison of drivetrain efficiencies is very misleading without also noting the significant losses associated with converting natural gas or coal to electricity, transmission losses, and charging inefficiencies.	Rejected. Nothing wrong with discussing drivetrain efficiencies, discussion here doesn't imply that this automatically yields lower GHG emissions….obviously, when emissions are discussed, generation and other inefficiencies must be discussed
15865	8	20	16	20	17	In general, should include more well-to-wheel life cycle analyses in Ch. 8 to help compare pathways on equal basis. Tank to wheel analysis can be deceiving: e.g., “BEVs operate at a drivetrain efficiency of around 80% compared with about 20-30% for conventional vehicles”. If you consider the power plant efficiency to make the electricity (30-50%), then BEVs are in the same efficiency range as ICEs.	again, well to wheel analysis IS crucial and must be discussed
3822	8	20	16	20	17	Note that drive-train efficiency of 20-30% probably applies to LDV and not to HDV, for which efficiency are quoted just a few paragraphs before as 45%.	Rejected. The 45% refers to engine thermal efficiency, leaves out all non-engine drivetrain losses and internal losses such as pumping and friction loss.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
11880	8	20	18	20	18	The new Ford Focus Electric charges in 4 hours…maybe removing the reference to 8-hours would be good since new technologies seem to already be reducing charge time. Though the basic issue of not being able to stop and fill up a tank of gas in 3 minutes is obviously still the big problem, and should be highlighte.	agreed that the eight hour recharge time should be modified….clearly is related to voltage and amperage levels….and rapid charging can be much faster
15822	8	20	27	20	28	statement not true - if battery prices drop for BEVs, they will also drop for PHEVs so cost of PHEVs will always be cheaper than BEVs. Might speificy if cost refers to first cost of vehicle or levelized cost per mile including fuel, O&M, etc	Agree but need references
15778	8	20	29		39	A lot of "targeted" and "expected" in this discussion.	well, yes….and how else does one talk about technologies that are at an early stage of development. I'm not uncomfortable with the way we've dealt with this here.
16296	8	20	29	20	39	I propose that the necessity of overcoming safety issues associated with Lithium-ion batteries be mentioned in this paragraph. Also, I propose that R&D activities and potential for polst Lithium-in batteries (such as all solid batteries, Li-metal batteries, Li-S batteries, and Li-air batteries) be mentioned in this paragraph.	Noted. Did not include as we were already too detailed on this given page constraints.
2729	8	20	3			Better to say "Alternative and new", since almost all alternative motive powers have a very long history, e.g. renewable methane in cars and trucks Finland since 1941 and synthetic kerosene in jet planes in Germany since 1942.	or just say "alternative propulsion systems"…I agree that not much is new under the sun
5334	8	20	32	20	33	Need to clarify whether energy density is specified at cell or pack level. Pack level is most informative.	Accepted. We clarified.
15791	8	20	33	20	33	Add "at pack or system level" after "currently 80100Wh/kg"	yes..at pack level
15792	8	20	34	20	34	Change "Improving vehicle energy efficiency" to "Improving battery energy density"	yes, though better to use "improving battery specifric energy (kWh/kg)"
15793	8	20	35	20	35	Add "electric vehicle lifecycle" after "a major factor affecting"	I agree
15794	8	20	36	20	36	Change "battery is about 1000 charges under 80% depth of discharge, typically enough for 5 years" to "battery can exceed 1000 charges under 80% depth of discharge, enough for 5~6 years or longer"	Rejected. We give a span as *average* ("typically"), adding "or longer" is not compatible with this.
5335	8	20	37	20	39	Need to clarify whether cost is specified at cell or pack level. Pack level is most informative. Not sure if targets are appropriate indicator of likely future costs as these are aspirational. Suggest reference to studies forecasting future costs e.g. Element Energy work for UK Committee on Climate Change, suggesting just over $200/kWh for BEV batteries and over $400 for PHEV batteries at the pack level in 2030. Note the higher cost of PHEV batteries. http://www.element-energy.co.uk/wordpress/wp-content/uploads/2012/06/CCC-battery-cost_-Element-Energy-report_March2012_Finalbis.pdf	Accepted.
15795	8	20	38	20	39	Change "...early high-volume production (e.g. 2012-2013) is expected to be about USD500700/kWh but is targeted to drop to USD300/kWh or below in the 2015-2020 time frame (IEA, 2010b)." to "...early high-volume production (e.g. 2014-2015) is expected to be about USD500700/kWh but is targeted to drop to USD300/kWh or below in the 2020-2025 time frame (Bloomberg New Energy Finance 2012; IEA, 2010b).	Agreed. Will check references again and adjust if needed accordingly.
13111	8	20	39			Reference should be latest (IEA, 2012) (ETP2012, page 508)	Accepted.
15820	8	20	4			might add fleets powered by CNG and LPG which are significant in world as well	Rejected. Sentence already includes reference to CNG.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
2730	8	20	4			In addition to ICEs many other heat engines are also used in all transport modes, including ECEs (like stirling engines which in commercial applications have proven higher thermal efficiency (48 %) than diesel engines and all other ICEs) and many types of turbines. ECEs and turbines have better fuel flexibility than ICEs. Therefore, their increased use improves possibilities to use alternative fuels.	Rejected. No relevant use of stirling engines/turbines on roads.
11778	8	20	40	21	1	Neithir coal only nor renewable noly case is realistic condition and those may imagine the negative impact on the coal and too much expectation to the renewable energy. This kind of comparison should be calculated by using more reliable condition. Refer to FEPC estimatinon of the CO2 emssions intensity in major economics which can deploy the EV by using IEA Energy Ballances. 1.FEPC:[Environmental Action Plan by the Japanese Electric Utility Industry, P6], http://www.fepc.or.jp/english/library/environmental_action_plan/__icsFiles/afieldfile/2012/05/16/actionplan_E_2011.pdf	Rejected/Accepted. Rejected: While it is correct that EV electricity will rarely be from one source only, it seems reasonable to compare the effects from different individual sources. Accepted. Will add something to note that all regions use multiple electricity sources, and that there are large differences among regions
15779	8	20	44			What's the current fraction of electricity from renewable sources and what is it expected to be in 2030? A genera statement that BEVs can achieve near-zero lifecycle emissions when operating on renewable energy is not relevant unless it is put into perspective. The same proclaimation can be made for nearly anything that runs off of electricity.	again, I don't really have a problem with what's in the text….but it might be reasonable to point out that in most countries, renewable electricity is unlikely to be the major electricity source for many decades.
5336	8	20	44	20	44	Not only renewable energy - nuclear and CCS also result in near-zero emissions	Partially accepted. Will add nuclear. But: CCS in general not yielding "near-zero" emissions, only possibly for BECSS.
16297	8	20	44	21	1	First, the phrase "from renewable energy" should be modified to "from renewable energy, nuclear energy, and fossil fuels with CO2 capture and storage". Second, the term "life-cycle" should be deleted or modified to "well-to-wheel", because producing BEVs generate non-negligible amounts of GHG emissions.	Accepted. Will replace. But please note: CCS yields near-zero emissions.
2731	8	20	6	20	7	The largest share of alternative fuels in the world is found in Pakistan, where over 80 % of road vehicles use methane (currently fossil methane, but could be renewable methane).	Rejected. Methane does not qualify as alternative fuel by our definition.
4339	8	20	29	29	39	what does "aggressive mean? please provide actual breakdown of costs for an electric vehicle	Accepted change of language (removed "aggressive"). Rejected going further into detail due to space constaints and prioritization.
4409	8	20	27	20	28	This sentence implies that if battery prices were to fall, the BEV may become less expensive than the PHEV.	Accepted. As comparison is difficult between range-limited and full-range vehicles, this sentence was deleted/rephrased.
4410	8	20	35	20	37	The 1000 charges is also dependent on the C-rate and temperature that the battery operates within. The variable currents required to satisfy a driving cycle implies different C-rates. This affects the number of total cycles which the battery can deliver and the number of driving years which can be expected from a single battery pack.	Accpeted. Rephrased the sentence to incorporate this.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
6482	8	20	40	21	2	– On the issue of electric cars powered by coal power plants – CO2 emissions are not the main critical point but PM, NOX and associated health impacts. It has been established that such electric cars when compared to gasoline cars can have an adverse impact of 3.6 times higher. See http://pubs.acs.org/doi/abs/10.1021/es202347q	Rejected. The reference cited actually establishes the opposite…yes, PM2.5 health impacts are 3.6 times higher, but overall environmental health impacts are lower than for conventional cars.
4411	8	20	42	20	44	Is the BEV with efficiency 200 Wh/km comparable to the conventional vehicle with emissions < 150 g/km? The overall sentiment is correct that GHG intensity of electricity can lead to more WTW emissions for a BEV than the equivalent conventional vehicle. However, the example given appears weak in its lack of detail to make the comparison robust. Also, the WTW emissions from the BEV are near zero from renewable electricity sources. Life cycle emissions should be defined carefully. Life cycle emissions should include those associated with vehicle production, including battery manufacture, which may be non-trivial. Instead, WTW emissions should be used.	we definitely should be using WTW rather than "lifecycle" emissions…as for CVs with emissions less than 150 g/km, I don't find this a poor comparison….the most likely CV competitor to an EV is a hybrid.
4294	8	20	9			The external power supply(OLEV: Online Electric Vehicle) and Capacitor(CaEV) should be added in electric vehicle. Capacitor is effective to reduce the weight and cost of the vehicle like delivery trucks and buses which starts and stops repeatedly. External power supply(include contact and contactless) is also effective to reduce the weight and cost of the vehicle.	Noted.
15796	8	21	1	21	1	Change "the liquid or gaseous fuel used" to "the type and amount of fuel used"	agreed
2732	8	21	10	21	33	Only hydrogen fuel cells mentioned. Also methane fuel cells are in commercial transport use, currently in ship transport, but they would be suitable for other types of transport, e.g. rail, too.	Accepted. Added in 8.3.3.2.
8031	8	21	16	21	16	Is it possible to give data for the range of CO2/km for these conditions?	should be possible, and useful….by the way, change "lifecycle" to "fuel cycle" again…we don't include vehicle production, etc.
15781	8	21	18		19	But the vast majority of H2 is from natural gas and will be for the foreseeable future. Again, these types of pronouncements need to be balanced with a rational assessment of the likelihood that zero-GHG electricity sources will be in place specifically for generating H2 for transportation use.	we do have a large number of statements that seem to foresee huge increases in renewables….somewhere we do need to say that hydrogen and electricity are going to largely come from fossil sources for the next few decades, at least.
4295	8	21	18	21	19	When making hydrogen by natural-power-sources + electrolysis for a fuel cell, total energy efficiency is very bad. Therefore, I think that the electricity made by natural power sources should be used by EV(BEV, PHEV) .	I agree with this reviewer….
16298	8	21	20	21	25	I strongly recommend you to pay attention to the estimate of the current cost of the PEM fuel cell stack. I think that this value is too optimistic. The IEA Energy Technology Perspectives 2008 (IEA, 2008, p. 446) indicated that the specific cost of a mobile PEM fuel cell stack is at least US$ 500/kW in volume production. The IEA (IEA, 2009. "Transport, Energy and CO2") estimated the long term "incremental" cost of the mobile PEM fuel cell system to be US$ 4560 per vehicle.	the low cost estimates for fuel cells are quite recent, but seem widely accepted….BUT balance of system will add to costs, so I don't agree with the "almost competitive with a gasoline ICE….."

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
14769	8	21	21	21	21	"Over the past decade, the cost of PEM fuel cells suitable for LDVs has decreased from about USD275/kW to under USD100/kW, with the possibility to reach USD50/kW by 2015 under conditions of largescale production (DOE, 2011a)." That's wrong - these numbers refer to high volume production of 500,000 FC systems per year. Today, costs of somewhere around 1000 USD/kW at low prodcution capacties are achieved. See ETP 2012. High on board storage costs needs to be further emphasized.	Rejected. The sentence clearly states this is "under conditions of large-scale production"….I certainly would be willing to add "at production levels above 500,000 units/year," if that's the correct figure.
5402	8	21	22		23	a $4000 fuel cell system wouldn't be close to competitive because of the electric motors, controllers, etc required….that's why DOE target is $30/kW, not $50/kW….and the "similar output" is somewhat misleading, because generally an electric drivetrain will have lower kW than a competing gasoline drivetrain because of the torque characteristics of the motor.	Accepted.
4413	8	21	26	21	28	This is a very good point, analogous to battery lifetime: 2500 hours at 50 km/h does not represent the variability in power requested from a fuel cell during driving. That is, the fuel cell does not operate at one load point in a vehicle powertrain as it might in a stationary device. Therefore, the real-world lifetime of fuel cells remains unknown, to a degree.	Noted. The text does not imply that lifetime was tested at constant speed but that the average over the test cycle was 50 km/h.
16299	8	21	28	21	29	I strongly recommend you to pay attention to the technical maturity of compressed hydrogen on-board storage. The IEA Energy Technology Perspectives 2008 (IEA, 2008, p. 433) indicated that vehicle on-board storage of hydrogen is very expensive and is not technically mature.	we certainly need to look at complete system costs, not just fuel cell costs
15797	8	21	3	21	3	Change "currently" to "In 2009". What about electric buses elesewhere in the world? Might find a more updated reference.	agree
15782	8	21	31		32	AT LEAST another 5-10 years.	agree
2735	8	21	34	22	2	Gas turbines are not mentioned. They are used in aeroplanes, helicopters, ships, trains, trucks and buses. LBG and CBG are suitable for them.	Noted. Turbines briefly mentioned in 8.3.3 intro, but otherwise not covered.
6705	8	21	35	21	41	When it comes to enegy policies, every nations must consider various aspects, for example, energy-security, influences on their economies. It is uncertain whetehr electric generation will be decarbonaized for next few decades. So, it should be noticed that “electricity generation has been depply decarbonized” isn't necessarily true.	yes we need to be clear that a lot depends on electric gen decarbonisation
3824	8	21	35	21	35	When talking about diesel hybrid locomotives it is worthwhile to distinguish them from diesel electric ones that are been used for long time. Thus, it is useful to explain the differences between the two types.	agree
16300	8	21	38	21	41	Introducing hydrogen fuel cell trains may also be attractive to decarbonize the railway sector, especially in areas where extensive electricity transmission network does not yet exist.	agree
8030	8	21	38	21	38	Hybrid systems (electric and Diesel), e.g. in Kassel or soon in Chemnitz are worth being mentioned	agree
4414	8	21	42	21	43	Onboard solar PV can only provide a portion of the auxiliary loads for a ship. Solid oxide fuel cells are well suited to heavy duty loads and operate at temperatures which do not require an auxiliary fuel reformer.	we can mention this
2733	8	21	44	21	45	LNG and LBG do not require on-board reformers, because they can be used in methane fuel cells. Please note that LBG (liquefied biogas) also exist in the market, not only LNG.	we can mention this
2734	8	21	45	22	1	Also mechanical wave power can be used. Demonstrations have been built and commercial applications have been planned.	we can mention this
15780	8	21	6		7	Would be good to note what drove this large expansion -- I assume it was the value proposition to the consumer. Can it be replicated any time soon with passenger cars? Very, very unlikely.	yes quite a specific application
3823	8	21	6	21	9	The number of two-wheeler electric vehicles for China probably includes electric bikes. If this is the case make it clear.	yes its all electric bikes, will clarify. Yes, electric bikes were included.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
4412	8	21	8	21	9	Note that many of the two-wheelers used lead acid batteries. This has created issues with battery disposal in China (problem shifting) See: C. R. Cherry, J. X. Weinert, and Y. Xinmiao. Comparative environmental impacts of electric bikes in China . Transportation Research Part D: Transport and Environment, 14(5):281–290, July 2009.	will mention if room. Agree. This aspect can be complemented to the 8.7.4 technical risks section.
2678	8	21	18	21	19	Claiming that H2 can be produced from electricity at very low life cycle CO2 is misleading. It is very unlikely that any marginal renewable electricity would be devoted to H2 production - it would be better used to off-set existing coal-fired electricity production.	not really a transport chapter issue. But, it does have an impact if we presume low carbon alternative fuels when the underlying assumptions are not correct.
2679	8	21	31	21	33	5-10 years seems very optimistic for FCVs to be commercially viable. I don't have access the IEA(2012) reference, but please check how this estimate of viability was done.	disagree - we did use ETP 2012 - IEA now thinks commercially viable in 2015-2020 time frame, but will take time to build the market - not many FCEVs on road before 2025.
15824	8	22	10			drop-in biofuels are another option	Agree. Sure, and while we're at it, butanol could be added, too.
13112	8	22	11	24	41	Different expressions such as "life-cycle"CO2 emission , "fuel cycle" GHG ratings, or "net" emission should be unified into (e.g.) "WTW" CO2 emissions.	agree we need a unified term, will fix this. RICH: Agreed about unifying. My preference would be to use "life cycle CO2e emissions" (or "life cycle CO2 emissions" when only that one gas) since well-to-wheel only applies to oil and gas, strictly speaking.
2738	8	22	16	22	17	Modification needed are not significant. Methane has been used in dualfuel diesel engines commercially since 1973 and this technology is currently spreading to many transport applications.	will try to clarify this, but conversions do cost signficiant $$$
15825	8	22	19	22	20	bio CNG systems will require lots of gas cleanup and heating value boosting to be practical	agree but only marginally a transport issue. yes, but not clear that needs saying here….as long as it's stated in the biomass fuel discussion
14770	8	22	2	22	2	Maybe mention EEDI and SEEMP which should be enacted by Jan 2013 (according to IMO, 2011)	As mentioned in response to comment 8717, more explicit reference needs to be made to the projected impact of EEDI and SEEMP on energy consumption and emissions (e.g. In recent study by Lloyds for the IMO)
2739	8	22	22			Otto engine is a gas engine. Therefore, conversion is needed if liquid fuels like gasoline is used, not when gaseous fuels are used.	incorrect(Otto cycle is for gasoline engines) and misses the point that the main part of the conversion is installation of gas storage tanks

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
2740	8	22	22			Refueling times of compressed and liquefied gases are approximately the same as with gasoline and diesel oil, i.e. minutes. It is very curious that long refueling times are attributed to gas vehicles (incorrectly), but the problem of typical 8 hour charging time of electric vehicles is not mentioned in chapter 8.3.3.2. Inhaling of toxic fumes is a health hazard of gasoline and diesel oil use. This is avoided in gas and electric vehicles.	refueling can be quite fast at high pressure stations, long times associated with home (and often depot) refueling. Long recharge times are discussed in earlier section on vehicles, so not really necessary here. Since there isn't a separate section for natural gas vehicles, 8.3.3.1 is the only place to mention refueling times for natural gas vehicles.
15784	8	22	23		24	Cost of storage tanks is also an issue.	well, key part of "conversion cost" mentioned here IS storage tank costs….but perhaps it makes sense to have a parethetical mention, e.g. conversion cost (largely the cost of the storage tanks and their installation)
15826	8	22	25			many studies suggest that most economic use of NG for trasnport in US and EU is as LNG for HDVs (long haul trucks for example)	should be looked into
2741	8	22	25			Quantitative information of the Pakistan case is needed, i.e. 3.2 million vehicles and over 80 % share of road vehicles is a proof that crude oil domination in traffic fuel market can be overcome.	agree
2743	8	22	25	22	30	It is not mentioned that methane is the only fuel suitable for all engine types used in all transport applications: road, rail, water, air and space as well as mobile engines like agricultural tractors, street maintenance machines etc. Also it is not mentioned, that methane is considerably cheaper than gasoline and diesel oil in almost all countries. Biogas is the only biofuel that currently is cheaper than gasoline and diesel oil even if they have same tax level. There are more than hundred OEM methane LDV models available.	fair comment….although the vehicles themselves can be expensive, the fuel is fairly cheap….discussion may be too negative
3826	8	22	25	22	30	When discussing NG use, mainly in non-original equipped LDV it is important to consider CH4 leakage due incomplete combustion or poor control of the fuel handling system.	correct, but if NG use grows, more OEM models will become available and fewer vehicles will be conversions….not sure this is a critical issue, though worth mentioning
2742	8	22	26			Australia has not so far had success in NGV use, like the other countries mentioned. i.e. it does not belong to the group. But Iran and China are big success stories.	if correct, worth revising. China has made considerable progress on NGV use, with about 1 million NGV population. But NGV use in China is still facing the lack of fueling infrastucture. Iran should be among the success countries.
15785	8	22	27		28	Need to be careful with conversions. If they are done poorly, the increase in tailpipe methane emissions could negate the perceived GHG benefits of this fuel relative to gasoline.	see above
4415	8	22	3	22	5	For aviation, there are geared turbofans and unducted turbofans which can deliver efficiencies close to the limit. Further efficiency improvements can be obtained by fly by wire or fly by light control, recuperative cores and exhaust gas recovery.	okay can try to add mention of these if we have room

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
2736	8	22	3	22	5	Text "In aviation, no serious alternative to jet engines for propulsion has been identified" is incorrect. Currently also otto engines, gas turbines and mechanical wind power are used. Airships are not mentioned. They have large potential especially in freight transport (big energy efficiency advantage compared to aeroplanes) and they can use many types of heat engines and fuel cells, and in addition they are especially suitable for solar power use. For jet engines, the higher they fly the better liquefied gases (renewable methane and hydrogen) work, in comparison to kerosene, due to their suitability to low temperatures. Tropospheric pollutant emissions are much worse problem than ground level pollutant emissions due to their long lifetime. Therefore, renewable methane and hydrogen are the fuels of choice in aviation. Even more this applies to space tourism, which is now just in a starting phase but expected to grow. It means the use of rocket engines in troposphere and especially in stratosphere, where pollutant lifetimes are even longer than in tropospheric emissions. Therefore, renewable methane and hydrogen are needed in rocket engines, too.	will try to reflect these points - but it seems clear that commercial passenger air travel will be dominated by jet engines for decades to come. Alan: Some useful suggestions which will be separately evaluated and would be worth incorporating. Air ships have had a chequered history as a freight transport mode. This essentially a niche freight mode but may need to be re evaluated as part of a low carbon logistics strategy. Is there any data on the carbon intensity of air ship heavy freight operations? Alan: Some useful suggestions which will be separately evaluated and would be worth incorporating e.g. need more discussion of the impact of just-in-time and the opportunities of relaxing it to cut energy use and emissions
13113	8	22	32	22	34	This paragraph (At least ,,,,,,,,,countries) is not necessary. No relation with the rest of the paragraph. Please cut it for simplicity.	agree. it might not fit well in this paragraph, but it's a crucial point for electric vehicles….needs to be said
16301	8	22	33	22	33	It is better to modify the phrase "power plant" to electricity production and delivery".	will check on agreed terminology. a reasonable edit
4416	8	22	34	22	35	Quantify “fairly slow” and “low voltage”	agree we should do this. good point…sentence is vague
15798	8	22	34	22	34	Add "assuming an ideal charging pattern and without peak time charging" after countries	agree something clarifying like this would help. correct….it could be misleading to blithely assume off-peak charging, except where there is a "smart grid" and the costs of charging are significantly different peak to off peak
2744	8	22	37	22	38	They can not provide full recharge in under an hour, at most 80 % (and they will never recharge fully).	more importantly, is it really true that lots of fast charging systems are being installed? Lots of locations are putting in "level 2" chargers, i.e. 220V (standard in Europe, but 110V is the U.S. standard)..quite different, will allow charging in 3-4 hours rather than 8, but still.....
5198	8	22	4	22	5	Auxiliary power consumes a few promiles of overall aircraft fuel; suggest to remove this detail.	will check on this

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
4417	8	22	41	22	42	How much more expensive are fast charging units to the 240V/120V versions?	important to quantify….early estimates are $25K-$50K per charger vs. perhaps $2K for a level 2 charger
3825	8	22	42	22	44	It is useful to make a back of the envelop calculation regarding the availability of solar energy and the amount of energy required to propel it. I suspect this proposal is almost unfeasible.	Rejected. Unclear what this comment is referring to. There is nothing on PV in the lines referenced.
8718	8	22	45	22	45	Additional note: It is possible that inadequate charging infrastructure will delay a widespread shift to electric vehicles. Public charging infrastructure is an important means of counteracting “range anxiety”, which is the fear of being stranded due to insufficient battery capacity. Although most trips can easily be accommodated by modern electric cars, consumers prefer to buy cars that are capable of much longer distances. Source: AEA, 2012. Next phase of the European Climate Change Programme: Analysis of Member States actions to implement the Effort Sharing Decision and options for further community wide measures: Transport Sector Policy Case Studies http://ec.europa.eu/clima/policies/effort/docs/esd_case_studies_transport_en.pdf	I agree, though not clear what to say about this….at least, we might want to note that it remains unclear just how much of a problem is created by the lack of travel flexibiility caused by EV range limitations…we don't know how many consumers will be willing to put up with this.
6706	8	22	46	23	2	When it comes to enegy policies, every nations must consider various aspects, for example, energy-security, influences on their economies. It is uncertain whetehr electric generation will be decarbonaized for next few decades. So, it should be noticed that “during which time electricity grids could be decarbonized” isn't necessarily true.	correct, but we're writing a report whose underlying assumption is that GHGs are a problem and we need to find solutions.
15783	8	22	7		9	This does not ring true and needs to be verified. GREET says WTW GHGs for methanol from natural gas is greater than for gasoline. It wouldn't surprise me if DME was similar.	I suspect this is correct….yes, natural gas yields GHG reductions…but the conversion efficiency to get the products is not very good. My quick look at some GREET results shows that methanol from natural gas yields higher net emissions; DME is lower, but I suspect that's because the baseline vehicle is a gasoline vehicle and DME is in a diesel....a diesel to diesel comparison might yield a higher GHG emission rate for DME.
2737	8	22	7			Text "There are relatively few lowcarbon fuel options for transport applications" is incorrect. There is no lack whatsoever on technical options for all transport applications, in excess of 100 are available. 23 generations of traffic biofuels have been identified. Some of these represent a group of many different feedstocks, production methods and chemical structures. In addition more than 10 other (non-biofuel) technological options for using all renewable energy forms in transport applications are available.	Accepted. The text statement has little meaning and seems overly negative. Agreed that "relatively few" isn't meaningful, but the implication in this comment that all biofuels are "low carbon" is incorrect.
15823	8	22	8			add LPG to methanol and DME list	agree we can mention these

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
7488	8	22	9	22	12	"Electricity, hydrogen and biofuels (including biomethane, DME, ethanol and methanol), all could provide operation with very low lifecycle CO2 emissions, but this depends on their feedstocks and conversion processes (see 8.3.3.4)". There is ample feedstock from the existing net primary production of woody biomass and residues to provide biomethane, DME, methanol, producer gas/water gas and gengas through the dry distillation processes for converting ligncellulose to these gaseous and liquid fuels.	Noted. Certainly not enough to replace liquid fuels in transport.
6483	8	22	13	22	30	It has been established that such conversions may or may not have any positive impact at all. See http://www.greencarcongress.com/2011/02/reynolds-20110220.html and http://sa.indiaenvironmentportal.org.in/files/air%20quality%20policy_0.pdf. Also the fuel efficiency of diesel is better than CNG/LPG conversions.	good points, will reflect
3465	8	22	14	22	28	It must be mentioned as well the utilization of natural gas together with diesel	it IS mentioned, on lines 16-17
2680	8	22	18	22	20	There is some evidence that methane leakage from fracking may lead to natural gas having a larger climate impact than coal. Please check the literature on this and what other parts of AR5 are saying on this issue, which is rapidly developing.	we do need a short paragraph on methane leakage, but presumably the chapter on energy production will deal with this in detail, and we should summarize what they say.
5199	8	22	31			No objection to discuss electricity with respect to electric cars, but please, do not forget the grid connected transport modes as electric (conventional and high speed) rail, urban rail, trolley bus. Globally these transport modes represent a much larger share than electric vehicles, have a very efficient and straight forward way to use the electricity (no batteries, etc.) and have a potential to reach very high shares by the end of this century and probably are needed to reach the 80% reductions and provide several times more transport volume as current. Another important caveat in all EV literature seems to me the cost aspect. For instance, peak shearing can be reached with storing off-peak electricity in car batteries, but the question needs to be answered why electricity producers do not use such batteries to store their electricity by themselves. The answer of course is that the cost of batteries is several orders of magnitude to high to do so. Then, the question remaining is why car drivers would be willing to pay for this high cost without heavily subsidising (or de-taxing) by governments. Actually, tax exemptions is currently the way in e.g. the Netherlands EV's are promoted. Economically this is really not efficient (batteries are far too expensive for large scale storage).	good point…..this section is supposed to deal with electric vehicles in transport, and this certainly includes rail and trolley. As for cost….cost is high today, hopefully much less so in the future.
2681	8	22	40	22	41	Reference to Axsen & Kurani is incorrect. This study did not survey those with Electric Vehicles - only those with potential home recharging, thus the conclusion stated in the text does not match with what this study analyzed.	also, the text implies home rechargers WILL use publich chargers….is that a correct interpretation of the source?
2682	8	22	41	22	45	This text strikes me as largely speculative. Would prefer to see a discussion of Israeli battery switching, see: https://betterplace.com/	well, there's not much evidence available, so speculation is about all we have…as for battery switching (A Better Place), its president just resigned….but we shouldn't ignore the battery switching option, since it's gotten so much publicity.
5403	8	23	1		2	The idea that an electric grid can be decarbonized in "at least one or two decades" seems a bit optimistic…..yes, you have the "at least," but a sweeping change of a nation's electric grid is a 40-50 year challenge, at least for developed countries.	I agree….way too optimistic

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2745	8	23	11			Remove “modified”: otto engine is a gas engine, i.e. suitable for hydrogen with ease (and is already so used). And hydrogen is also used in wankel engines.	I'm not quite sure what the reviewer means by "otto is a gas engine"…it's a spark-ignited engine
15799	8	23	2	23	2	Add "to some extent" after "could be decarbonised"	or something like that…."decarbonized" seems a bit unlikely.
15786	8	23	22		24	But it's $1 to $2 trillion more than the existing infrastructure. Unless there are significant govt incentives/mandates, this is unlikely to occur on its own. There is little value proposition for station owners to install these systems.	I think lines 17-24 don't do a bad job of describing the infrastructure problem, but we could be somewhat more forceful in explaining that fuel suppliers will NOT build the infrastructure without a promise that the vehicles will come
15827	8	23	25	23	27	replace "quite high" with "very high". Also check NREL USDOE tests (CDP#15): http://www.nrel.gov/hydrogen/cdp_number.html	not sure why we should make that change….USD!/litre is about the U.S. price of gasoline today, admittedly ignoring taxes on the hydrogen
17125	8	23	25	23	27	DELETE: The current cost of hydrogen production and delivery to vehicles is quite high compared with gasoline or diesel fuel, with steam reforming at point of use estimated to be about USD 1 per litre gasoline equivalent, and electrolysis at point of use about USD 1.50 per lge (IEA, 2012). REVISE TO: Hydrogen cost is not necessarily ‘quite high’, when large improvement of vehicle efficiency is considered. Vehicle efficiency of FCV is expected to be 2.5 – 3 times better than conventional vehicles. Eventually energy cost per a km of FCV may be cost competitive to conventional vehicles. CONCAWE, EUCAR, EUROPEAN COMMISSION (2008). Well-to-wheels analysis of future automotive fuels and powertrains in the European context. Available at: http://ies.jrc.ec.europa.eu/uploads/media/V3.1%20TTW%20Report%2007102008.pdf	I don't agree with the 2.5-3 times stuff, because the appropriate comparison is to a hybrid vehicle, with a considerably smaller multiple….plus, although natural gas-based hydrogen produced at the station won't be super expensive, we probably need centralized production with CCS to get the GHG emissions reductions we need. Certainly, though, we should add something about the higher vehicle efficiency to the statement.
14771	8	23	26	23	27	The mentioned 1 to 1.5 $/lge is only H2 generation. With distribution/delivery it sums up to some 3 to 3.5 $/lge.	no…..production AT POINT OF USE!
3827	8	23	27	23	27	Explain the meaning of "lge". It is the first time it shows up.	LITRE OF GASOLINE EQUIVALENT
5404	8	23	28		29	a US 0.50/lge hydrogen price sounds like an (optimistic) "at the plant" cost….the delivered price would be MUCH higher	yes….production cost by itself is misleading…as for "much higher," that depends…if the scale is large enough for pipeline delivery, delivery costs will be high but not enough to yield "MUCH higher" delive red cost
15787	8	23	29			Does the 50 cpg value include the levelized cost of the compressed fuel (including the cost of compression equipment), or is the just the cost of H2 from the reformer? The station/compression cost will be a substantial component of delivered cost and needs to be included in these kinds of comparisons.	good point, what's included in the cost estimate must be specified

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16302	8	23	37	23	38	It has been recognized that a small percent blend of hydrogen with natural gas, called "hythane", can be transported by existing natural gas pipelines without causing problems such as embrittlement.	true, I believe….but a "small percent" won't make much of a dent….and the hydrogen can only move through NG pipelines to the delivery point FOR THE NATURAL GAS…..so cost savings are limited, I suspect.
12899	8	23	39			A reference to chapter 11 (agriculture) must be introduced in chapter 8.3.3.4 in order to refer to the tade-offs in land-use with respect to food production. Additionally, recent evidence on substantial indirect land-use changes due to feedstock production must be addressed as well as unfavourable life-cycle GHG emissions from bioenergy. Cite relevant studies, for example Leopoldina (2012), Bioenergy, Chances and Limits must be added.	I agree
2446	8	23	42			Risen fairly rapidly to 3% - this is very small scale and has made a negligible contribution to CO2 reduction	it's probably correct that contribution to CO2 reduction is negligable…but increase is interesting…the key is what fuels we're talking about….palm oil, for example, is probably not sustainable, nor is corn….the reviewer may well be correct that our statement is inappropriate
7489	8	23	42	23	45	However, [biofuels] production in 2012 grew little compared to 2011 possibly due to concerns regarding sustainability of feedstock production along with the slower than projected development of advanced biofuels, which are still in the development stage (IEA, 2012). There is ample feedstock from existing NPP. Also the dry distillation of biomass has been used for centuries.	Noted.
2746	8	23	45			Some, not all, are in the development stage. E.g. biogas and many types of synthetic biodiesel are commercial.	but presumably these are not "advanced" biofuels
11881	8	23	47	23	47	The phrase "compatible with all types of vehicles" seems misleading, particularly given the discussion that follows	perhaps we should say "compatible -- with minor modifications in some cases -- with….."
15800	8	23	6	23	7	Change "EV recharging can yield the benefits of "peak shaving" and "valley filling" (charging from grid when under low grid load)." to "EV discharging and recharging can yield the benefits of "peak shaving" (discharging to grid when electricity is in high demand) and "valley filling" (charging from grid when grid load is low). These power service functions, however, can shorten EV battery life due to more frequent cycling and are unlikely to be accepted by EV owners and/or manufacturers in the near future."	a good rewrite….I'm concerned about the last sentence, though….I imagine the effect on battery life depends on the degree of discharge….if small, might not be consequential. We need to check this out before stating shuch a thing.
2447	8	23				There is too much reliance on one publication - IEA 2012	it shouldn't be hard to find additional sources for some of these statements
2683	8	23	2	23	2	10-20 years seems like overly optimistic timeframe for decarbonization.	Noted.
2684	8	23	3	23	5	This section seems repetitious.	true, this was stated in earlier paragraph..could be deleted
2685	8	23	6	23	9	V2G is still speculative; it is mainly useful for helping to manage transient load fluctuations. Would be better to discuss these issues. Good overview is provided here: Guille, Christophe, and George Gross, 2009, A conceptual framework for the vehicle-to-grid (V2G) implementation, Energy Policy, 37: 4379-4390.	agree that it is somewhat speculative, will take time to develop

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
2686	8	23	35	23	35	Deng et al 2010 is missing.	will correct
17126	8	24	1	24	2	REVISE: number 10%-15% to 5% to 10%; 10 to 20% to 5 to 7% ; REVISION SHOULD BE: …to go above limits of around 5% to 10% ethanol blended with gasoline, or 5 to 7% biodiesel blended with diesel fuel. Reason: The value has to be equivalent to the compatibility range of legacy fleet vehicles. (Oak Ridge National Laboratory, Technical Issues Associated with the Use of Intermediate Ethanol Blends in the U.S. Legacy Fleet: Assessment of prior Studies. Available at: http://info.ornl.gov/sites/publications/files/Pub7767.pdf)	Noted.
15828	8	24	10			biofuel infrasrcuruew costs can be high due to need for dedicated pipelines, storage tanks and dispensers, esp. for hi ethnaol or biodiesel blends.	Noted. Revised text.
3828	8	24	15	24	16	HDV using Diesel engines and fed with a blend of 95% ethanol and 5% additive (cetane enhancer) are being used in several countries (e.g. Sweden, Brazil, Italy). Around 1,000 of these vehicles are in operation. Please, look the BEST- Bioethanol for Sustainable Transportation site at the web. A thesis is available about the BEST Project in Brazil (in Portuguese).	Noted.
16303	8	24	17	24	18	The phrase "vegetable oils" should be modified to "FAME (fatty-acid methyl ester) biodiesel fuels" because biodiesel produced from microalgae can be hydro-treated to produce hydro-treated renewable jet (HRJ) fuels. If the above comment is reflected, I propose that the article "T.Takeshita, 2011 "Competitiveness, Role, and Impact of Microalgal Biodiesel in the Global Energy Future." Applied Energy 88, pp. 3481-3491." be included as a reference.	Agree that FAME is appropriate for most fuels derived from vegetable oil - but not all, will distinguish
16304	8	24	18	24	19	I propose that the article "T.Takeshita and K. Yamaji, 2008. "Important Roles of Fischer-Tropsch Synfuels in the Global Energy Future." Energy Policy 36, pp. 2791-2802." be included as a reference, because this article has shown the potential for biomass-derived Fischer-Tropsch synthetic fuels to be used as a fuel for aircraft.	Okay will check it
2448	8	24	20			More on this - important statement - and the comments in the next para on contention	we have a lot on biofuels sustainability in different places, but will review
11643	8	24	21	24	30	YES, YES, YES - it is state of art to include land-use change. Hence do it! Figures without are misleading and should not be used!	partially agree -we should show both ways. Very difficult and controversial and the group will work hard on how to represent all this for next draft. I'm fine with just making sure we repeat the land use warning whenever we discuss the figures on WTW and lifecycle emissions . RICH: the problem with that is that without land use change included, the figures may be meaningless. The problem is fundamental to the use of product-based LCA to represent mitigative capacity.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
15829	8	24	21			although some biofuels like Brazilian sugarcane may have 30-90% GHG reducitons compared zero blend fuels, corn ethanol has been showing to also have positive emisisons, so range for those (dominant fuels in OECD) is more likely in the 10 to -10% range on average. Might find a paper on this	agree there is a big range and corn doesn't do great. We will get to a figure that shows all this. GREET shows a moderate GHG reduction for ethanol, disregarding land use changes….perhaps our range should be widened a bit, but my understanding is that most corn ethanol has positive reductions…exceptions are where coal powers the distillery and/or where yields are low....but, especially now, natural gas is the more likely fuel, and yields are high in most places. Attributional LCA results are not predictive of climate change mitigation benefits. USE WITH CAUTION.
3829	8	24	28	24	30	Add EPA, 2010 to the list of references. EPA, 2010 - EPA (Environmental Protection Agency). Renewable Fuel Standard Program (RFS2), Regulatory Impact Analysis. Assessment and Standards Division, Office of Transportation and Air Quality. EPA-420-R-10-006, February (2010).	enough references here already.
5239	8	24	30			The following reference makes an overview of the various studies on the results concerning the EU sustainability criteria for biofuels. According to the reference, the criteria will not guarantee low ghg balance for the biofuels. Ref.: Soimakallio, S. & Koponen, K. 2011. How to ensure greenhouse gas emission reductions by increasing the use of biofuels? – Suitability of the European Union sustainability criteria. Biomass & Bioenergy 35, 3504–3513.	Will amend. but we have more than enough references here already.
7490	8	24	31	24	35	“All land-competitive biofuels potentially induce emissions from indirect landuse change, though the magnitude of this effect is quite uncertain ---. The production of landcompetitive biofuels can also have negative direct and indirect impacts on biodiversity, water and food availability (see Bioenergy section in Chapter 7)”. This is not true if existing net primary production (NPP) is used more fully.	i.e. ag wastes? True…Will amend.See remarks above about using existing NPP
16305	8	24	34	24	35	Takeshita and Yamaji (T.Takeshita and K. Yamaji, 2008. "Important Roles of Fischer-Tropsch Synfuels in the Global Energy Future." Energy Policy 36, pp. 2791-2802.) have shown that biofuels produced from feedstocks cultivated on excess cropland that can be used for energy purposes without conflicting with other biomass uses such as the production of food, paper, lumber, and traditional fuelwood could make a large contribution to avoiding dangerous climate change without negatively affecting food availability.	we will point this out. Agree. It's not clear what "excess cropland" means in practice with growing populations eating higher on the food chain, and with extreme weather potentially reducing crop output. All purpose-grown energy crops potentially compete with food production. In any case, the paper doesn't show, but assumes, that biomass is sustainably produced on what is deemed excess cropland
2748	8	24	36			Because gene manipulation technologies are commonly used in algae fuel development (although natural algae would work), potential ecological and other risks of GM algae deserve to be mentioned.	agree but not really a transport chapter issue

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
5337	8	24	36	24	36	Algae cannot grow at sufficient volumes using atmospheric CO2 alone. Algae production therefore requires a very significant input of CO2 from a non-atmospheric source, i.e. fossil CO2 from power or industry sources. The GHG benefits of algal biofuels are therefore very limited, and only appropriate if either CCS or alternatives to the use of fossil fuels are not available in the industry or power sectors.	Noted.
3830	8	24	36	24	37	It looks unfair to quote sugar cane ethanol in the same place as lignocellulose crops and algae. These last crops are not yet commercial for energy production, while sugar cane ethanol is presently the only advanced ethanol commercially available. Thus, it should be treated in another sentence where its merits should be explicitly listed.	Noted. Ethanole now also otherwise mentioned in Sectin 8.3.4.4.
3831	8	24	36	24	37	When discussing sugar cane ethanol it is worthwhile to make reference to its significant capability of fuelling "plug-in" hybrid vehicles. This issue is discussed, starting already in pg 24 and it should make a link with the sugar cane feedstock. Please, see Pacca and Moreira, 2011 for further information, and use the words Pacca+Moreira+biofuel+2011 to see paper repercution in several sites. Please, also consider the relevance of sugar cane ethanol regarding GHG emissions, when used to feed a fleet of plug-in hybrid vehicles. - Pacca, S. and J. R. Moreira, 2011. A Biorefinery for Mobility? Environ Sci Technol. 2011 Nov 15;45(22):9498-505.	yes but true for any ethanol or drop-in biofuel. I don't see how this issue is already "started" in p.24, but the general idea is a good one…..the community has been talking about combining PHEVs with biofuels for the last few years….since the amount of liquid fuel required could be fairly low if the PHEV range was reasonably high (more like the VOLT than the Prius plug-in). useful if the biofuels are low carbon. Comment incorrectly suggests this is a feature of sugarcane ethanol only.
7491	8	24	36	24	38	“Advanced biofuels from lignocellulose crops (e.g. grasses, short-rotation trees) and algae, along with sugarcane ethanol, offer potentially lower life-cycle emissions than grain-based or oil-seed-based biofuels, with better opportunities to avoid large direct and indirect land-use change impacts”. If existing NPP is used more fully and the lignocelluloses is broken down by dry distillation to methanol etc. then much if not most land-use change could be avoided.	Noted.
2749	8	24	39	24	40	Word "also" gives a very wrong impression. It should be made clear that biowastes, forestry waste and agricultural and forestry residues makes much larger GHG emission reduction possible than energy crops, including lignocellulosic energy crops. In addition, their ecological problems are much smaller and they do not require land use, i.e. no land use change problems. E.g. the source (EUCAR/CONCAWE/JRC, 2008) used in this chapter shows that GHG emission reduction of -200 % is possible when utilizing biogas made from biowaste sources that otherwise would be atmospheric methane emitters.	a reasonable point, though a bit overstated….if we're comfortable with the conclusion that waste utilization yields.lower GHG emissions, we probably should reword this.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
2750	8	24	40	24	42	Text "the alternative fate of wastes and residues must also be considered: net emissions can rise if waste diversion releases carbon that would otherwise be flared, sequestered, or utilized for energy" is misleading. Use of bioresource for transport does not increase emissions compared to its use in other energy production (but has a potential to decrease them because transport is now almost completely crude oil based). Use of bioresources for transport decreases emissions when compared to resource wasting flaring. Flaring should not be recommended.	well, certainly the words about flaring in our text are incorrect….if the waste would otherwide be flared, its diversion to fuel can't produce MORE carbon…flaring releases all of it….as for energy use, depends on what the biomass energy substitutes for...if it substitutes for coal, then using it as a transport fuel might indeed yield higher net GHG emissions. I do recommend we rework this a bit. agreed that the word "also" incorrectly attributes "very low net GHG emissions" to the fuels mentioned in the prior sentence.
17771	8	24	44			Biofuels - test flights by airlines Qantas, United, Boeing should be included	agree
15788	8	24	7		9	You might be able to get the vehicles on the road, but processing the billions of tons of biomass required in such a scenario into liquid fuels would be an incredible challenge.	the reviewer is correct, but that's not what the sentence says….it only says that obtaining the vehicles wouldn't be too difficult…which is correct…discussion of obtaining the fuel is a separate issue.
2568	8	24	7	24	9	Biofuel blends higher than 5.75% face the difficult barriers posed by standards such as the World Wide Fuel Charter. Tracing back these guidelines one can see from which studies these came from. More at http://cenbio.iee.usp.br/download/publicacoes/STC_Ethanol_SEPT2005.pdf	but many manufacturers warrant vehicles to 10%, US EPA estimates 15% is safe except in quite old vehicles. Maybe the reviewer's point is to change the charter to help overcome this barrier?
2747	8	24	8			Text “given slow vehicle stock turnover rates”gives a wrong impression. Vehicle lifetimes, especially road vehicles, are much shorter than lifetimes of power (5x) and heating plants (2x). Therefore, new technology, including ability to use renewable energy, can be taken into use in transport sector faster than in other energy sectors.	Noted.
3418	8	24				I miss a notion in this paragraph or a previous one that urban modal choices differ among countries, regions, continents because of substantially different urban transport systems. E.g. cheap and abundant forms of private and collective transport (taxis, rikshas, motorized two- and threewheelers, minibuses) in Asia and Latin America. The volumes are such that this report needs to recognize this sub-sector (its associated efficiencies and inefficiencies, its private LDV growth mitigation potential, its pollution etc.). Making a difference between LDV and HDV is rightful when talking about vehicle and fuel technology, but it falls short when viewed from a more socio-economic and spatial angle. In 8.9.3 there is reference to this notion but it is a bit late.	seems this reviewer is referencing another text from ours….comment otherwise makes no sense
2450	8	25		27		Good succinct review	yay thanks!
8432	8	25				Please specify the average emission factor considered for the reference vehicle (“a base 2012 ICE gasoline vehicle), or else change the y-axis considering not the percentage change in l/km but absolute CO2emissions (g/km) expected from the different technologies	good comment…I'd prefer the former

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
4524	8	25				Not sure what lge is in the label on the y-axis. Should show WTW ghg emissions which for BEVs is highly dependent on the carbon emissions in power generation. It is not transparent, and therefore a misrepresentation to equate energy in electricity to energy other fuels which is perhaps done in this figure. (e.g. see NRC report on "Hidden Cost of Energy" for examples of WTW studies for BEVs)	yes, but showing WTW adds greatly to complexity…I'd stick with fuel consumption here, unless we're willing to greatly expand the number of data points we show
5405	8	25				the 2012 and 2030 values for the BEV and FCEV seem much too similar, given the very large load reductions possible in this timeframe	Agree
16307	8	25				Same as above.	Agree - referring to his last comment
11644	8	25	10	25	19	Make a comprehensive figure including biofuel options and at the level of GHG emissions!	as above (comment no 16307) …a good idea, but you'll need lots of data bars to make it comprehensive (or the bars will be far too wide to be useful)
11645	8	25	10	25	19	Add by similar chart for HDV otherwise lack of balance.	good idea
15830	8	25	10			the low GHG values shown for BEVs and FCEVs are only possible if using low-carbon electricity and hydrogen. Should also consider using BTU/km, not gge/km, since the BTU would capture any electricity used in the fuel, in addition to liquid fuels. should really show totoal BTU or Joule / 100 km, not just liquids since would represent BEVs and PHEVs more accurately.	don't agree, BTU presents us with the problem that the efficiency of conversion varies widely…and what's the "efficiency" of nuclear?
4296	8	25	11			Since this section shows the analysis for reduction of fuel consumption and CO2 emission, we should also indicate comparison of the CO2 emissions in well-to-wheel in each vehicles.	same issue as comment no 15830 ….this would be nice, will take up considerably more space…but probably worth doing
2449	8	25	15		19	A very important point is made here, but this is not followed up in the rest of the Chapter. The W2W comparisons are central to CO2 estimates - as are the embedded energy and carbon in the construction of the infrastructure.	agreed, though the last sentence states we can't yet do this well
16308	8	25	16	25	16	The term "life cycle" should be deleted because emissions caused by vehicle manufacturing are not accounted for	yes, we're talking about the fuel cycle here
15831	8	25	18	25	19	not clear about this last sentence. Many studies have been done to measure WTW emissions for many pathways, inc; biofuels. Not sure what this issue is here?	good question….it's true that some controversy remains, e.g. land use change, but certainly there are many WTW studies (GREET, for example) that are reasonably well accepted. will amend. yes, accepted, but within a framework that doesn't actually estimate mitigative capacity.
11882	8	25	18	25	19	The statement that a "suitable comparison capturing all contingencies (including LUC for biofuels) has not yet been satisfactorily achieved and further analysis is required" needs elaboration if it is to be included. This is a sweeping statement, but the phrase "all contingencies" is vague making it difficult to understand current research/analysis needs. There are many studies that have attempted to do well-to-wheel analyses, so it seems like an explanation of which aspects need more analysis (beyond LUC) should be pointed out.	same point made again (see answer to comment no 15831)

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
2754	8	25	18	25	19	Uncertainty has not prevented showing other quantitative diagrams in the chapter and should not prevent showing lifecycle GHG emission data either, whether LUC effects are included or not. When showing the DENA bar diagramme (see my comment 28) it is advisable to mention that LUC effects have not been taken into account in energy crops (ethanol and biodiesel) shown in the diagramme, but they have been taken into account in biowaste based biomethane, because it does not need land. Therefore, biomethane WTW emissions can be compared to fossil fuels, electricity and hydrogen in the diagramme. Because fertilizer value and much of its carbon is easily recovered from biowaste, when anaerobic digestion is used for biogas production, there are very little concern over fertilizer and soil carbon loss, unlike when using forest residues (as correctly mentioned on page 24 lines 42-44 of the draft).	Noted. Introduced Figure 8.3.2 with LCA data now.
3832	8	25	18	25	19	I understand that some comparison is already available. Look for EPA, 2011 - EPA (Environmental Protection Agency). Renewable Fuel Standard Program (RFS2), Regulatory Impact Analysis. Assessment and Standards Division, Office of Transportation and Air Quality. EPA-420-R-10-006, February (2010).	and again…
3431	8	25	28	26	11	Unlike what is mentioned here, I don't think that the literature is unanimous that consumers undervalue fuel economy. Several additional references can be provided here, but pages 96-97 of the following article provide a good overview of the findings of many studies: Anderson, Parry, Salee and Fischer, 'Automobile Fuel Economy Standards: Impacts, Efficiency, and Alternatives'. Rev Environ Econ Policy (2011) 5 (1): 89-108. doi: 10.1093/reep/req021. Moreover: Even if fuel economy undervaluation is true, this does not automatically make fuel economy standards a preferred policy tool - see again Anderson et al.	Noted. Issue is complex (there are other factors involved, like power, size, industry strategy (the high fuel economy models are usually the "cheap" ones), etc), still core factors are covered.
4418	8	25	4	25	6	A 2012 baseline vehicle is used here compared to a 2010 baseline vehicle used earlier on p17, line 9	this would be OK if we were simply using a graph from an existing study…but this is a constructed graph…and by the way, we used a 2005 baseline also, in referencing Bandivadekar…..although by itself this might not be enough to redo this graph, my own comment might merit a redo...I really don't think the 2030 values make sense.
16306	8	25	4	25	6	These sentences should clarify the definition of fuel economy, or more specifically, whether it denotes test fuel economy or on-road fuel economy.	given that the values stated are in percentages, this might be ignored…..though if one wanted to get precise, it does seem that onroad correction factors tend to be more severe for higher fuel economy vehicles. We probably could say that the percentage differences relate to test fuel economy, because the Plotkin and Bandivadekar references use only 2-cycle corrections without accessories (Plotkin) or just a constant correction factor (Bandivadekar).

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2753	8	25	5			Fuel economy advances applicable to gasoline vehicles are also applicable to renewable fuel vehicles. In addition many renewable fuels have engine technological advantages compared to gasoline (higher octane value) and diesel oil (higher setane value). E.g. biogas has an octane value of 140 making it possible to increase fuel economy of otto engines substantially compared to gasoline use. Many such examples are already in the market and there are large potential for more.	generally correct observation….though I'm not aware that OEM natural gas vehicles have gotten higher (gasoline equivalent) fuel economy than competing gasoline vehicles (VW does have a turbo/supercharged vehicle, I assume a prototype, that it claims gets high efficiency from methane)..this is worth looking into.
8367	8	25	21			In the first part it says: 'some behavioural concepts are introduced ... ' There is nothing about how to handle the immense increases of low-cost travelling in developing countries that do not have adequate transport infrastructure. The spreading of the urban lifestyle means that there is a huge pressure for access in rapidly growing cities with only dismal infrastructure, insufficient budgets and lack of management capacity to cope with the emerging transport challenges. Far too many cities and countries have not been able to respond to the growing need for transport facilities and how will they be able to meet the travels needs and introduce reductions of greenhouse gases at the same time? In this part the structural conditions, policy approaches and different strategies to manage huge increases in demand for transport and transport energy will have to be described and discussed. Pls integrate such analysis as to increase the quality of the debate.	worth contemplating some additional discussion
8550	8	26				RECOMMEND ADDITIONAL EVIDENCE TO CITE "Driving rebound effects: Changes in driving in reaction to changes in the fuel cost of travel, e.g. due to fuel efficiency increases or shifts to cheaper fuel, is commonly called the (direct) “rebound effect” COMMENT: The new USEPA impact analysis of the proposed 54.5 miles per gallon fuel efficiency standard finds the rebound effect to be -0.1. See: www.epa.gov/otaq/climate/documents/420r12016.pdf. This is important because it is the basis of public policy in the world's leading automobile oriented economy	I assume this comes from Small and Van Dender (2007)….worth citing.
13114	8	26				Not only for conventional gasoline vehicle, but also HEVs/PHEVs/Evs/FCVs/CNGs/should be compared to mass transportation (Bus, Rail, Air,,,), if those data are available. Especially, Evs/FCVs with low carbon electricity and hydrogen.	good idea….though all modes will change quite a bit in the future….so perhaps we should focus only on commercially available vehicles, e.g. Prius, VOLT, Leaf.
8719	8	26	11	26	11	Additional note: Evidence suggests that the form of the incentive is also an important factor, in addition to the total subsidy amount. Consumers are highly sensitive to upfront costs, and less influenced by total cost of ownership, which may explain why schemes which deliver up-front incentives tend to be more effective than those which offer savings post-purchase. Source: AEA, 2012. Next phase of the European Climate Change Programme: Analysis of Member States actions to implement the Effort Sharing Decision and options for further community wide measures: Transport Sector Policy Case Studies http://ec.europa.eu/clima/policies/effort/docs/esd_case_studies_transport_en.pdf	useful information, but not here….should be discussed in policy section
5246	8	26	12	26	29	The same point as made above needs to be inserted.	It is not clear what this refers to. For this reason the comment could not be addressed.
5338	8	26	17	26	19	Even with generous incentives, electric vehicles are significantly more expensive than conventional vehicles. It is likely that high cost is an important driver of slow market introduction, so difficult to attribute this to negative perceptions about vehicle attributes or range anxiety.	Noted.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
3432	8	26	20		29	You may add here that the gap between test and real-world fuel economy may have increased in recent years, which is an alarming prospect. See ICCT working Paper 2012-02 "Discrepancies between type approval and “real world” fuel consumption and CO2 values". See also TNO (2010): "CO2 uitstoot van personenwagens in norm en praktijk – analyse van gegevens van zakelijke rijders [CO2 emissions from passenger cars in standard and practice – analysis of data from business drivers]", TNO Report MON-RPT-2010-00114.	if correct, this is valuable information that should be added
17127	8	26	25	26	29	COMMENT: Well understood "Various studies (e.g. (IEA, 2009) suggest that a 510% improvement in on-road fuel economy can be achieved through efforts to promote “ecodriving”; another 510% maybe be achievable by an “integrated approach” including better traffic management, intelligent transport systems, better vehicle and road maintenance, etc." REASON: McKinsey describes: In 2020, more than 50 percent of CO2 abatement potential could come from the combined impact of second-generation biofuel, traffic flow, shifts to public transportation, and eco-driving measures. Such measures are essential for near-term abatement because of the potentially shorter time and relatively lower incremental cost associated with their implementation, as well as their applicability to the entire fleet, not just new vehicles. Figure: (p.3 & p.6 Exhibit1, Roads toward a low-carbon future, McKinsey&Company, 2009) (Roads toward a low-carbon future: Reducing CO2 emissions from passenger vehicles in the global road transportation system, March 2009, McKinsey & Company. Available at: http://www.mckinsey.it/idee/practice_news/roads-toward-a-low-carbon-future-reducing-co2-emissions-from-passenger-vehicles-in-the-global-road-transportation-system.view)	I'm not sure that the reviewer wants here….more detail? With our space constraints, perhaps we shouldn't do that.
12900	8	26	35	26	44	Another rebound should be mentioned here: The purchase rebound; growing engine size and mass of passenger cars have offset (and are still offsetting) parts of fuel economy improvements (if not addressed by relevant policies). Cite related literature, for example Amela Ajanovic, Lee Schipper, Reinhard Haas (in press), The impact of more efficient but larger new passenger cars on energy consumption in EU-15 countries, Energy, xxx, 1-10; Meyer, Ina; Wessely, Stefan (2009): Fuel efficiency of the Austrian passenger vehicle fleet—Analysis of trends in the technological profile and related impacts on CO2 emissions, Energy Policy, 37, 10, 3779-3789.	good point…it is an oversight not to discuss how vehicle performance, size and features have shifted over time and their effect on fuel economy…this seems to be a universal trend, though especially pronounced in the U.S.
5200	8	26	35	26	44	Add same rebound for air transport efficiency improvements and relation with rail (see my note 16).	Covered in 8.10
16309	8	26	37	26	40	This sentence should clarify the time span during which this elasticity value holds true. In other words, it should be clarified that this elasticity value was estimated in the short-, medium, or long term.	agree
15833	8	26	45			this bullet repeats point from previous bullet right above it on rebound effect. Could be merged or deleted.	I don't really agree…suggest we keep separate
4002	8	26	45	46	2	The paragraph on oil market response seems (1) out-of-place - but maybe there is no better spot for this important material, (2) a bit vague - what is the range of oil price supply elasticities, what does it depend on?, (3) does not take into account non-competitive behavior on the part of OPEC. Since oil/fuel price is a key driver in all modes of transportation, this material should be significantly expanded. Perhaps, it should be moved to it's own sub-section.	Noted.
15832	8	26	6	26	8	another explanation is prefernece of vehicle performance over fuel economy. See heywood et al for more references on this.	here's this issue again….it needs to be discussed
4342	8	26	22	26	24	need to include the "vehicle mix" as an additional factor in the overall fuel economy (on road)	agree
2687	8	26	45	27	2	Oil market response paragraph does not fit this section on 'behavioural aspects'.	agree

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
8567	8	27				ADDITIONAL CITATIONS RECOMMENDED "If rail systems achieve modal shift from road vehicles, lifecycle emissions from rail infrastructure may be partially counterbalanced by reduced lifecycle emissions of road infrastructures, COMMENT: This is RE high speed rail. Two additional sources should be included and summarized. (1) Booz, Allen, Hamilton (2007), "Estimated Carbon Impact of a New North-South Line," which estimated a very long GHG payback period for infrastructure (http://webarchive.nationalarchives.gov.uk/+/http:/www.dft.gov.uk/pgr/rail/researchtech/research/newline/carbonimpact.pdf). and (2). Jean-Noel Chapulet and Jean Pierre Taroux, "Trens Ans LGV: Comparison de Prevision et Realisations," Tranports, July-August 2010. This work shows the diversion from cars to high speed rail to be modest, even in an environment with high petrol prices and expensive highway tolls.	will read those sources and consider. in developed nations at least, road infrastructure isn't growing with increased vehicle use…it's not all that clear that reducing slightly the growth in vehicle use will have much of an effect on inffrastructure development, except perhaps for repairs . Care to be taken with Booz, Allen Hamilton report - is very much grey literature and based on grey literature. Also typical UK where e.g. emissions from electric rail can be abated at a fraction of cost of e.g. air and even car. Not much technical development in maglev/high speed rail considered, which seems not adequate (both vehicles energy savings as emission reduction with electric plants are possible). I could not find the Transports ref; suggest to ignore this.
17716	8	27	11			Again, this sentence might be misleading. Car-oriented transport has increased with rising incomes, but this has been the result of certain policies and investment choices (eg subsidised fuels).	The sentence is not specific to car transport. the reviewer's assertion might be correct, but what's the basis for it? solved as whole section 8.4.1.1has been deleted. The authopr has a point of couse that there is no specific causal relation between income itself and car use or mobility; there are some based on TTB TMB and access increases to high speed transport with increasing income.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
10770	8	27	32	27	38	It should be made clear which components that have been included in the results behind figure 8.4.1 (only Kyoto gases or short-lived forcers also?) and how the effects have been transformed to CO2-equivalents. I assume it is by GWP. Which time horizon that is used should be given. It is important to note that other time horizons and metrics would produce a different result; see figure 2 in Fuglestvedt et al., 2010: Transport impacts on atmosphere and climate: Metrics. Atmospheric Environment 44 (2010) 4648–4677. See also WGI, chapter 8, fig 8.31.	Figure will be reconsidered. it does make sense to specify such things, e.g. time horizon….as for 'noting that other time hoizons and metrics would produce a different result," we need a methodology discussion somewhere in the overall report, not in the transport section, about LCA. actually I believe we should always give both CO2 and CO2e, simply because the first is independent of assumptions that are purely political, while the second is depending on that.
4419	8	27	36	27	36	Be more specific on the statement “probably large”	Will consider more literature to specify here. the current version doesn't concern me. indeed lots of literature with contradicting results; will draft a table with this all recalculated to emissions per seat km first and than per pkm for different occupation rate assumptions.
15834	8	27	40	27	42	Calif high speed rail is a poor example / case study since this is still a very uncertain and early stage project. Why not draw from hi speed rail projects already done such in Taiwan or China or EU and compare these to non-high speed systems. Use real life example sbased on real existing operating data	Will consider according to data availability. if such project data are readily available, they might be better….but otherwise I don't have a problem using the CA example. There is lots of literature here; the Chester ref needs to be contextualized and qualified and comparing apples to pears and not represenative for whole world (USA only)
11883	8	27	44	27	45	I believe the finding from Chang and Kendall was recuperation time of just over two years (not within 2 years)	This is correct and changed accordingly.
18904	8	27	45	27	46	recycling of rail track materials: Are there numbers to what degree this is ususally done? As I would have expected that gravel is always reused and rails always recycled.	There is some literature e.g. {von Rozycki, 2003 #797}, {Westin, 2012 #3372}, {Du, 2012 #3764}, and combining with steel literature like {Damgaard, 2009 #3765} and {Yellishetty, 2010 #3766} and from the industry i.e. {International Iron and Steel Institute, 2005 . Paul has full references

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
2451	8	27				This section needs a clearer focus and rationale - it could again be shortened - duplication on the costs of taxiing in aviation, the iconography of the car (Unruh and Urry), and links with Ch 12 - it is unclear what this Section actually adds - yes there is a need for a systemic approach, but does this provide it as it is so compartmentalised	both shorten and sharpen it
9071	8	27	3	33	8	8.4 Infrastructure and systemic perspectives can be deleted due to the limitations on the nos of pages	This is not an option, as the structure was given to us.
13877	8	27		27		This section should stress the urgency to act - due to the resilience / path dependency of urban structure - expecially in developing country where the type of urban growth that cities will experience in the next three decades will determine the level of their energy consumption and GHG emissions in the second half of the century (see Lefèvre, B., 2007, Long-term energy consumptions of urban transportation: A prospective simulation of "transport - land uses" policies in Bangalore, Energy Policy, Volume 37, Issue 3, March 2009, Pages 940-953)	Potentially an interesting paper showing the basic choices by governments in infrastructure/land-use planning and the ultimate transport systems and impacts.
2688	8	27		28		This is a growing area of research. Chester & Horvath is only one study of rail impacts, suggest these results be discussed with less certainty, as their analysis is very case specific.	agreed, consider.
13898	8	27	28	28	17	Life cycle analysis of electric vehicle should be discussed since the production of battery is energy intensive. See French Strategic Council, La voiture de demain,carburants et électricité, Jean Syrota, Juin 2011, http://www.strategie.gouv.fr/content/rapport-la-voiture-de-demain-carburants-et-electricite-0	interesting report of 332 pages and fully in French… will try to get the battery info from it.
10773	8	27	28			This paper could be relevant here: Peters et al. 2011: Alternative 'Global Warming' Metrics in Life Cycle Assessment: A case study with existing transportation data. Environmental Science & Technology, 45: pp. 8633-8641.	consider.
7810	8	27	28	28	17	Peters et al. (2011) (Peters, Glen, Borgar Aamaas, Marianne Tronstad Lund, C. Solli and Jan S. Fuglestvedt, 2011. Alternative 'Global Warming' Metrics in Life Cycle Assessment: A case study with existing transportation data. Environmental Science & Technology, 45: pp. 8633-8641.) also focus on LCA of the transport sectors, for European conditions and including also short-lived climate forcers.	consider.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
5201	8	27	28			In essence this section is important, but be careful: much is based on the Chester & Horvath 2009 reference and I am afraid this reference is not valid for the current state of the art regarding life-cycle analysis of infrastructure and based on very a-typical cases to be of general vallidity or transport in the world. it even could be misleading. My objections are: 1. It compares apples and pears: air transport is used for trips above 100 km at least (averaging 1500) while urban rail systems are for distances to at most 35-40 kms. These are totally different markets and now the impression is created that rail is not toop efficient compared to air, while long range rail is performing much better than these specific urban rail systems (see my refs below). 2. I checked the basic data for the rail systems and found they stem from the 1970s, describing new rail systems build in the 1960s with very typical USA characteristics like an enormous amount of enery used by lighting the stations up to almost day-light level during nights (because of safety regulatins that do not exist in this way in other parts of the world), a low ridership and low train frequencies of a new not matured system. Actually current urban rail systems are much better (or for air transport the DC9-30 should have been used for comparing). As you do refer to Akerman 2011 already, please check my rough calculation from data from that paper that infrastructure share of emissions per pkm is just about 5-7% at the 25 billion pkm prognosed for the high speed railway in Sweden. Based on data from Amos, P., Bullock, D., & Sondhi, J. (2010). High-speed rail: The fast track to economic development? In. Beijing: World Bank, the real capacity of this line could be at least double the 25 billion, halving the percentage for infra to be some 3-4%, which is substantially different from 33% given by Chester et al. My recommendation: do not use the Chester & Horvath 2009 reference but make use of the data given in e.g.the followig papers: Åkerman, J. (2011). The role of high-speed rail in mitigating climate change - The Swedish case Europabanan from a life cycle perspective. Transportation Research Part D: Transport and Environment, 16, 208-217. Chang, B., & Kendall, A. (2011). Life cycle greenhouse gas assessment of infrastructure construction for California's high-speed rail system. Transportation Research Part D: Transport and Environment, In Press, Corrected Proof. IWW/INFRAS. (2004). External costs of transport. Update study. Final Report. In. Zürich/Karlsruhe: UIC. Milford, R. L., & Allwood, J. M. (2009). Assessing the CO2 impact of current and future rail track in the UK. Transportation Research Part D: Transport and Environment, In Press, Corrected Proof. Tuchschmid, M. (2009). Carbon Footprint of High-Speed railway infrastructure (Pre-Study). Methodology and application of High Speed railway. and, though not really LCA: Peeters, P., Szimba, E., & Duijnisveld, M. (2007). Major environmental impacts of European tourist transport. Journal of Transport Geography, 15, 83-93. As LCA has still many uncertainties, please add figures for direct CO2, direct RF, and same LCA based.	invite peters to become CA to solve this issue.
8433	8	28				In this figure of this paragraph I suggest to show only the % increase in GHG due to transport infrastructure, and not all the emissions from fuel combustion that has its own variation and uncertainty	It is valuabe to have the context, but we need to recompile a new graph. Will try to develop a table/graph including all literature and these comments

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
11277	8	28				It should be made clearer in the text that the figure is only showing the specific US case, not claiming representativeness of the data for other regions. Furthermore, the figure might be better understood with further explanations (in the text), since the illustration - even though it refers to a particular take on GHG emissions - might convey at first glance the picture of strongly better aircraft performance over, e.g., urban diesel buses - discussed holistically, this is phrased differently on, e.g., page 30 (lines 9-11) (since flight over road transportation should probably not be recommended).	Agreed, we need to draw a new graph.
15835	8	28	1			Horvath studies have been controversial for several reasons. This is supposed to be a study of studies so suggest showing a graph based on data from several sources. Could be an average of several studies or something like that, but don't just cut and paste from a single source. Similar chart was shown in SRREN report Chap. 8 on Integration for trasnportation sector. might check that.	agreed, problem is to find more data here. Scarcely availale. Will check SRREN Ch. 8
17717	8	28	12			suggest a stronger word than "may": there is plenty of evidence that building roads increases VMT	accepted
11646	8	28	16	28	17	Delete, it's misplaced here.	Accepted. Moved to 8.9.2.1
18906	8	28	19	28	20	Channels are line infrastructures for shipping - please take this into account.	Accepted
11276	8	28	26	28	30	The notion on airport congestion management should include a critical comment on the extension of flight operation hours into the early mornings and evenings (or even nights), resulting in environmental, social, and health repercussions on adjacent environments and settlements that might not be offset by economic and efficiency concerns.	agreed.
5202	8	28	3			Please remove this figure and replace with one based on refs given in my note 20.	consider.
8886	8	28	30	28	32	This is a quite old paper focusing on tourism. There are many papers out there showing that aviation demand is relatively price inelastic.	if we find better literature, we will consider. Mayor et al., is about tourism but is not the reason to not take it up as, 90% of air transport is basically tourism transport as tourism comprises not only leisure travel, but also visting friends and relatives and business trips outside ones own usual environment (UNWTO definition); where this includes same day visitors, but for 'tourists' it includes only visitors staying at least one night. Mayor's paper gives a very specific take on macro economics, that is not shared with all literature.
5204	8	28	30	28	32	I feel this general taxing remark belongs not in this section.	Agreed. Sentence deleted. Figure out where to put it.
14287	8	28	31	28	31	To note that the EU now does have a price on CO2 emissions from aviation, as all flights to/from the EU are covered by the EU ETS.	Sentence deleted.
11884	8	28	31	28	31	I am not sure it is clear what "in contrast to a boarding tax" means in this sentence, or what is meant by a boarding tax in the first place.	Sentence deleted.
18907	8	28	31			"taxing jet fuels": Consider mentioning that most other transport mode fuels are taxed in most countries so that the current state causes market distortion	Sentence deleted.
11647	8	28	33	29	8	Check for analysis by Scheiner & Holz-Rau. They are very careful not to jump to conclusions. See e.g. http://www.vpl.tu-dortmund.de/cms/Medienpool/PDF_Dokomunte/Publikationen/Ursache_Wirkung.pdf	will check this paper.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
5247	8	28	33	30	7	Of course urban systems are important, not least because the proportion of the world's urbanised population is rising, but why is there no section of the various important needs of rural dwellers?	Accept. Add key references on the rural side.
11184	8	28	33			The sections in relation to urban form are overlapped with some sections in Chapter 12. The sections in Ch.8 could be moved to Ch.12 because Ch.12 might not exist without the subject.	Noted. This is discussed in both chapters, here with details on transport not covered in Ch.12 and in Ch.12 in a broader context.
5286	8	28	42			ADD: Ecodriving has also obtained reduction of about 15% and can be maintained in time when companies offer part of the gains in energy costs to drivers (Stéphane La Branche, « La réduction des émissions de GES des entreprises dans la région de Lyon : freins, blocages et opportunités. Report for the City of Lyon, France. », 2010 #3773}. Point here is that the 15% is for those drivers that accept the eco-driving behaviour, but their shares seem not high?	Accept. But need peer-reviewed literature.there is like {Barkenbus, 2010
2452	8	28				Has shipping in the title - but no mention of shipping in the text.	Accept. Change title.
2689	8	28				Nothing about shipping in this section, despite sub-title.	see above (i.e. answer to comment no 2452).
5203	8	28	18			The quote of 5-10% of fuel burn on the ground is a very high number and really non-typical (also it is based on a conference presentation of which the sheets seem not publicly available, but I feel it will be based on a very short flight with extreme hig taxi times). Even in heavily congested airports as JFK with average taxi times of 30 minutes, the total fuel share of this taxiing will be, at 7% power rating and assuming 75% power rating during the flight and average flight duration of some 90 minutes, give 2-3% of total fuel burn. But the JFK is rather non-typical: in most airports taxi times are generally in the order of 5-10 minutes. So please remove this and add that overall taxi fuel for the global fleet is just a few promiles (that still can be reduced in some heavily congested airports).	Need to reread the literature. add also {Nikoleris, 2011 }, {Simaiakis, 2011} and {Simaiakis, 2010}.
8213	8	28	18	28	32	There is very limited write up of "shipping", while the main section (8.4.1.3) is for 'aviation'. The in-port congestion (incl seaports and inland waterway ports) can be as serious as airports, which lead to heavy emissions and time lost.	Accept. Need literature. {Balkanski, 2010 ;Haites, 2009}, {Wit, 2004}, {Corbett, 2009}, {McCollum, 2009}
2453	8	28				Cross reference to Ch 12	Accept.
8547	8	29				CHARACTERIZATION OF RESEARCH IS AT VARIANCE WITH THE SOURCE.... RE: "Both self-selection and the built environment can explain travel behaviour with slightly more emphasis on the latter" (Cao et al., 2009). COMMENT: This characterization gives undue weight to one of 38 studies that were reviewed. See the following in Cao et al: "The studies adopting a structural equations modeling approach (e.g.Bagley and Mokhtarian, 2002; Cao et al., 2007b) found an influence of residential selection, although the influence of the built environment appeared to be stronger than that of self-selection in the latter study." They continue... "Unfortunately, given the various limitations discussed throughout this paper, we are unable at this point to confidently specify the nature and extent of the causality between the built environment and travel behavior." From the cited research, the following would be a far more faithful reading of the conclusions. "Both self-selection and the built environment can explain travel behaviour (Cao et al., 2009)."	Reject. The reviewer is right that Cao 2009 is an insufficient reference for this statement. But see also Ewing Cervero 2010. Furthermore, there is path dependency in mobility choices (see Goetzke 2008). Need to be cited though.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
5205	8	29	13	29	14	If we accept travel time budgets, than transport infrastructure is leading deterining the overall travel speed and urban form will follow this. I feel priority should be that every new urban develoment chooses to base itself on public transport and bicycle infrastructure and adapts to the opportunities of those, not compromising it with private car use. As far as I can follow from non-scientific literature, the Chinese made two decades the error to partly forbid cycling to make room for cars, but have found already that in that way the whole trabsport system collapses. In japan, cities like Tokyo, they do forbid cycling because urban rail systems are even more space efficient. Sorry, have not now literature available about this.	Accept. Is not really in contradiction what has been written. Will accomodate. section 8.4.2.1 has been moved to 8.6?
11885	8	29	16	29	31	This paragraph stands in stark contrast both in style and content than previous paragraphs/sections. On its own this is no a problem, but the paragraph seems to jump from one sweeping conclusion to another without enough information or detail for the reader to make sense of all the topics. Is there a way to make this paragraph more accessible and straightforward for the reader?	Accept. Is deleted (also space reasons).
5206	8	29	16	29	31	Very good section, but add here means to break the circle: the best are car ownership policies (like very high parking rates for citicens in Amsterdam) and of course limiting road investments, which will help people to choose other transport modes. The large differences in modal split between e.g. Ireland (some 2-3% public transport) and Switzerland (some 20-25% public transport) show what consistent infrastructure policies can do.	Accept. No space though for this section. Suggest to move part of this to the introduction. Add what the reviewer suggests to 8.6. if you are writing in a section about systemic aspects of infrastructure this kind of feedback structures is typical for it and so would rather reinstall it, though may be shortened.
5695	8	29	16	29	16	The reviewer strongly agree with the idea. This aspect should be emphasized in other places. Especially link to activity in fig. 8.1.2.b	The idea might be to framed more shortly here. suggest to rewrite a new 8.4.2.1 about role of infrastructure, transport speed and for all modes of transport and both freight and passenger.
16310	8	29	27	29	31	The two sentences "For example, … public institutions (Unruh, 2000)." are not so important and should be deleted.	Accept.
5287	8	29	28			(Unruh, 2000)… ADD: Since 2012, French Territorial Climate and Energy Plans impose on cities with over 50 000 people norms and principles aiming at reducing GHG through urban planning, land management and mobility practices and infrastructures integrated with one another. The approach that seems to be merging is the urban multifunctional, multiservices polycentric model.	Reject. Here not appropriate. But take up the idea further below. if you are writing in a section about systemic aspects of infrastructure this kind of feedback structurres is typical for it and so would rather reinstall it, though may be shortened.
17133	8	29	29	29	31	DELETE: In turn, a transformation towards a sustainable transport system requires simultaneous changes in non-transport domains, e.g. in relevant public institutions (Unruh, 2000). REVISE TO: A new set of innovations is necessary to mitigate CO2 emissions from road transportation, maintain the sustainable development of society, and achieve a higher QOL. These innovations have three aspects: Energy efficient vehicles and their collectively optimized control, Efficient traffic flows achieved by functional urban design and traffic management and Multi-modal transportation. (T. Okazaki, M. Yamaguchi, H.Watanabe, A. Ohata,, H.Inoue, and H. Amano(2012), Climate Change Mitigation, Springer, Chapter 9: Technology Diffusion and Development, 210-211)	Reject. The whole point was to speak about institutions.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
17718	8	29	44			Does the balance of "self-selection" and "the influence of the built environment" depend on the setting? In high quality environments, self-selection might perhaps play a weaker role.	Accept. Need literature.
5406	8	29	45			self selection tends to make the effect of compact development on transit use and travel seem larger than it is….since people who would prefer to travel less and use transit will gravitate to compact development…..the statement says exactly the opposite	Accept. Wording must be accurate. But there is also a dubious revealed preference assumption in the self-selection argument.
3414	8	29	7			Public transit system: Check whether Frank and Pivo mean supply-driven systems here. Lower population densities may be better served by demand-driven services (e.g. On call).	check.
2690	8	29	2	29	7	Ewing & Cervero, 2010, is a meta-analysis of studies that evaluates elasticities of different measures; Cao et al. (2009) examines whether self-selection bias is a major problem (and concludes it is not). These key points of both these studies should be emphasized.	Accept.
8368	8	29	6			Urban sprawl is seen as a way of modernizing cities and sprawl has been strongly supported by politicians in collaboration with business communities. A heterogeneous and compact city growth will lead to changes in mobility patterns. PIs connect urban sprawl, city planning and with overall goal of equity, the MDG's and social inclusion presented elsewhere in this report.	Accept. The idea of connection urban settlement patterns with various goals is valid. Otherwise it is a little bit unclear what the reviewer want to say here.
8369	8	29	16		31	This part can be shortened because the information is already well known. The quality of the text is fine but all this info is not really needed.	Accept.
2691	8	29	9	29	31	Delete this section as it is irrelevant.	well, it is certainly not irrelevant (reviewer does not show why it is).
13899	8	29	32	30	7	The debate on urban form and GHG emissions could be enriched by other views, which are not considering a direct/systematic link between density and sustainability. See Marcial H. Echenique, Anthony J. Hargreaves, Gordon Mitchell & Anil Namdeo (2012): Growing Cities Sustainably, Journal of the American Planning Association, 78:2, 121-137	Accept. the reference has a point to some extent: density seems not to do really much when irt is speed dictating distances and thus transport patterns. However, the density has an impact on those speeds and to some extend on the necessity to possess a car, whicgh has definitely an impact on speed and thus distances. Might try to see if this is somewhere given in the literature? Including refs as in review 2692 (Row 1018 below)
2692	8	29	32	30	7	This section starts with a discussion of population density. As research has shown (Ewing & Cervero, 2010) this is probably the least important of the many urban form and design features that affect travel. These points are mentioned in this paragraph, but I would recommend that these key points be the starting point for discussion, rather than the end of the paragraph. Additional recent reference to look at: Salon, Deborah, Marlon G. Boarnet, Susan Handy, Steven Spears, and Gil Tal, 2012, How do local actions affect VMT? A critical review of the empirical evidence, Transportation Research part D, 17: 495-508.	Reject. Population density is still a proxy for the other more fine-grained things. But will consider rewording to avoid being unclear here.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
6484	8	29	33	30	7	The issue of urban form needs more attention then what is provided in the report. For example link with urbanization and urban form. It has been established that - Asian cities are growing rapidly and another 1.1 billion people will live in the region's cities in the next 20 years (ADB). Majority of growing cities do not have proper plans promoting smart growth and hence urban form and structure can be very powerful to avoid future transport growth or shift future motorized travel to more sustainable modes. (example – only 24% of cities in India have developed master plan (Ministry of Urban Development India).	Accept.
15294	8	3	2			I was expecting a CO2 equivalent value, rather than CO2-only statistics for transport's contribution. I believe 5 to 15% of transport's GHG contributions are non-CO2, which is not so negligible. I also wonder about all the embodied energy implications of transport (in the form of vehicles, road & port provision & maintenance ,etc.). Those probably add another 15% to 100% of GHG contributions (depending on mode: e.g., car vs. a high-end subway system, based on Chester & Horvath's published work). Is there a way to make this distinction clear early on, since the 6.4 Gt only speaks to running emissions, I believe.	Accepted. Change Fig.8.1.1 to CO2eq. Further, different sections of chapter also cover well-to-wheel emissions, etc.
8552	8	30				INCORRECT REFERENCE: SHOULD BE REMOVED "In Delhi, India, a transition to a bus-system would result in a decrease in energy use of 31% and a transition to metro-rail based system would result in a decrease of 61% (Khanna et al., 2011). Citation is about biofuels, and not about Delhi. Khanna M., C.L. Crago, and M. Black (2011). Can biofuels be a solution to climate change? The implications of land use change-related emissions for policy. Interface Focus 1, 233–247. (DOI: 10.1098/rsfs.2010.0016). Available at: http://rsfs.royalsocietypublishing.org/content/1/2/233.abstract.	Accept. Will amend
8553	8	30				UNCLEAR, POTENTIALLY MISLEADING STATEMENT Urban transport is particularly susceptible to modal shift as it is subject to a prisoner's dilemma: an individual's rational choice of private car (non-cooperative behaviour) leads to CO2 emissions, congestion, air pollution and noise, whereas the use of public transport and non-motorized transport (co-operative behaviour) is comparably socially advantageous (Camagni et al., 2002) COMMENT: The sentence could be wrongly interpreted to support the view that modal shift in urban transport can easily occur. The clause " is particularly susceptible to modal shift" is not supported by the balance of the sentence. The sentence should simply say: "Urban transport is subject to a prisoner's dilemma: an individual's rational choice of private car (non-cooperative behaviour) leads to CO2 emissions, congestion, air pollution and noise, whereas the use of public transport and non-motorized transport (co-operative behaviour) is comparably socially advantageous (Camagni et al., 2002)	Accept.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
8554	8	30				"To stay within an average daily travel time budget of 60 to 70 minutes a day (Zahavi and Talvitie, 1980; Newman and Kenworthy, 1999; Schäfer, 2000), transit requires a fast service networked to serve the majority of the city. Compact settlement structures support fast transit by reducing distances and increasing accessibility..." COMMENT: The difficulty of achieving this should be acknowledged. Indeed, there is no major metropolitan area in in North America, Western Europe or Oceania in which mass transit carries the majority of motorized travel. The difficulty of designing such a system is illustrated in Ziv and Cox, 2007 ("Megacities and Affluence: Transport and Land Use Considerations," paper presented to the World Conference on Transport Research, Berkeley, 2007; http://www.publicpurpose.com/ut-wctrs2007.pdf). The huge shortfall in mass transit access is indicated is illustrated by the fact that in US metropolitan areas of more than 1,000,000 population, the average worker can access only 6 percent of the jobs within 45 minutes by mass transit (average automobile travel time is 25 mintues). This calculated from data in Tomer, A, E. Kneebone, A. Berube, & R. Puentes, R. (2011), "Missed Opportunity: Transit and Jobs in Metropolitan America," Brookings Institution. Even in Paris, with perhaps the best mass transit system in the West, mass transit access is far below that of cars in suburban new towns served by the regional metro (RER), see: Fouchier V. & S. Michelon (1999), "Isochrones autour des villes nouvelles aux heures de pointe." DREIF & Groupe Central des Villes Nouvelles. No serious proposal has yet been tabled to establish a mass transit system that would replicate the mobility of the automobile in a modern Western metropolitan area. A fast service "networked to serve the majority of the city" has never been shown to be feasible, theoretically or in reality. The entire paragraph, beginniing on line 18 is misleading and should be deleted.	Accept the criticism and be more precise in the wording. there are a few relationships important here: (1) the longer the distance the higher the average transport speed; (2) the lower the density the lower the number of road junctions etc and the higher the speed; (3) the TTB suggests that the distances travlled will be larger in low density urban areas because the transport speeds there will be much higher on average.
8555	8	30				CONTINUTATION OF LINE 11 COMMENT....The huge shortfall in mass transit access is indicated is illustrated by the fact that in US metropolitan areas of more than 1,000,000 population, the average worker can access only 6 percent of the jobs within 45 minutes by mass transit (average automobile travel time is 25 mintues). This calculated from data in Tomer, A, E. Kneebone, A. Berube, & R. Puentes, R. (2011), "Missed Opportunity: Transit and Jobs in Metropolitan America," Brookings Institution. Even in Paris, with perhaps the best mass transit system in the West, mass transit access is far below that of cars in suburban new towns served by the regional metro (RER), see: Fouchier V. & S. Michelon (1999), "Isochrones autour des villes nouvelles aux heures de pointe." DREIF & Groupe Central des Villes Nouvelles. No serious proposal has yet been tabled to establish a mass transit system that would replicate the mobility of the automobile in a modern Western metropolitan area. A fast service "networked to serve the majority of the city" has never been shown to be feasible, theoretically or in reality. The entire paragraph, beginniing on line 18 is misleading and should be deleted.	Misleading is a very strong statement. Also: the US is not really a role model here, and neither can results from the US easily transfered to other parts of the world.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
8568	8	30				INCOMPLETE AND POTENTIALLY MISLEADING INFORMATION Given relatively slow rates of improvement in average carbon intensity of car and air modes, a 25% reduction in car and air travel by 2050 (relative to baseline growth), with half the travel shifted to rail, bus, and non-motorised travel and half the travel eliminated through better urban planning and telematic substitution, results in an estimated 20% reduction in transport energy use and CO2 emissions (IEA, 2009; (Cuenot et al., 2012). COMMENT The improvement in auto carbon intensity is by no means slow. The US Department of Energy, Energy Information Administration estimates that CO2 emissions from light vehicles will decline 19 percent from 2005 to 2035, despite a large increase in driving. This is assuming the new 35.5 MPG fuel standard adopted in 2010 for 2016 ("Annual Energy Outlook: 2012). This is before the new 54.5 MPH standard just adopted. No official estimates are out yet, but I am modeling a decline of 35 percent based upon the projected experience with the 35.5 MPG standard. This is very rapid and should be cited favorably. Telematic substitution is in addition to this and has potential to increase this reduction.	Accept. Reword the beginning of the sentence. be careful as for aviation the progress is limited to some 30-40% on a theoretical basis. For automotive the progress might ber much stronger as for surface transport the laws if physics are much less ,imiting as for aviation 9in air transport you need speed to stay aloft and the same forces that create lift also create unavoidable amounts of drag).
8569	8	30				IMPLAUSIBLE EXPECTATION half the travel eliminated through better urban planning and telematic substitution, results in an estimated 20% reduction in transport energy use and CO2 emissions (IEA, 2009; (Cuenot et al., 2012). COMMENT The US studies on the potential of urban planning to replace (reduce) travel indicate much smaller potentials. The mid-point vehicle reductions in two major US reports over 45-50 years was estimated at about 5 percent, with one report (TRB) expressing doubt that its higher scenario could be achieved. Similar results from the UK See: (1) Board on Energy and Environmental Systems (2009), Driving and the Built Environment: The Effects of Compact Development on Motorized Travel, Energy Use, and CO2 Emissions, Transportation Research Board. (2) Cambridge Systematics (2009), Moving Cooler: An Analysis of Transportation Strategies for Reducing Greenhouse Gas Emissions, Urban Land Institute. and (3) Echenique, M. L., A. J. Hargreaves, G. Mitchell & A. Namdeo (2012), Does Urban Form Really Matter? Journal of the American Planning Association, V. 78, Issue 2, pp. 121-137. □	Accept. Cite the relevant work. There are however caveats to this literature as well: The US starts from a very low density setting, often with decentralized commuting. In such settings relative compactification is less effective than in more traditional urban forms. The Echenique paper is good but also has its shortcoming (see a discussion of the paper at Env Res Web: http://environmentalresearchweb.org/blog/2012/07/does-urban-form-really-matter-2.html). should make a clear distinction in the world between the two Americas (they have discarded almost all public passenger transport, Europe/Japan (with still relatively good PT infrastructure and high densities, Asia with the power to create huge PT infrastructure (and doing so) and Africa with lacking funds but lots of opportunities to develop in a certain way.
12901	8	30	12	30	13	Delete the sentence regarding CO2 co-benefits	Reject. No explanation is given for this request.
16312	8	30	12	30	12	The word "efficiency" should be modified to "energy intensity".	Accept.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
3433	8	30	12		13	The CO2 benefits depend not only on the relative efficiency of each mode (in energy use per pkm) but also on the carbon content of the energy form used in each mode.	Accept.
3415	8	30	14	30	17	Sentence is difficult to understand. Half the travel plus half the travel is all th travel so how does this tally with 25% reduction in travel?	Accept. Reword.
8040	8	30	17	30	17	It is worth to mention that already today in OECD-countries like Japan there is a modal split of 50 - 50 (cars and public transport). In other OECD countries (e.g. Germany) scenarios for diminishing the modal split of cars (80 % today to 50% in 2050 for Germany) are being discussed (see http://lowcarbon.inforse.org/files/resource_1/ENCI-Report_Scenarios_Germany_2012_EN.pdf, page 20 or http://lowcarbon.inforse.org/files/resource_1/ENCI-Report_Stakeholders_Germany_2012_EN.pdf, page 3) or http://www.germanwatch.org/klima/mt10lv.pdf	Accept. Can we cite this? PAUL P: ENCI reports are funded in FP7 research so should be OK. Germanwatch is an NGO, may be avoid if not necessary. Furthermore, there are some other strong transport scenarios that could be mentioned as well.
17128	8	30	18	30	22	DELETE: Urban transport is particularly susceptible to modal shift as it is subject to a prisoner's dilemma: an individual's rational choice of private car (non-cooperative behaviour) leads to CO2 emissions, congestion, air pollution and noise, whereas the use of public transport and non-motorized transport (co-operative behaviour) is comparably socially advantageous (Camagni et al., 2002) (Creutzig and He, 2009) see also 8.7). REASON: Current vehicle does not contribute to air pollution anymore due to the improved catalyst and quality of fuels. Rather, old used vehicle with insufficient maintenance and pollutant emissions from the stationary source often contribute to air pollution. Public transports such as trains and buses also have noise issue for residents near public systems. Sound abatement shields could be applied along the highway as a countermeasure.	Reject. While technology proves to alleviate some of the calamaties in some countries, it doesn't change the nature of car use a prisoner's dilemma.
16313	8	30	18	30	22	I think that the word "susceptible" should be modified to "unsusceptible" in the light of possible lock-in. If my understanding is wrong, I propose that these sentences be modified so that readers can easily understand them.	Accept.
17720	8	30	19			Is use of the private motor car in urban settings really the "rational choice" (for the individual)? In many cities, the "effective speed" of car travel is less than that for other modes (given work-time required to cover the costs of fuel, maintenance and vehicle purchase).	Accept. the problem is that the first car user is certainly at an advantage, but as soon as the numbers of car users rise above a certain level, the road capacity fails and using a car becomes very slow; but than we have habots with status. So may be add something about status of car use like in {Scheiner, 2007 #3779}.
14289	8	30	22	30	22	Not sure that modal shift from cars reduces land use - it may reduce utilisation of roads, but the roads still exist so land use is not changing.	Reject.
3416	8	30	22			reduces land use FOR CARS	The land used for cars is reduced but total land use of course is not (the world is not shrinking). So may change using ".. makes space available for other urban functions like slow modes, public transport and parks."

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
5407	8	30	23			using "% of trips" as a measure of how important a travel mode is can be misleading….yes, the fraction of trips is important, but the fraction of actual person kilometers traveled may be more important…..depends on the context….yes, cars account for 33% of trips and use 94% of road space in Paris (assuming the author is correct), but cars probably account for a MUCH higher % of actual distance traveled. This chapter devotes a considerable amount of space to urban planning and other "soft" measures, which probably makes perfect sense, but it must be careful to use available statistical data in a way that doesn't appear to be putting a thumb on the scales.	Accept. In an urban context the average distance by car is certainly not much different from other motorised modes; might even be shorter than bus because it is very inconvenient to take a bus for 500 m, but cars are still used much on such short distances. an issue might be that part of the road space is determined by safety services 9fire cars, etc.) and for freight (the van if you moce to another home). .
13241	8	30	24	30	27	« to stay with average travel time budget » appears to be a deterministic formulation. We suggest to replace this sentence by “Travel time budget of 60-70 minutes a day (ref) can be only achieved if transit provides a fast service networked to serve the majority of the city”.	Accept. may be this is reversing the idea; society is not so much trying to travekl as much kilometers within 60-70 minutes, but, given a certain urban density, infrastructure, etcm, the travel time is a constant so only distances are the outcome; if yopu have a dense city with a very fast transport system you will see that peopel start to go to the second or third nearest supermarket in stead of the nearest one.
17721	8	30	33			why will there be a "strong pull towards increasing car ownership and use"? If growing cities follow the model of Singapore, or Shanghai, rather than Chicago or Sydney, then patterns of transport growth might be quite different in the future than they have been in the past.	Accept.
17719	8	30	4			Heavy use of US examples in this section. Perhaps it would be helpful to broaden the range - there have been plenty of innovations in Europe and South America, for instance, that might be worth citing.	Accept. and certainly also in Asia.
11279	8	30	41	30	43	Also worth citing here for a discussion of possible impacts and benefits of public transit and bus rapid transit systems, especially with regard to innovative cases such as Curitiba and Bogotá: UN-Habitat (2009): Global Report on Human Settlements 2009: Planning Sustainable Cities, pp. 162-163; as well as UN-Habitat (2011): Global Report on Human Settlements 2011: Cities and Climate Change, p. 100-103. [downloadable at http://www.unhabitat.org/pmss/listItemDetails.aspx?publicationID=2831 /// http://www.unhabitat.org/pmss/listItemDetails.aspx?publicationID=3086	Accept.
15836	8	30	44			Dehli already has a metro! Why transition?	Accept. Reconsider wording.
11886	8	30	45	30	46	The last clause of this sentence isn't clear - light rail capital costs are higher than which? BRT and metro, metro, or BRT?	Accept. Reconsider wording.
15742	8	30	8	33	8	p.30: see general statement on the chapter.	ok.
15743	8	30	8	33	8	On modal shifts, see general statement on the chapter.	ok.
16311	8	30	9	30	10	Same as the comment No. 9.	ok.
8370	8	30	9		17	Can be deleted. The information has already been presented elsewhere. You might delete the entire paragraph line 9-17.	Check.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
2694	8	30	18	30	18	"prisoners dilemma" is not really the correct analogy to use here. Individuals are rational in their choice of alternative modes and this has nothing to do with 'cooperative' behavior.	Reject. The prisoner's dilemma is characterized by rational chocie of individuals. suggest to simply remove "(co-operative behaviour)" because that is the problem, and also not entirely true for e.g. Cycling, which is a very individual choice not requiring co-operation. Also may be the effect is more like the 'tragedy of the commons, than exactly the prisoners dilemma.
2695	8	30	38	30	38	Acharya and Morichi reference is missing.	Accept. Include.
13115	8	30	8			Personal EV/FCV vehicle with low carbon electricity or hydrogen might be lower GHG (/pkm) than public transport of Buses, Rail if average passenger occupation ratio is low. Please add comments, "if good utilzation rate and similar technology (such as electric driven) is applied to mass transportation."	Accept. agree it is always necessary to give such additional information. But there is also a more general problem in the chapter (and actually the wider literature on mitigation in transport) with notions of energy consumption, emissions and occupancy rates. For instance, a policy providing lots of rail in acountry and trains running on them but failing to give incentives to drive less cars and just investing in coal powered electric plants will cause empty trains that of course do have high emission factors per pkm. But what is the problem here? Trains that are inefficient in itself or a very inconsistent policy.Somehow we may need to address this in a concluding section?
11278	8	30	8			In this section (or whereever suitable) the role of car sharing options should be discussed. They are already in practice in various cities and sometimes even combine the car sharing idea (behavioural change) with alternative propulsion systems (mitigation technology).	Accept.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
2693	8	30	9	30	17	Would be useful to examine the following work: McCollum, David and Christopher Yang, 2009, Achieving deep reductions in US transport greenhouse gas emissions: Scenario analysis and policy implications, Energy Policy, 37: 5580-5596.	This source is useful for those interested in answering the question, "what would it take to achieve a huge reduction in GHG emissions?".....but it's basically a "normative" analysis….not all that interested in the probability of actually achieving the goal, or even especially the costs....may not be a particularly useful source for us. actually I feel we should gather several of such 'normative' scenario studies in a single section because these are normative with respect to a defendable goal 980% emissions at a certain time) and not normative in a political sense, which actually the idea that something is "not probable" because of lack of policies expected to reach these goals is very much polically normaticve. Sghould we not try to keep away from that? The ref simply reasons; we want tbis, we can do with technology that and we could invest such to reach what we want. It is simple math and logic. Up to the politicians to take this in with their decision making.
8371	8	30	22			There are some 700 million cars in the world or put differently about per cent of global population own a car. The car-owners are unevenly spread over the globe and in most places on earth there are not many cars at all. PIs take this fact into consideration when discussing space and car use as well as when focusing on the mobility of the roughly 90 per cent of global population (roughly 6 billion persons) that do not have a car.	Accept.
4691	8	30				The connections to traffic accidents (in the 'Spillover' section) didn't make sense to me. Perhaps it needs further clarification to avoid misinterpretation and confusion by folks like me.	Accept

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
8548	8	31				OPINION IN SOURCE RESEARCH NOT SUPPORTED BY DOCUMENTATION High-speed rail, combined with strong land-use and urban planning, has the potential to restructure urban development patterns, and may help to alleviate local air pollution, noise, road and air congestion (McCollum et al., 2010). COMMENT: The basis of the above sentences is the statement in McCollum et al. The following statement appears in the work, but is not documented and must be dismissed as opinion. In addition, high speed rail may provide other benefits compared to air travel, such as reductions in local air pollution, noise, and air and roadway congestion; moreover, combined with strong land-use and urban planning policies, P22 The "potential to restucture urban development patterns" is particularly speculative, and, at a minimum should be removed from the sentence. □	Reject. It is well know that long-distance transport infrastructure reshapes development patterns. That is also true for airports. The impact of the railway infrastructure on urban development in China is significant. I certainly agree with the first comment….this is not a useful "source material," given it's normative nature. again do not agree aboiut this normative discussion, see my comment at ID 2693.
8566	8	31				INVALID SOURCE Source for Table at the top of the page is incorrect. No such data. Moreover, direct CO2 should not be used. Indirect should be added if this chart is not deleted (electricity generation and transmission losses)	Reject. The source is correct. Double check. I suspect that generation and transmission losses are in there…it would be strange if they were not. But it seems to me the numbers are rather low so may be the reviewer has a point here - or is it per seatkm?
8570	8	31				IMPORTANT POINT OMITTED McCollum et al (2010) also say.... A rigorous study by Jamin et al. (2004) shows that if high speed rail systems were to connect major metropolitan areas throughout the United States, the energy and emissions benefits would be relatively modest due to insufficient traffic volumes in many cases: less than a 3 percent reduction in total U.S. domestic air traffic volume would be achieved, with consequently modest reductions in energy use and emissions. On the other hand, recognizing that connecting major downtowns is not the only potential market for HSR.... COMMENT objectivity requires citation of this point.	Reject. That is a right observation. But most of the world is not the US. is Mcollum et al. Not the 2009 report (not 2010)? The point with jamin is they keep the travel pattern itself constant and assume that just offering HSR does the trick, while it ius known that such model studies of new modes are generally not performing too well... (e.g. the Madrid Barcelona railway line performed several times better than envisaged in model studies.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
14290	8	31	18	31	21	Potential for emissions reduction from modal shift from air to high-speed rail may be limited. Although a significant number of passengers may shift, the impact of this in emissions terms may not be large due to the relatively short distances involved (the majority of aviation emissions are long-haul flights which cannot be substituted by rail). For example, in the UK modal shift to high-speed rail could reduce passenger demand by up to 8% by 2050 but this would only reduce emissions by around 2%. See Committee on Climate Change (2009), "Meeting the UK aviation target - options for reducing emissions to 2050", Chapter 3 p77-78 (http://downloads.theccc.org.uk/Aviation%20Report%2009/21667B%20CCC%20Aviation%20AW%20COMP%20v8.pdf).	Accept. Reword. entirely true except: there is much scope for changing destinations, certainly in the leisure tourism market where a beach is the central thing to achieve, not the exact kilometrage to the beach (if tourism is a section in Ch 8 or 10, then this will be covered in that section). The idea is that modal shift should also be accompanied by shorter distances thus increasing its impact very much; the raikl option is more to accommodate responsible travel while reducing less responsible forms of travel.
11648	8	31	18	31	29	The shift from short-haul flight to HSR only saves GHG if the liberated airport slot is not filled up again. However in fact it is often substituted by a more profitable and more polluting long-haul flight. Hence from the total system perspective the shift without a backstop is a bad idea. Please add this caveat! See e.g. Clewlow: Impacts of high-speed rail on air transportation in Europe: an analysis of demand and emissions. ETC 2011 https://etcproceedings.org/paper/impacts-of-high-speed-rail-on-air-transportation-in-europe-an-analysis-of-dema	Accept. also this is an example of inconsistant policies by expanding airport capacity and aiming with new HSR development at less short haul air transport. On the other hand: the substitution is only true if currently long haul slots are sighnificantly rnot given upon request from the market.
5207	8	31	18	31	29	It might be interesting to consider through backcasting what might be necessary in long distance (tourism, i.e. leisure, visiting friends and relatives and business all is tourism; see UNWTO definition) travel to achieve 70% reduction of GHG at increased numbers oftrips by 2050. From our research it appears there will be a systemic limit to aviation's growth at current levels, but under the condition that about 80% of car trips is replaced by train, or the projected growth of car can be kept, but then at a strong reduction of current aviation volumes to the level of about the 1970s (see Peeters, P. M., & Dubois, G. (2010). Tourism travel under climate change mitigation constraints. Journal of Transport Geography, 18, 447–457). This may set the challenge for the modal shift policies proposed (which will be hard to achieve anyway).	Accept.
16315	8	31	18	31	29	First, this paragraph should clarify whether or not comparisons of GHG emissions and energy intensity between high-speed rail and air travel were made from a life-cycle perspective, or more specifically, whether or not GHG emissions and energy consumption associated with high-speed railway network are taken into account. Secound it is better to mention the potential and future prospects for Maglev in this paragraph.	Accept first part, Reject second part: no good literature on Maglev, costly concept. agree magLev seems not a really viable option due to e.g. The necessity to have all trrains on a certain track driving exactly the same speed thus stations need to be separated at exactly constant distances or you need to cut up the tracks in single trajectories causing strong reductions of capacity.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
8434	8	31	2	31	17	I suggest to better underline the importance of NMT (non-motorized transport), expanding the 15 lines written in this paragraph. If we consider the whole world, and not only industrialized countries, cycling and walking are still today the most frequent way people use for moving in the everyday life. Maybe a specific paragraph could be created.	Accept.
13116	8	31	2	31	17	Do not give too much explanation for cycling and walking issue in "modal shift" paragrapph. Modal shift from personal vehicle to cycling and walking may decrease energy use, however, it does not play important role of global modal shift. Please cut most sentences for simplicity.	Reject. See example comment above. and there is a systemic link here: a cycling/walking based city requires less car possession and thus less car use also indiirectly on longer distances. Imagine all cities in the world were slow modes designed…
16314	8	31	2	31	17	This paragraph should clarify whether or not such increases in cycling and walking could restrain the growth in automobile ownership and the modal share of automobiles.	Accept.
3417	8	31	20	31	21	Correct, but new infra induces new use, new demand for it. Creating the high-speed railway city to city connections in Europe certainly has generated a lot of new travel that would otherwise not have been there at all. Worth to check whether there is literature on this, probably considerable, rebound effect.	I would reject this argument, because every investment in transport causes mobility that would not have been there without it. So a shift in investment always will cause that mobility at one hand is reduced and other mobility is generated. the idea of this is that some form of mobility is necessary to keep the economy going. If such a new mode trip is a new trip is actually not relevant. The political problem is that it is easier to invest in (new rail) than to restrict less sustainable popular forms of transport.
3595	8	31	30			There is no need for emphasis on modal shift solution for freight. All trials and intermodal projects have had limited impacts so far, since rail have at best maintained its market share, and shipping and aviation have no serious competitor. Other solutions are far more sucessful in terms of ghg reduction per tonne delivered and far more cost-efficient if considering external costs internalisation (Leonardi and Baumgartner 2004; SUGARLOGISTICS.EU; Piecyk&McKinnon 2008; McKinnon et al: Green Logistics 2012).	include more caveats about the likely impacts of particular measures. Some useful suggestions which will be separately evaluated and would be worth incorporating e.g. need more discussion of the impact of just-in-time and the opportunities of relaxing it to cut energy use and emissions. Clearly mode shift is only one of a series of 'decarbonisation' options for freight transport. Greater emphasis could be given to these other options and reference made to the publications cited.
13428	8	31	33	31	36	We need to mention about the "Just in Time system".	Needs a reference.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
6485	8	31	18	31	29	The table misses one critical point which was discussed in the section GHG emissions impacts of transport infrastructure . LRT and Metro since grade separated and thus the infrastructure provision involves high emissions when compared to systems like BRT. More good discussion can be found @ http://www.adb.org/sites/default/files/EKB-REG-2010-16_0.pdf. Discussions on High Speed rails in 18 to 29 statements in page 31 also need to provide link with infrastructure construction and cost especially for developing countries and cities.	Accept link with infra.
12121	8	31	18	31	29	Video-conferencing as an alternative to air-travel completely ignored. Discussion of passenger model shift from air travel to very fast trains completely ignores another major alternative to air travel - video conferencing. A six hour videoconference can save some 99 per cent of energy and material resources that would be consumed by the transatlantic trips required to hold the same meeting in a single location. Ref von Weizsäcker, E., Lovins, A. B. and Lovins, L. H. (1997) Factor 4: Doubling Wealth, Halving Resource Use, Earthscan, London	it is mentioned in table 8.8.1 and on p 43 of the original draft. May be add it here as well. Interestingly the recent financial crisis did impact on business flights and vid-conf, e.g. {Smeral, 2010} though not well founded in empirics..
12119	8	31	2	31	17	Modal shift opportunities for passengers - excellent section - missing key point that suggests there is a huge potential here - REF see IPCC AR4 2007 Transport chapter "As the IPCC has stated, “While the trend has been away from non-motorised transport (NMT), there is considerable potential to revive interest in NMT as more than 30% of trips made in cars in Europe cover distances of less than 3 km and 50% are less than 5 km ."	accept. As in other comments above; direct impact on emissions not high (only short distances0 but indirect impacts on car ownership and shorter overall distances might have a significant impact? No lit as far as I know.
12120	8	31	2	31	17	Car sharing Schemes do not seem to be discussed at all in this transport chapter. Yet they compliment and help enable passenger modal shifts and help reduce the costs to citizens of transport services overwell, whilst also reducing GHG emissions. Now there are car sharing schemes in operation in some form in over 600 cities.	Accept.
4297	8	31	30			As the example of modal shift opportunities for freight, I propose adding electric cargo train system or external power supply convoy. Low-carbon investment in freight transport can be less than the railway.	Not clear what is being proposed here. A large proportion of railfreight already moves on electrified services.
2696	8	31	35	31	36	Provide evidence for statement that deregulation has favored road transport.	This sentence will need to be reworded. The intention was to argue that trucking operations have benefitted from the liberalisation of freight markets around the world over the past 40 years. There was no intended inference that deregulation has benefitted road more than rail.
12902	8	32	16	32	19	Does the faster rate of incremental technical innovation and faster vehicle replacement rate of HDV compensate for higher emissions/tkm with respect to rail? What is the situation when full life-cycle analysis is applied, including infrastructure?	This comment poses interesting questions that will require further investigation. On the long term the replacement rate is not the factor determining the outcome but mainly the technological progress (the progress will be delayed at first and than later a much larger step down will be made).

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
4420	8	32	33	32	36	Check on inconsistency in earlier part of the chapter re last mile freight	Rather vague. Not clear what this relates to
8028	8	32	4	32	6	The White Paper 'Roadmap to a Single European Transport Area – Towards a competitive and resource efficient transport system' is the reference for the contents of this sentence. Why not refering to it?	Agreed. Need to add a reference to this EU White Paper
6486	8	32	26	32	29	This may not be entirely true from developing cities perspective (shift to better modes not exactly roads to rail but inefficient trucks to better modes is possible). The last mile vehicles are often the most polluting i.e. vehicles which are very old and cannot be used for longer distance and thus load from such vehicles could be shifted to more efficient vehicles and non motorized transport modes. Many Chinese cities over last two years have used sticker concept to prevent old inefficient vehicles from accessing urban space. To reduce air pollution in cities, the diesel trucks are labeled green and yellow in China. Green labels are applied to diesel vehicles which correspond to China National III emission standards or above (new), whereas yellow labels are for diesel vehicles below China III standards (old). By restricting the entry of yellow label vehicles, the authorities are trying to reduce pollution (black carbon emissions) in some big cities by allowing only cleaner vehicles inside the cities. Nearly 20% of vehicles are "yellow-label vehicle" . The other important factor in securing better urban freight is the urban form and structures. By having better landuse policies, freight movement can also be impacted.	Makes a good point about the relative energy / CO2 efficiency of long haul and local delivery ('last mile') trucks, which clearly varies around the world. Efforts in Chinese to raise the efficiency of delivery fleets may merit a mention. HAO: Agree. Freight transport mode shift can be promoted by banning inefficient trucks, as China has implemented. Alan: include more caveats about the likely impacts of particular measures. Agreed, but this partly reflects the availability of data and research and the state of public policy on freight transport. Would certainly be desirable to correct this geographical bias. Some useful suggestions which will be separately evaluated and would be worth incorporating
4262	8	32				Recent research shows that increased active travel can avert costs to the National Health Service from seven major conditions that are related to sedentary lifestyle. Jarrett J, Woodcock J, Griffiths UK, Chalabi Z, Edwards P, Roberts I, Haines A. Effect of increasing active travel in urban England and Wales on National Health Service costs. Lancet 2012; 379:2198-205	Accept. Thanks for the reference.
14291	8	33	3	33	5	Slow steaming has not necessarily widened the time gap between sea and air. The purpose of slow steaming is to utilise spare capacity in the fleet and save fuel costs (since slowing down uses less fuel). Although journeys take longer, there are more ships being used on routes. Therefore, service levels are maintained even though individual journeys are slower.	Unclear comment. It concedes that sea journeys are taking longer as a result of slow steaming. Assuming that air freight is moving at its previous speed, the time gap must be widening. In practice this issue is much more complicated that this comment and the current text in the chapter suggest. The reference to slow steaming needs to be elaborated (including references to new research on the subject).

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
14292	8	33	7	33	8	Last sentence beginning "This merger of..." - is there any evidence to cite in support of this argument. Not convinced, in the absence of any evidence, that this would lead to "substantial cost and CO2 savings".	This is surely self-evident. Airfreight service all the way from China to UK will be likely to generate significantly more CO2 per tonne than a service involving sea from China to, say, Dubai and airfreighting to the UK from there.
2454	8	33				Missing theme of flooding - transport is susceptible to flooding - metros and other systems - and also not designed for the intensity of rainfall - so it acts as a barrier. There have also been examples of railway track buckling as a result of high temperatures. The general missing issue in this Section is that of redundancy and resilience of the transport system - bearing in mind that after an event any rescue etc is dependent on the transport system actually working.	Accept. We touch on this point, but should make it more explicit.
9072	8	33	9	35	19	8.5 Climate change feedback and interaction with adaptation can be deleted due to limitations on the nos of pages	Reject. It is a required section for all sector chapters.
2698	8	33	9	35	19	I would recommend this section not be included as part of this chapter. There is too much uncertainty regarding regional and localized impacts to say much here at this stage. It really goes beyond the scope of what this chapter should be addressing.	Taken into account.There is indeed a high level of uncertainty for some aspects (e.g. 8.1.2 Relocation of production, international trade and global supply chains), but there is also a significant amount of certainty (e.g. 8.1.1 Accessibility and feasibility of transport routes). Section 8.5 highlights potential caveats with regard to relationship between adaptation and mitigation.
11280	8	34	29	34	31	For discussion on climate change adaptation and mitigation in urban planning, see: Kehew, Robert, et al. (2013): Formulating and Implementing Climate Change Laws and Policies in the Philippines, Mexico (Chiapas), and South Africa: A Local Government Perspective. Local Environment: forthcoming.	Could not find the reference yet, but will incorporate it when available
11281	8	34	31	34	33	For discussion of the interdependencies between urban vulnerability and climate change adaptation and resilience, see: Bulkeley, Harriet, and Rafael Tuts (2013): Understanding urban vulnerability, adaptation and resilience in the context of climate change. Local Environment: forthcoming.	Could not find the reference yet, but will incorporate it when available
15837	8	34	34			Have you cross checked this section on adaptation with WG2?	Yes.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
3261	8	34		59		1. 8.4.2. Urban forms of mobility is good indicator of global divide. This section may address the specificities of African countries for instance dominated by informal transport systems with huge implication in GHG emission. In the same section urban structure imposed some special transportation systems such as bikes and motorbikes (a new market for Indonesia and India) and not a cultural behaviour such as in Scandinavian countries. a. In 8.4.2.2 implications of urban growth in GHG emission include land cover changes (positive? e.g. Las Vegas or negative e.g. Dakar, Ouagadougou, etc). Positive means greener cities compared to baseline or greyer-browner cities when vegetation is cleared for buildings. It can relate to the energy needed to build new cities or extend new ones depending to emerging use of new technologies and new materials. b. 8.4.2.3. Apart from emerging economies (India, Brazil, China), modal shift did not happen in Africa because cities and urban population have not been prepared for that (shanty towns, twisted and tiny roads). NB. Denmark is regretting the removal of tramway in its transportation system, a new behavioral need for an old practice. 2. 8.10.1. Also needs some African (LDC) perspectives with another concept of common transportation influenced by poverty, urban structure (working areas in one location), road systems, aging vehicles park (a huge proportion of transportation systems are used cars from developed countries). In particular the change of behaviour in Europe and US, gave new opportunities to import cheap used cars that have some implications in air pollution, health and GHG emission… Unfortunately there are no clear statistics on imported second (sometime fourth hand) car in Africa. In Some countries with improved wealth imported used cars are declining (Latin America, EAU, etc.) 4. Statistics of imported (new and used) cars in Senegal from 1980 to 1997 (source, Ministry of Transport-Republic of Senegal) no update of these data, but we could try to have global picture of used car export in Developing countries a. In Kenya at 2008 a total of about 30000 used cars have been imported from Japan alone (http://www.autoassista.com/import_guide/japanese_used_car_import_statistics.html) 5. At the same time new changes are occurring because of changing legislations (the use of non CFA fridge after Montreal Protocol, the change in regulation of used equipment imports in Africa including cars). This underlines how international binding agreements have depicted in national regulation, and therefore a change in decision making and behaviour. 6. 8.10.5. It might be good to bring in the picture the raising “second chance” in the African urbanization through emerging new cities (new development platforms such as the transition in Asian Dragons in the 1970ties). In Gonza City for Kenya, Diamniadio for Senegal, Ouaga-2000 for Burkina Faso, etc. 7. Finally Africa has the highest economic growth during the last 5 years, this pulls down many investors who are generally established in cities for their business. The change in behaviour related to this influence of GLOBALIZATION can be addressed as well.	Related to 8.5? Useful comments though some dated. Will incorporate where relevant if room in text.
14294	8	35	14	35	19	This is really only an issue to the extent that surface transport is not decarbonised.	Taken into account
12338	8	35	14	35	19	This paragraph might also include some considerations as regards the cooling agents used in air-conditioning systems.	Taken into account. This would be more an additional mitigation factor, rather than an aspect that relates to linkages between adaptation and mitigation. This point here relates to the relative energy efficiency of public transport (as a mitigation option) in a warmer climate.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
15867	8	35	2	35	5	This paragraph indicates that global warming will increase vehicle emissions. This is statement is questionable because some emissions increase with colder weather (for example, unburned hydrocarbon, particulate, and CO emissions in vehicles), and the potential GHG-driven changes in ambient temperatures and humidity are in general not enough to really change the combustion processes. Also vehicles operate in wide ranges of temperatures (summer, winter) so not clear how you could differntiate climate chnage impacts from seasonal variation in engine performance and also fuel formulation (winter, summer fuels)	Accepted. Will need to follow up.
12903	8	35	20			Change headline to: Mitigaton costs and potentials	Reject. Thanks for the comment but this first-level heading cannot be changed.
3434	8	35	28		30	A nice phrase, with a strong policy message, is one said by Lee Schipper (I don't have a reference but I am sure he would like it to be included): "Transport matters a lot for CO2, but CO2 matters little for transport. High CO2 emissions are only one of the symptoms of poor urban transport in most developing cities". Therefore, the polycentric approach mentioned elsewhere in Chapter 8 makes very much sense in the case of mitigationg GHG emissions from transportation. I think that this is worth mentioning at this point.	Reject. Thanks for the comment but only if the reference was provided this could be included.
16316	8	35	45	35	46	The sentence "Optimizing ~ a reduction of 8 Mt CO2/yr" shoul clarify where and when this level of reduction was estimated to be achieved (in Beijing?).	Accept. We will amend text.
2455	8	35				The missing element is the subsidisation of fuel - for road transport, but also for rail and aviation - any form of subsidy or exemption from taxation means that people and firms are shielded from market forces and from paying the real social costs of the carbon (and other costs).	Accept. We will amend text.
17773	8	35				consider changing the title to "Costs and potentials for GHG reduction"	Reject. This heading cannot be changed according to IPCC rules.
13878	8	35		39		This section need to be linked with chapter 16 "cross-cutting investment and finance issues" in order to avoid overlapping between chapters	Accept. We will amend text.
13060	8	35	20	40	3	On the Costs & Potentials issues it is difficult for the reader to access the bigger picture of the cost & potential information. Each sector has its own approach to costs and potentials, which is appropriate as each sector has its own unique qualities and considerations. Nonetheless, the information that will be most relevant to take-away for policy-makers is overarching cost information that brings these different pieces together. To help policy-makers access this information, it should be important to highlighting market realization, but also the policy aspects of cost (by policy it is meant institutional frameworks and/or market frameworks and/or capacity building arrangements, etc...). In both developing and developed countries policy can have a strong impact on cost. Simply looking across the costs & potentials sections of the sector chapters, the reader could miss this message, although the information on policies and measures is there in the chapter. Therefore it could be important to make sure that these informations are put in perspective appropriately.	Accept. Thanks a lot for this very useful comment. We will amend text to try to address this very important issue.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
2699	8	35	20	40	3	This section is very poorly written and is poorly structured. Is the intent to discuss costs and benefits of policies? Or is it simply describe potential policies? I would suggest dropping what is very confusing terminology: 'activity effect component', 'structure effect component', etc. Instead I would structure this section by grouping specific policy approaches into sections. 1. Pricing and taxes, 2. Subsidies for transit, 3. Urban form and design, 4. Non-motorized, 5. Other TDM (parking, carpooling, telecommuting, etc.), 6. Technologies (vehicle and fuel), 7. Need for synergies and integration of all policies for maximum impact.	Reject. Thanks for the comment. However, it has been agreed that the Kaya identity should, somehow, provide a storyline for the different sections of the report. In this case, since this section is about Costs and Potencials, it has been agreed by the authors that this should be the way to go. Also, page allocation for this section is quite limited to accept the suggestion provided.
11275	8	35				This section reads very much economic (see remarks in No.1 above), what about people and their (real) behaviour (and, thus, needs and activities)?	Accept. We will amend text provided there is literature to support it.
16319	8	35	27	36	20	I propose that estimates of the long-term price elasticities of transport activity demand be mentioned in this section to point out the price-inelastic nature of the transport sector.	Accept. We will amend text provided there is literature to support it.
13879	8	35		37		These two sections focus on potentials without dealing with cost. Cost-effectiveness is key to be policy relevant. See Sweeney, J., Weyant, J., 2008, Analysis of Measures to Meet the Requirements of California's Assembly Bill 32, Precourt Institute for Energy Efficiency, Stanford University	Accept. Thanks a lot for this very useful comment. We will amend text to try to address this very important issue.
8551	8	36				TEXT INDICATES - ALSO CRITICIZED COST METHODOLOGY Any change in benefits associated with modal shifts must also be factored in. An Australian study showed redevelopment around transit and walking reduced GHG emissions by 4.4 t CO_2-eq per household per year compared with developing a car dependent suburb (Trubka et al., 2010) . Cost savings for each new transit-oriented household were for infrastructure savings (non-transport), USD85,000; for public and private transport savings, USD250,000 over 50 years; for GHG emissions, USD2,900 assuming USD25/tCO_2-eq or USD24,990 at USD 215/tCO_2-eq (social cost); for health savings, USD4230 from reduced obesity; plus USD34,450 from increased productivity due to increased walking. COMMENTS: (1) This paragraph does not accurately reflect the Trubka et al research. Trubka et al reaches its 4.4 CO_2-eq per household per year by comparing urban development within 3 km of the CBD to fringe development 60 or more kms from the CBD. The finding is not about "redevelopoment around transit and walking" but rather redevelopment within 3 km of downtown. (2) The costs cited (from " Cost savings for each new transit-oriented household were for infrastructure savings ...") are not in the cited work but are consistent with previous work by the same authors. Considerably lower costs have been developed for the Sydney area by Center for International Economics (2010), which also includes comparisons to the Trubka, et al. costs. See: The benefits and costs of alternative growth paths for Sydney: Economic, social and environmental impacts http://www.metroplansydney.nsw.gov.au/Portals/0/pdf/AlternativeGrowthPaths.pdf (3) The cost methodology (under subpoint 2 above) is from Trubka, R., Newman, P. and Bilsborough, D., 2008. Assessing the costs of alternative development paths in Australian cities. Fremantle: Curtin University Sustainability Policy Institute., which is criticized in the New Zealand Productivity Commission "Housing Affordability Inquiry." The exception taken to these costs by the Commission should be cited http://www.productivity.govt.nz/sites/default/files/Summary%20Version%20-%20Final%20Housing%20Affordability%20Report_0.pdf	Accept. Thanks a lot for this very useful comment. We will amend text.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
3833	8	36	10	36	10	Define ICT the first time it appears.	Accept. We will correct text.
11187	8	36	13	36	20	To keep higher density in urban areas of developing countries is also important. In reality, once low-density development prevails, it is quite difficult to densify the area.	Accept. We will amend text.
5408	8	36	16		17	what does it mean to say "compact neighborhoods use cars a third as much as……suburbs"? Actually a third of the PKT by private vehicles one sees in the suburbs? If so, say so.	Accept. We will amend text.
18910	8	36	18			"10 Gt CO2": Are these annual emission reductions? If so, for what year? Please clarify.	No. These are accumulated emission reductions for the period.
3435	8	36	19			When using the term 'polycentric policies' in this chapter, I think it would be appropriate to cite the Economics Nobel Laureate Elinor Ostrom for using the term. E.g.: Ostrom E., A Polycentric Approach for Coping with Climate Change. Background Paper to the 2010 World Development Report, Policy Research Working Paper 5095, The World Bank, Washington, DC, 2009.	Accept. We will try to amend text to reflect this, although we may end up with a problem of having to cite "grey" literature, which IPCC is trying to avoid.
8215	8	36	24	36	25	High-speed rail in China is controverisal, esp. on the safety issue. Moreover, high-speed rail sometimes do not have many stops in certain distance, it connects mainly first and second tier cities in China that are remoted from each other. Shifting short-medium haul air trips to high-speed rail cannot satisfy travelers in 3 or 4 tier cities. Therefore, I suggest to delete the half sentence 'particularly high-speed rail including in China (Akerman, 2011).'	Disagree. Although it is true that not all short-medium air trips could be shifted to high speed rail (as the reviewer stated), a considerable shift has been achieved. See Xiaowen Fu, Anming Zhang, Zheng Lei, Research in Transportation Economics, Will China's airline industry survive the entry of high-speed rail?
5409	8	36	32		34	I would think that the average reader would draw virtually nothing from knowing that each household used 4.4 t CO2 less…..it would be much more useful, I think, to talk about percentage reductions in emissions, since most people haven't a clue how much carbon is actually emitted by the average household.	Accept. We will amend text.
7399	8	36	39	36	45	use comprehensive measure to assess cost. The statement of negative costs based on the cited study can't be generalized.	Reject. Text is very clear on refering to India and in not generalizing it.
17129	8	36	46	36	48	DELETE: Taking into account the total societal cost of vehicles, fuels and infrastructure, a significant cost reduction could occur from a shift away from growth in car and air travel and toward mass transit and non-motorised travel, along with changes in urban form and increased use of ICT (IEA, 2009). REASON: This language is not appropriate because terrible impacts of personal mobility demand reduction on economies is not clarified.	Accept. We will amend texto to better reflect this.
7398	8	36	5	36	20	Need to use comprehensive measures to assess costs. For example, densifying suburbs negatively impacts propoerty values.	Accept. We will amend texto to try to address this.
16317	8	36	5	36	7	Same as the comment No. 9.	Reject. Comment could not be found.
17722	8	36	5			The examples here are almost all from Australia and the US. What about cities elsewhere in the world, where the majority of population growth will occur in the 21st century? What studies are there from Africa, for example?	Accept. We amend text provided that we can find literature.
16318	8	36	9	36	13	This fails to constitute a sentence due to grammatical mistake(s).	Accept. We will amend text.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
5208	8	36	21			In general all elemenst are mentioned within this section, but what I miss is the overarging impact of infrastructure policies: if we do not manage to significantly reduce investing in airport and road capacity and increase investing in high speed rail, than there will be no cost or other measure effective enough to avoid further growth of air an dcar and stand still or even decline of rail; based on logics, not so much the scientific literature (though many show the inability of prices to reduce growth so there is an urgent need to follow different policies, see e.g. aviation, see Mayor, K., & Tol, R. S. J. (2007). The impact of the UK aviation tax on carbon dioxide emissions and visitor numbers. Transport Policy, 14, 507-513. Mayor, K., & Tol, R. S. J. (2010). Scenarios of carbon dioxide emissions from aviation. Global Environmental Change, 20, 65-73. Pentelow, L., & Scott, D. J. (2011). Aviation's inclusion in international climate policy regimes: Implications for the Caribbean tourism industry. Journal of Air Transport Management, In Press, Corrected Proof.	Accept Thanks for the comment and for the references. We will amend text.
8372	8	36	22			A simplistic view is put forward here because most likely the consequences of climate change will be very different in the Global North and the Global South. Heat and/or rain impede on walking and bicycling and the same goes for cold, wind and rain in the Global North. In larger cities distances and time spent on roads are also growing A considerable group of (some 2, 5 billion individuals) cannot afford to take a BRT bus or travel with a gentrified system of transport. Also because they do not run to places that women have to go.	Reject. It is not clear what exactly is the suggestion here.
3419	8	36	42			Especially systems that truly integrate public transport and cycling have a lot of potential.	Accept. We will try to amend text.
5288	8	37	14			ADD: But, information is not enough: in a qualitative and quantitative study on mobility in Lyon, hte publci interviewed considered itslef to be well informed (81% said that CC was the number one challenge of the 21st century, 81% also said that the best way for an individual to fight CC was to stop using the car, yet, 56% used their car for all activities on a daily basis (96% had a public transport accessible within 400 meters). Thus, information related to climate change did not lead to changes in mobility modes (Stéphane La Branche. « La gouvernance climatique face à la mobilité quotidienne. Le cas des Lyonnais ». Revue Environnement Urbain/Urban environment. 2011).	Accept. We will try to amend text to reflect this.
3420	8	37	21			While this is right, you may consider to show a notion of mobility careers here; i.e. trying to influence groups to postpone or abstain from the next step in their mobility career.	Accept. We will try to amend text to reflect this.
5410	8	37	21		23	asserting that something is a "critical part" of a package is probably too strong for an IPCC report, but besides, I suspect there's little evidence that "broad public and institutional education initiatives" do lots of good.	Accept. We will amend text.
3596	8	37	24	37	33	This section is not on structural effects, but on system efficiency and sustainable goods transport management. This section should include comments and list all business/public sector efficiency measures leading to a better use of existing capacity and to less CO2 per unit delivered (night deliveries, increased load factor, multi-use lanes, delivery windows etc); and an indication on how to promote them in order to increase the market uptake.	Accept. We will amend text to try to incorporate these important suggestions, particularly relating to the loading of freight vehicles which needs elaboration.
4298	8	37	30	37	33	Just-in-time delivery has also caused small lot size of distribution and aggravation of the load factor. It is regarded as one of the important issues. As solution, there are downsizing of vehicles, formation of cooperative transportation, and ICT practical use (logistic information system).	Accept. But we would need literature to amend text.
15838	8	37	49			Do the $/tCO2 values include capex and fuel costs? Negative numbers suggest improvements cost less than current technology which is not very probable. Again, more data would be useful - IEA has done $/tCO2 analyses too. Might include some of that. (ETP, WEO)	Accept. We will try to amend text.
4061	8	37	24	37	33	Section 8.6.2. These sentences discuss the cost-effectiveness and benefits of "just-in-time" logistics. However, just-in-time logistics may suffer from climate change impacts when disruptions occur. What is the net benefit of changing to just-in-time logistics?	Accept. We will amend text if we can find literature.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
8373	8	37	38			Yes, especially in cities in emerging economies. Therefore, pls map out 4-5 different kinds of urban areas and clarify the conditions and possibilities in cities with different political and economic systems.	Accept. We will try to amend text provided we can find literature to back it.
8720	8	37				Note: Comparison of mitigation options for US and European HDVs is available in this recent report(Table 3.9) Cost reductions for each technology for each vehicle category in Table 4.22 AEA & Ricardo, 2010. Reduction and testing of Greenhouse Gas Emissions from Heavy Duty Vehicles http://ec.europa.eu/clima/policies/transport/vehicles/docs/ec_hdv_ghg_strategy_en.pdf	Accept. We will amend text to better reflect this.
4421	8	37	39	38	30	Could much of section 8.6 be combined with the earlier section vehicle technologies? The consequence of separating the cost of powertrain improvements from the technology is that much of the earlier discussion is repeated to allow costs to be discussed. Additionally, costs of technological improvements for shipping, rail and air have been omitted.	Accept. We will amend text. The reviewer has a good point, although we must stick with the agreed outline.
11649	8	38				Add also the cost analysis in Lutsey 2009, and Borken-kleefeld 2010: http://webarchive.iiasa.ac.at/Admin/PUB/Documents/XP-10-014.pdf	Accept. We will amend figure.
5339	8	38	1	38	1	increases in efficiency ARE possible	Accept. We will try to amend text.
2456	8	38	16		24	Lots of data here, but there is no comment on the potential for any combination of migitation measures and the total costs that this would result - over what sort of time period.	Accept. We will try to amend text to better reflect this. But in fact there is a table for this in the earlier section, though it can be greatly improved. An issue with figure 8.6.1 is that we do not know the effect of reduced loads. But Figure will be improved.
2759	8	38	16	38	24	Mitigation cost may be negative. E.g. biogas vehicles may be cheaper than corresponding diesel vehicles and their fuel is also cheaper. In addition, octane value of 140 makes substantial engine efficiency increase possible reducing energy consumption per km.	Accept. We will amend text and find literature to better reflect this.
5340	8	38	16	38	24	Need to clarify what modes this para refers to: all LDVs? Cars? References to "short term" and "long term" need to be defined. Time frame not specified for EV costs, so not clear what "in the same timeframe" refers to for FCVs	Accept Thanks for the comment. We will improve text.
16320	8	38	16	38	21	CO2 mitigation costs for ICEs, ICE-hybrids, and plug-in hybrids must differ by fuels, so fuels used in vehicles in question must be clearly described, such as advanced gasoline ICEs.	Accept. We will modify/clarify text.However, the authors doubt this is significant as long as the fuels are liquid fuels.
3834	8	38	17	38	17	Explain in a footnote what advanced spark-ignition ICE means.	Accept. We will clarify.
3835	8	38	18	38	19	I recommend to consider the PHEV coupled with sugar cane ethanol as a low cost and high intensity GHG emission mitigation alternative. See Pacca and Moreira, 2011 and consider that the technology is already in the market. - Pacca, S. and J. R. Moreira, 2011. A Biorefinery for Mobility? Environ Sci Technol. 2011 Nov 15;45(22):9498-505.	Accept. We will try to ammend text.
15840	8	38	21			add "low cost and" before "low carbon"	Accept. We will ammend.
15841	8	38	21	38	22	$80-120/tCO2 look like very long term costs, not near term (i.e., cheap batteery prices). Might clarify assumptions	Accept. We will clarify.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
5341	8	38	22	38	22	Depends on battery cost. UK Committee on Climate Change analysis suggests cost could be near-zero by 2030 if charged off-peak with low-carbon electricity. See CCC (2012) International Aviation & Shipping Review Technical Report http://hmccc.s3.amazonaws.com/IA&S/CCC_IAS_Tech-Rep_2050Target_Ch4_Transport.pdf	Accept. The problem is that one can always find a very high and very low cost with the right assumptions about battery costs. That's the key, and we probably need to state what our battery cost assumption is to get out these levels.
16321	8	38	25	38	25	This sentence should be modified to "~ achieve a reduction in fuel consumption per km of 38-51% from XXXX (2015?) to 2020".	Accept. We will clarify. We.need to look at the NRC report. Probably 2010 at the latest.
15839	8	38	7			Might add a chart showing $/tCO2 vs. tCO2/km, or $/passenger km traveled vs L/km charts to capture full life cycle costs (vehicle capex + fuel + opex). Also not clear if same vehicle class assumed (mid sized LDvs? Compact cars? Keep consistent	Accept. We will try to improve figure.
4340	8	38	8	38	11	legend is missing "G-adv" label? What does it mean??	Accept. We will clarify (advanced gasoline).
13881	8	38	16	38	24	If discount rate is discussed in page 25, mitigation cost for electric vehicle are provided without any indication on the discount rate hypothesis used. It seems that IEA (reference provided) takes a quite low 3% discount rate, which could explain the relatively low mitigation cost. It could be useful to discuss the effect of high discount rate on deployment	Accept. We will try to improve text.
13897	8	38	16	38	24	Only one reference is provided for EVs and PHEVs mitigation cost. Here is another reference, with much higher costs: Oscar van Vliet, Anne Sjoerd Brouwer, Takeshi Kuramochi, Machteld van den Broek, André Faaij, Energy use, cost and CO2 emissions of electric cars, Journal of Power Sources, Volume 196, Issue 4, 15 February 2011, Pages 2298-2310, ISSN 0378-7753, 10.1016/j.jpowsour.2010.09.119	Accept. We will try to incorporate new, authoritative references.
17774	8	39				retype the table; also there is another table with the same table number	Accept. We will correct this.
15842	8	39	11			why have efforts been usuccessful? Important to know	Accept. We will clarify.
2760	8	39	12	39	14	In addition to black carbon, diesel engine emission problems include other particles etc. These are not solved by liquid biofuels, i.e. biodiesels, synthetic biodiesels and pure plant oils, even if they can reduce lifecycle GHG emissions. But these problems can be solved by using gaseous fuels (renewable methane and bio-DME) in the diesel engines. Those fuels also reduce lifecycle GHG emissions compared to biodiesels, synthetic biodiesels and pure plant oils.	Accept. We will try to improve text if we can find good references for it.
2458	8	39	15		23	This is almost a repeat?	Accept. We will amend text to improve it.
3837	8	39	15	39	23	This is another place where the technology discussed in Pacca and Moreira, 2011 could be considered for analysis. - Pacca, S. and J. R. Moreira, 2011. A Biorefinery for Mobility? Environ Sci Technol. 2011 Nov 15;45(22):9498-505.	Accept. Thanks for the reference.
16322	8	39	15	39	15	The phrase "renewable- and non-renewable-electricity based" seems redundant and shall be deleted.	Accept. Will amend text.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
2761	8	39	17	39	19	Here the 20 % limit means liquid biofuels. The EU expert group on future transport fuels has estimated (in January 2011) that biogas (BG) and synthetic biogas (SBG) resources in the EU are larger than transport energy consumption in the EU. And still biomethane resources are very small part of all renewable methane resources. Solar and wind methane are much larger: their use also solves the storage problem of intermittent renewable energy sources (also Chapter 7 issue, see comment 59). In Finland 40 % share of renewable methane in transport energy consumption in 2050 has been proposed in a sustainable development path. Most would be wind and solar methane because they have crucial contribution to sustainable energy system. BG has been used commercially in transport in Finland and Sweden since 1941. SBG use in transport has been demonstrated in Austria since 2009 and wind methane use in transport has been demonstrated in Germany since 2009. Commercial SBG production for transport will begin in Sweden in 2013 and commercial wind methane production for transport will begin in Germany in 2013.	Accept. We may try to amend text but we really need literature to back this.
5342	8	39	17	39	18	~20% is in IEA scenario but this is not indicative of what is likely or desirable. If ILUC is ignored there could be much more biofuels, but if ILUC is addressed there could be much less. Also UK Committee on Climate Change analysis indicates over the longer term bioenergy should be prioritised in other sectors, and zero-emission vehicles deployed to decarbonise road transport. See CCC (2011) Bioenergy Review. http://www.theccc.org.uk/reports/bioenergy-review	Accept. We will try to improve text.
12904	8	39	17	39	18	This number might be outdated due to recent scientific findings on the non-sustainability of biofuels.	Accept. We will try to find more recent literature.
16323	8	39	17	39	18	This sentence should clarify the region where it holds true, e.g., at the global level.	Accept. We will clarify.
16338	8	39	17	39	18	Takeshita (T. Takeshita, 2009. "A Strategy for Introducing Modern Bioenergy into Developing Asia to Avoid Dangerous Climate Change." Applied Energy 86 (Suppl. 1), pp. 222-232) estimated that the amount of biomass feedstocks that can be used for energy purposes without conflicting with other biomass uses such as food production would decrease significantly in the second half of the century because of the growth of food demand, particularly in now-developing regions. Therefore, it is likely that the share of biofuels produced from plantation-based feedstocks will not be so high in the long term.	Accept. We will improve text.
3836	8	39	2	39	4	Please, explain the meaning of all vehicles classes.	Accept. We will clarify.
16324	8	39	24	39	24	The phrase "varies across regions and raw materials" should be modified to "varies across regions, raw materials conversion processes, and final products".	Accept. Thanks. We will modify.
13117	8	39	31	39	34	This paragraph (Emissions from EVs ,,,,,,,,,ICE-based vehicles) is not necessary. Similar paragraph is seen line 40 page20 . Please cut it for simplicity.	Accept. We will try to improve text. But a reference to electric vehicle is important here since this section is about the carbon intensity effect.
4422	8	39	32	39	34	The point of WTW emissions from EV being linked to the carbon intensity of power generation was said earlier in p 20, line 42.	Accept. We will cross-reference with there. But it is important to have this in here, as this subsection is about carbon intensities.
2457	8	39	5		9	With statements like this, it is very hard to see transport making any substantial contribution to CO2 stabilisation targets - if 2% fuel efficiency is set against a growth of 4.8% in aviation - these inconsistencies need to be reconciled if the document is to have any credence.	Reject. There seems to be no inconsistency here, as this part of the text only refers to aviation. We are simply relying on the literature available.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
17723	8	39	8			does this mean that there must be a reduction in air traffic to meet climate change targets, even with the most optimistic scenarios for efficient technologies?	Accept. Thanks for the comment. In fact there are other possibilities as well, as low/zero carbon fuels that could be used in aviation,. We will try to amend text.
6487	8	39	11	39	14	One of the main reasons why dieselization of fleet is happening in Asia is the availability of subsidies which keeps the price of diesel less than gasoline. This has a negative impact on carbon emissions due to rebound effects and black carbon emissions.	Reject. Thanks for the comment but it does not conflict with what is already in the text.
2459	8	40				This table is important - and perhaps needs some sort of commentary on risks and returns	Accept. We will try to incorporate that.
16325	8	40				For the upper left cell (raw 2, column 2), hydrogen should be included in fuel switch options.	Accept. We will amend.
16326	8	40				For the cell (raw 3, column 2), the assumption that electricity can account for 100% of the global transport fuel demand is clearly unrealistic. As described in the IEA Energy Technology Perspectives 2008 (IEA, 2008), long-haul trucks, international shipping, and aircraft are unlikely to operate on electricity.	Accept. The same way as we have amended the text already we will amend table.
16327	8	40				For the cell (raw 4, column 2), it should be confirmed that 17.3% share holds for the entire transport sector or the specific transport subsector (e.g., the road transport subsector) in Brazil in 2010.	Accept. It is for the entire transport sector as indicated in the table.
16328	8	40				For the cell (raw 3, column 3), the phrase "50% improvement by 2050" should be modified to "50% improvement from XXXX to 2050".	Reject. This is a rough number. It is up to 50% as compared to today. But table will be improved anyway.
16329	8	40				For the cell (raw 4, column 3), the same comment as No. 58 is applied.	Reject. This is a rough number. It is up to 51% as compared to today. But table will be improved anyway. and, in NEW VEHICLES….row 3 column 3 refers to stock
17724	8	40	16			what is meant by "consciousness"?	Accept. We will modify/clarify text. We will change to "environmental awareness"
4423	8	40	17	41	2	This paragraph on externalities should join the earlier discussion on externalities. The sentences on p41 could be removed as they repeat the information given previously with regard to externalities from road transport.	Accept.
15843	8	40	2			mitigation options: missing H2 as a fuel. also add smaller/lighter/aerodynamic vehicles as another efficiency option. For Potential: Electric vehicles could only be used for LDVs - not practical for HDVs. 100% of global demand is very unlikely.	Accept. We will amend table.
4299	8	40	3			We should also add the potential about carbon intensity (percentage of GHG emission reduction) to the table8.6.2. Also, please add the potential of GHG reduction by comprehensive four columns.	Accept. We will amend table.
5248	8	40	5	40	16	clear reasons for wishing to change existing habits … adapt lifestyles and transport behaviour? What do the authors think rural dwellers do, faced as so many of them are by high transportation costs to meet their basic needs of food, etc? Again, an urban mentality seems to override all in this chapter.	Taken into account
2700	8	40	4	40	17	The sub-header 'socio-economic effects' does not fit and neither does the first paragraph of 8.7.1 I would recommend that this introductory paragraph basically focus on externalities, as this is what the following sections are about - not about socio-economic effects.	To take into account.
17888	8	41				Transportation affects every aspect of our lives and daily routine, including where we live, work, play, shop, go to school, etc. It has a profound impact on residential patterns, industrial growth, and physical and social mobility. However, uUnsustainable transport leads to an increase in the burden of disease in the short and in the long-term due to air and noise pollution, consequences of reduced physical activity, social disruption, and climate change.	Agree.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
17725	8	41	12			Perhaps this section could be reviewed and re-written with input from public health colleagues. There are plenty of recent, primary references on the health effects of vehicle emissions that would be worth citing, for instance. The list reported here of symptoms associated with emissions is a little confusing, and may be inaccurate. Costing the impacts of air pollution, compared with those of congestion, rests on judgements, necessarily arbitrary , about the value of human life. And there is a host of references on the health gains resulting from more active transport, apart from Woodcock and Trubka.	Taken into account
4038	8	41	14	41	15	suggested wording: "lead particles in few countries (UNEP 2011) and particulate matter (PM) that includes, among others, black carbon". UNEP 2011=Global Status of Leaded Petrol Phase-Out. United Nations Environment Programme, Nairobi. http://unep.org/transport/pcfv/PDF/leadprogress.pdf (accessed 26 May 2011)	Accept. We will amend.
17726	8	41	34			What has happened historically is that the incidence of road crash injury rises with increasing motorized traffic, but only to a point, and then injury incidence diminishes with further increases in traffic. The peak occurred in Australia around 1970, for example.	Taken into account
8026	8	41	35	41	35	Not every year 1.27 mio people are killed - please specify the year for which this was valid	Accept. We will clarify.
8027	8	41	4	41	4	For some scientists (e.g. Rothengatter) the costs from congestion are no externalities because they are internalised - the drivers who cause them have the 'damage'.	Accept. We will modify/clarify text.
16330	8	41	6	41	10	This sentence should clarify the time point where it holds true, e.g., in 2000.	Accept. We will clarify.
2460	8	41				Issues relating to quality of life are mentioned, but not picked up in the text - and there is very little on substitution of trips by technology or through doing many different things on one trip (chaining) - or on the need to keep distances as short as possible - this again relates to the travel time budget where people have substituted faster modes for slower ones - and they can travel further - but the costs are that more CO2 and energy is used.	Reject. Beyond the scope of the section. Refer to sections 8., 8.4, 8.10.
2461	8	41				These figures are very dated - can newer ones be used - or a note that most are over 10 years old - there is also dispute over how they have been calculated and whether any transport system allows congestion free travel - what are society's expectations?	Accept. To take into account
8205	8	41	3	41	10	The average percentage of traffic time lost accounded to GDP in the world as whole is lacking.	Reject. Out of the scope of this Chapter.
13882	8	41	4	41	10	it would be interesting to present in parallel the costs (or benefits) -for individuals and for an economy/society - associated with slower transport modes (walking, cycling, bus, 30 km/h urban zones)	Reject. This is outside the scope of the section
2462	8	41				See latest WHO (2012) paper on transport and health	Accept. Thanks for the reference.
8206	8	41	11	41	32	I do not think there are enough literature reviews in this section (8.7.1.2 Public Health). There are much more other literatures that have not been well exmined.	Reject. It is not the purpose to cover a public health review. We seek to providesome examples of cobenefits of mitigation co-benefits and risks.
8374	8	41	11			The impact of road transport on public health in emerging urban areas is not studied much and the impact of cutting emissions on people's health is still under researched. The side-effects of noise and vibrations on human health and the fauna is another area with knowledge gaps.	Reject. This is outside the scope of the section
17956	8	41	25			Are these numbers based on scenarios rather than experience? If yes, simple past is not the appropriate tense.	Editorial
8375	8	41	47			About 10 per cent of global population have a car so there is another 90 per cent that are not car owners (not only the poorest ones). Many of them perhaps some 75 percent are women, children, elderly and so on. PIs re-write this phrase. □	Noted
2463	8	41				Note this is particularly important for young people	Noted

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
4424	8	41	36	41	37	Road traffic injuries kill more people than those who die from those three diseases combined or individually?	Noted
2464	8	41				Part of this is the availability of space (in cities) for transport - often very limited (under 10% in most Chinese and other Asian cities) and how this is used - for people, for traffic, for work, for markets, for open space etc - it is an allocation and ownership question - the availability of space is cities for traffic is not mentioned here (cp Ch12).	Adress to coord Ch 12
4425	8	41	42	41	47	I appreciate that the costs associated with land use in car-dominated cities are externalities. However, this section may be placed better when discussing the urban form more generally.	Accept
2701	8	41	42	43	8	Note that rail can be a barrier also, but is normally less intrusive than high-speed roads. Airports also consume very large quantities of land. I would recommend a discussion of the land take associated with parking (see the work of Donald Shoup for more on parking).	Noted
15844	8	42	10			why don't more cities use congestion charges?	Refer to 8.10
4426	8	42	15	42	21	The benefits of reducing congestion on human health in general and in Australia in particular were given earlier on p 41, line 31. Most of this paragraph discusses congestion which could be placed with 8.7.1.1.	Accept
16331	8	42	17	42	21	The two sentences "Beyond time saving, … due to greater walking (Trubka et al., 2010)" should be deleted or moved from this section, because these sentences don't have a relation with climate change mitigation as a co-benefit and because the latter sentence already appears in Section 8.7.1.2.	Accept
16332	8	42	28	42	34	The four sentences "Strategies that target … exacerbated in them (Lindley et al., 2006)" should be moved to Section 8.7.2 because they mention climate change mitigation as a co-benefit. I propose that the co-benefits of climate change mitigation on transport-derived local environmental issues and health effects be mentioned in this section (Section 8.7.3) in the following manner: Takeshita (T. Takeshita, 2012. "Assessing the Co-Benefits of CO2 Mitigation on Air Pollutants Emissions from Road Vehicles." Applied Energy 97, pp. 225-237) concluded that the co-benefits of climate change mitigation on local air pollutants emissions from road vehicles would certainly exist. He estimated that global cumulative emissions of SO2, NOx, and PM from road vehicles during the period 2020-2100 in the 400 ppmv CO2 stabilization scenario would be reduced by 22.1%, 10.8%, and 14.4%, respectively, compared to the no climate stabilization scenario.	Accept
2465	8	42	30			Is this PM25?	Editorial
4039	8	42	31			after "black carbon" add "(UNEP and WMO 2011)". Reference: UNEP and WMO (2001). Integarted Assessment of Black Carbon and Tropospheric Ozone. Available at http://www.unep.org/dewa/Portals/67/pdf/BlackCarbon_report.pdf	Accept
7401	8	42	35	42	38	These lines shoul belong to section 8.7.4 discussing transport technologies.	Accept
6388	8	42	35	42	38	This paragraph could use editing, both for readability and for content: it's not clear what this paragraph is trying to convey. Also, it seems out of place here. It might be more at home in a section on risks and uncertainties (w.r.t. mitigation options)	Accept. We will rewrite
16333	8	42	35	42	38	The two sentences "To evaluate … and implementation (Larsen et al., 2009)" should be moved to Section 8.7.4 because this section focuses on the potential risks of biofuels deployment.	Accept
16334	8	42	40	42	42	The two sentences "Improving vehicle efficiency … mobility problems (Steg and Gifford, 2005)" should be moved to Section 8.7.3 because they mention environmental effects.	Accept
2466	8	42	41		42	Word missing here? 'create'	Editorial
8207	8	42	7	42	7	Limited literature review: "Creutzig and He, 2009" is highly and sololy refered in this section to discribe China's case. Please review and refer more literature to avoid risk.	Accept. Thanks. We will modify. Agree. MAYBE HAO CAN PROVIDE SUITABLE REFERENCES
8208	8	42	7	42	7	"7.5% to 15% of GDP". This number is big. Please refer other literatures (studies) to avoid mistake.	Accept. We will rewrite
13883	8	42		42		This section seems not to fit well. Main points already presented in other well structured sections.	Accept.
2702	8	42	22	42	34	This section is repetitive of other parts of the report, suggest it be deleted.	Noted

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
17959	8	42	23	42	31	This paragraph has to my mind rather introductory character to 'climate change mitigation as a co-benefit' and might be placed at the beginning of section 8.7.2.	Accept
8389	8	42	26		27	This phrase is feeble and will have to re-phrased. Passengers often have to go by buses that are old, insecure and poorly maintained.	Accept
17960	8	42	32	42	34	This paragraph has to my mind rather introductory character and would be well suited to be placed before section 8.7.1.1.	Noted
17961	8	42	35	42	38	This paragraph rather belongs to the assessment of biofuels and seems somehow misplaced here.	Accept. Agree
2703	8	42	39	42	46	This section is not needed. Please delete.	Reject but we will rewrite. Agree
6489	8	42	40	42	42	suggest rewording following statement – “Technological solutions, improved fuel efficiency, reduction in noise levels, may improve environmental quality but mobility problems (Steg and Gifford, 2005). “ - to - “Technological solutions, improved fuel efficiency, reduction in noise levels, may improve environmental quality but would increase mobility problems ". and the para needs editing.	Editorial
5289	8	43	17			ADD: Some modern anthropological works suggest strongly that permanent modal change is caused by a rupture (induced or accidental such as car engine failure) in habits, followed by positive reinforcements (from pleasure reading in the TC). Permanent change seems more difficult to achieve without both factors. (A. Rocci. De l’automobilité à la multimodalité ? Analyse sociologique des freins et leviers au changement de comportements vers une réduction de l’usage de la voiture. Le cas de la région parisienne et perspective internationale. Dec. 2007. PhD thesis, INRETS ; S. Vincent. « L’altermobilité : un geste écologique ? » In S. La Branche, Le changement climatique dans tous ses états, Presses universitaires de Grenoble, 2008.	Reject. Out of the scope of this Chapter.
17775	8	43	2			any reference for this statement?	Accept. We wil delete the sentence
6389	8	43	2			It's unclear what this sentence means, and in any case, it's doubtful this claim can be supported as written.	Accept. We will delete the sentence
12905	8	43	31			This paragraph does not seem to be related to the subject of the subsection (8.7.5 Public perceptions) and could thus be deleted or moved to another subsection.	Accept. We will rewrite
2704	8	43	1	43	36	The premise of this section is that people face barriers to altruistic voluntary actions to reduce climate change. People do respond to economic incentives, and this should be the focus of any discussion, not bemoaning the fact that people are not altruistic in their behavior.	Accept. We will rewrite
17963	8	43	2	43	10	This paragraph discusses structural and psychological and should thus be placed in the barrier discussion in section 8.8.3.	Accept. We will rewrite
8377	8	43	31		33	Food security and access to medical care and other of the human basic human needs is a core issue in most countries of world. Conditions of life are rapidly changing and the sector of transport will have to respond to the human basic needs of the growing population such as access to food, work, medical care and clean air. Given the importance of the issue and it should be stressed earlier on.	Noted
17964	8	43	31	43	36	According to the classification of different types of risks provided by Section 6.7, this paragraph could be moved to the risk section 8.7.4.	Accept. We will rewrite

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
9912	8	44	1			An analysis of 104 empirical studies of innovation to change showed the following barriers, that could refine and structure the discussion of barriers: Issues of resourcing (76%), for instance, “not enough resources” (Post and Altman 1994), “lack of adequate resources such as time and staff” (Adams and McNicholas 2007), limited or no budgeting (e.g. Harris 2000 and Anumba et al. 2006), access to capital and lack of time (Rohdin and Thollander 2006). Issues of capabilities (75%), for instance, “low technology literacy” (Stewart, Mohamed and Marosszeky 2004), “ill-equipped in terms of training and expertise” (Whitaker 1987), “employees are not trained” (Tamimi and Sebastianelli 1998), “lack of understanding” (Waldron 2005), “lack of technical skills” (Rohdin and Thollander 2006), “lack of skill, knowledge and expertise” (Kirkland and Thompson 1999), etc. Issues of communication (64%), for instance, “communication barriers” (Heide, Grønhaug and Johannessen 2002), “communication overload and distortion” (Allen 2002), “lack of communication within the team” (Attaran and Nguyen 1999), “lack of communication among those sharing responsibility for different aspects” (Kunda and Brooks 2000), “poor communication practices that damaged employee commitment to projects” (Jacobs et al. 2006), “tension among departments arising from the incompatibility of actual or desired responses” (Aggarwal 2003), etc. Issues of organizational structure (62%), for instance, bureaucracy (e.g. Molinsky 1999; Borins 2000; Abdul-Hadi, Al-Sudairi and Alqahtani 2005), “salary structure” (Al-Qirim 2007), “complexity, centralization, and formalization”(e.g. Allen 2002), “rigid organizational boundaries” (Butler 2006), “departmental fortresses” (Cicmil 1999), and organizational structure (e.g. Scarbrough and Lannon 1988; McGaughey and Snyde 1994; Yauch and Steudel 2002). Abdul-Hadi, N., Al-Sudairi, A. und Alqahtani, S. (2005): Prioritizing barriers to successful business process re-engineering (BPR) efforts in Saudi Arabian construction industry, In: Construction Management \& Economics, Vol. 23, Nr. 3, S. 305-315. Adams, C.A. und McNicholas, P. (2007): Making a difference: Sustainability reporting, accountability and organisational change, In: Accounting, Auditing and Accountability Journal, Vol. 20, Nr. 3, S. 382-402. Aggarwal, N. (2003): Organizational Barriers to Market Orientation, In: Journal of Management Research, Vol. 3, Nr. 2, S. 87-97. Allen, R.Y.W. (2002): Assessing the impediments to organizational change: A view of community policing, In: Journal of Criminal Justic, Vol. 30, Nr. 6, S. 511-517. Al-Qirim, N. (2007): The adoption and diffusion of E-commerce in developing countries: The case of an NGO in Jordan, In: Information Technology for Development, Vol. 13, Nr. 2, S. 107-131. Anumba, C.E.H., et al. (2006): Understanding structural and cultural impediments to ICT system integration: A GIS-based case study, In: Engineering Construction & Architectural Management, Vol. 13, Nr. 6, S. 616-633. Attaran, M. und Nguyen, T.T. (1999): Design and implementation of self-directed process teams, In: Management Decision, Vol. 37, Nr. 7, S. 553-561. Borins, S. (2000): What Border? Public Management Innovation in the United States and Canada, In: Journal of Policy Analysis and Management, Vol. 19, Nr. 1, S. 46-74. Butler, J.C. (2006): Ten Lessons Learned: Data Warehouse Development Project, California Department of Fish and Game, In: CrossTalk: The Journal of Defense Software Engineering, Vol. 19, Nr. 10, S. 16-20	Accept. We will rewrite
2771	8	44	4	44	6	Many developing countries have showed example on how to decouple crude oil based mobility from wealth generation. Natural gas based traffic in Pakistan (> 80% share in road transport) and Bangladesh (>60%) are two examples. Of methane used in transport over 60 % in Sweden and 100 % in Iceland is renewable.	Noted
16335	8	44	5	44	5	Significantly less increases in what? It should be clearly described.	Accept. But we would need literature to amend text.
13884	8	44		51		This section need to be linked with chapter 16 "cross-cutting investment and finance issues" in order to avoid overlapping between chapters	Noted. Section has been significantly restructured and rewritten. Section 8.8.2 links to Ch.16.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
13885	8	44		51		Methodological barriers should be discussed: lack of harmonized / standardized methodologies to assess transportation GHG emissions; lack of "Measurable, Reportable, Verifiable" (MRV) procedures; lack of methodology to assess cost-effectiveness of transportation (+land use) package (see Lefèvre, B., 2012, Incorporating cities into the post-2012 climate change agreements, Environment & Urbanization, vol 24(2))	Useful reference if transport infrastructure included
13886	8	44		51		This section could mention that there are already existing relevant decision-helping tools to take up the climate change challenges in the transportation (+land use) sector : LUTI models (see Wegener, M., Furst, F., 1999, Land use transport interaction : State of theart, Deliverable 2a of the project TRANSLAND of the 4th RTD Framework Programme of European Commission; Masson, S., 2000, Les interactions entre le systeme de transport et systeme de localisation en milieu urbain et leur modelisation, These pour le doctorat de sciences economiques, Mention economie des transports, Dir. Bonnafous, A., Universite´ Lumiere Lyon 2, Faculte de Sciences Economiques etde Gestion; Lefèvre, B., 2007, Long-term energy consumptions of urban transportation: A prospective simulation of "transport - land uses" policies in Bangalore, Energy Policy, Volume 37, Issue 3, March 2009, Pages 940-953)	Agree. It could go in here or in 8.4
13887	8	44		51		The rebound effect (and the lack of knowledge on its determinants) should be discussed here. See Schipper, Lee & Grubb, Michael, 2000. "On the rebound? Feedback between energy intensities and energy uses in IEA countries," Energy Policy, Elsevier, vol. 28(6-7), pages 367-388, June; Small and van Dender, 2007, Fuel Efficiency and Motor Vehicle Travel: The Declining Rebound Effect, Energy Journal, vol. 28, no. 1 (2007), pp. 25-51.	Agree. Helpful references provided.
3165	8	44	1			Section 8.8 is complicated and unfocused and the table uses a lot of space. It has lots of info but little analysis. integrate with table 8.10.1	Disagree. Cannot merge with a table just on Integration. Words not ticks are needed to explain Barriers and Opportunities.
2467	8	45				This is important - but it gives the impression that options are discrete alternatives - needs more on complementarity, the use of policy packages, and the phasing of implementation. More also needed on the 'soft' measures - car sharing, renting bikes and cars, use of technology for timetables and real time information, company plans, and involvement of all stakeholders in debates over low carbon transport. Also more needed on regulations and standards.	Agree. But this is not the place for 'complementarity', apart from mentioning it perhaps. These comments are also really about Policy section. All actions suggested are in the Table.
6491	8	45				8.8.1 Table , Page 45, Barriers in deployment of electric vehicles and even in discussion 8.3.3.2 Electricity and 8.3.2.1 Electric-drive road vehicles – please do consider the availability of limited electric supply in many developing cities. The blackout is very severe. A good example for this is the battery powered vehicles in Kathmandu. The movement of promoting electric vehicles started in early 1993. However even with great support from the government, the promotion of electric vehicles could not result in huge impact due to load shedding. There is a severe shortage of electricity and though electric vehicles low in number may or may not influence grid calculations (though vehicles are generally charged in night where the peak requirement is high..) but the charging becomes difficult. The other problem is the disposal of lead batteries.	Agree. Will add something.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
17130	8	45				COMMENT: Current Table8.8.1 contains technology and practice -Fuel carbon Intensity: Fuel switching 3 items (EVs and PHEVs, CNG, Biofuels) -Intensity: Energy Efficiency of Technology 1 item (Improve fuel efficient) -Structure: System infrastructure efficiency 9 items (6 Modai shift, 2 Urban planning, 1 System optimize) -Activity: demand reduction 3 items (1 Mobility service substitution 2 Behaviour change) This table describes many items of modal shift in 'Structure', but just 1 item in 'Intensity'. There should be more practice items such as eco-driving, road infrastructure to improve traffic flow, to improve on-road fuel efficiency as a stock-base of vehicles, but it only refers to new (sales-based) vehicles. ADD: Proposed texts in the table will be sent to comments@ipcc.ws3	Disagree. The items mentioned like Eco Driving are in the Behavior Change section and the road infrastructure to improve fuel efficiency is a highly contentious policy which we have proved to be a myth. Will amend
4064	8	45				Item 1. BEV and PHEVs. "Rapid increase in use likely over next decade…" This statement about "rapid increase…" is too optimistic given the significant barriers.	Disagree. It is very rapid so already toned down but Chevron may want it stopped altogether.
4065	8	45				Item 2. CNG and LNG. "Infrastructure available in some cities can allow a quick ramp-up of CNG and LNG vehicles." This is an optimistic statement. At best, the statement should be restated as "Infrastructure available in some cities can allow a quick ramp-up of CNG and LNG vehicles in the same cities.	Agree. Will change.
4066	8	45				Item 3. "Advanced and drop-in biofuels likely to be significantly adopted around 2020, mainly for aviation." We are already in 2012. For aircraft engine manufacturers to accept these new fuels, more testing will have to be done.	Unsure - will need to ask the team.
3589	8	45				It is almost impossible to read this table. Introduction in text would be better. Instead of separating the different policies it would be better to show a more pragmatic, realistic approach and to try integrate them.	Disagree. Its not the Policy section.
3838	8	45				Last row, 3rd. Column - Check wording.	Seems OK wording to me.
16336	8	45				Hydrogen fuel cell vehicles should be included in fuel switching options. Renewable electricity should be modified to low-carbon electricity because BEVs and PHEVs based not only on renewable electricity but also on nuclear-generated electricity and fossil-generated electricity with CCS can be viewed as effective fuel switching options.	Agree. Have changed in 1.
16337	8	45				The word "pof" might be "of".	Agree. Fixed.
4300	8	45				The external power supply(OLEV: Online Electric Vehicle) and Capacitor(CaEV) should be added in No.1 line (based on renewable electricity).	Noted. Not covered due to space constaints and limited role.
15845	8	45	1			In general this tabel is too long. Also, there is a disconnect between content and text in previous sections. Some content not discussed in text and vice versa, also several hand-waiving statements. Might combine tables 8.6.2 and 8.8.1 and streamline. Specific comments pertain to (row#, column #): (3,2): rapid increase in BEV and PHEV likely only in some OECD countries and China, not rest of world. Be more specific. (3,4) Another barrier are high carbon grids, (4,1): CNG infrastructure is not discussed in text. should add this; (4,5): opportunitie salso include low NG prices in US, HDVs	Disagree. Costs are not the same as Barriers and Opportunities. Will see if more on CNG infrastructure in text is needed.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
5290	8	45	1			To: BFs displacing gasoline, diesel and jet fuel; ADD TO BARRIERS: AND may increase inequalities due to impacts on food prices (the case of corn in Mexico)… To: MS by public transport displacing private motor vehicle use; ADD TO BARRIERS: AND time of transport + public perception of transportation modes To UP by reducing the distances to travel within urban areas, ADD TO BARRIERS: lack of diversity of services and high density centres with low density suburbs; To UP by reducing the distances to travel within urban areas, ADD TO OPPORTUNITIES: Favouring multifonctionality and polycentric urban lay out.	Agree. All suggestions added.
2705	8	45				Row 1: Under barriers for BEVs/PHEVs, emphasize the need to decarbonize electric sector. Row 2: CNG/LNG barriers, emphasize potential leakage of CH4	Agree. Both changed.
15846	8	46				(1,3): drop in fuels possible for road too, not just planes	Will check with team.
10771	8	46				Which paper by Fuglestvedt et al. 2009 is referred to? I cannot find it in the list of references.	Will find.
3839	8	46				1st. Row, 2nd column. Take care with first generation biofuel market share. Here it is stated as 2%. In the text it is 3% and in Chapter 7 - Energy Systems it is quoted as 5%!!!	Will check and fix.
3840	8	46				Please, consider also the possibility of using biofuels and bioelectricity produced from the same feedstock and at the same site. This is the case of sugar cane ethanol. See Pacca and Moreira, 2011. - Pacca, S. and J. R. Moreira, 2011. A Biorefinery for Mobility? Environ Sci Technol. 2011 Nov 15;45(22):9498-505.	Agree. Added this. Agree
17966	8	46				According to SRREN, the global share of biofuels on total road transport fuel was 3% in 2009. Has it dropped since?	Will check. Will amend
2706	8	46				Row 3: BF barriers, instead of 'environmentally poor', state indirect land use impacts and affect on food prices. Row 4: ICE technology, under barriers list problem of on-road performance not matching test results on fuel economy.	Agree. Added.
13889	8	46	1	46	1	Concerning EV technology, no mention is made of emerging new business models, especially those based on sharing (and not on private ownership). It could represent a way to facilitate their deployment. See: Thomas Budde Christensen, Peter Wells, Liana Cipcigan, Can innovative business models overcome resistance to electric vehicles? Better Place and battery electric cars in Denmark, Energy Policy, Volume 48, September 2012, Pages 498-505, ISSN 0301-4215, 10.1016/j.enpol.2012.05.054; Fabian Kley, Christian Lerch, David Dallinger, New business models for electric cars—A holistic approach, Energy Policy, Volume 39, Issue 6, June 2011, Pages 3392-3403, ISSN 0301-4215, 10.1016/j.enpol.2011.03.036; Alessandro Luè, Alberto Colorni, Roberto Nocerino, Valerio Paruscio, Green Move: An Innovative Electric Vehicle-Sharing System, Procedia - Social and Behavioral Sciences, Volume 48, 2012, Pages 2978-2987, ISSN 1877-0428, 10.1016/j.sbspro.2012.06.1265.	Agree. Have added.
15847	8	47				(2,4) and (3,4): weather (e.g., cold climate?) and urban vs country environment can affect cycling and walking as well	Agree. Added climate.
3421	8	47	6			system infrastructure, cycling infrastructure: cycling requires physical measures to create perceived cycling safety and to take these measures in a coherent, integrated way to show that cyclists are being taken serious. This comprises more than infrastructure; it is about creating a cycling system, a network that is safe, direct, comfortable, correctly signed and contains parking facilities. Linking to/integrating with public transport certainly is an opportunity to be mentioned in order to create a serious alternative to private car use. See the Cycling-Inclusive Policy Development - A Handbook. Interface for Cycling Expertise, GTZ, April 2009 http://www.bikepartners.nl/index.php?option=com_content&task=view&id=166&Itemid=	Agree. Added.

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3422	8	47	7			the same requirements of safe, direct, comfortable, correctly signed and short waiting times apply to walking. Also, tapping the potential of integration with public transport is an opportunity. Www.livingstreets.org.uk/expert-help/resources/	Agree. Added.
2707	8	47				Row 6: Opportunity for cycling, source of growth is rapid deployment of city-bike sharing systems. Row 7: Walking, long-term, I would not say 'significant' displacement of MV trips, much of this depends on transit availability and is very dependent on car ownership levels (reference: Sehatzadeh, Bahareh, Robert B. Noland, and Marc D. Weiner, "Walking frequency, cars, dogs, and the built environment", Transportation Research A: Policy and Practice, 45, (2011), 741-754.)	Agree. Added bikeshare. Disagree on walking, it can be significant.
5209	8	48				In line 10: why not add that high speed rail also competes with private car, which is does efectively and would, if high speed rail is well integrated in conventional rail and urban public transport, offer a door-to-door alternative for private car use.	Agree. Changed.
4301	8	48				As the transport technology or practice of modal shift of freight, I propose adding electric cargo train system or external power supply convoy.	Agree. Added. Like 1072 not clear what is being proposed here. A large proportion of railfreight already moves on electrified services.
2708	8	48				Row 8: Success of TOD highly dependent on good quality transit. Row 9: Parking, barrier is that planning codes typically require too much parking (see Donald Shoup). Row 10: Plane vs. Rail: there was no discussion of safety as a barrier in text - what evidence is there that HSR has a safety problem?	Agreed to all three. All fixed.
15848	8	49				(5,2):show some data on traffic density or at least a reference	Agree. Added eg London.
2709	8	49				Row 13: Freight opportunity - note that private sector welcomes efficiency improvements. Row 14: Communications, note that instead of communciations substituting for transport it can induce new trips (see work or Mokhtarian and colleagues). This issue was not discussed in text.	Agreed. Changed. Point about private sector welcoming efficiency improvements hardly needs stating. Links between communication and transport could be elaborated. need more discussion of the impact of just-in-time and the opportunities of relaxing it to cut energy use and emissions.
2432	8	5		6		A general point on the executive summary and Ch8 is that scale of the problem being faced in transport with respect to CO2 - the growth in travel that is taking place, the time needed for real reductions, the lack of progress made so far (the tenor is too optimistic about the future, particularly when past progress is reviewed), the inertia and huge costs sunk in the current mobility system, and the difficulty of implementation due to institutional problems - lack of powers and too many intrerested parties.	Good point for 8.1
16266	8	5	10	5	12	Schafer & Victor (A. Schafer and D.G. Victor, 2000. "The Future Mobility of the World Population." Transport Research Part A 34, pp. 171-205) projected a continuous increase in transport demand in all OECD regions through to 2050. The phrase "be reversed" might be overstatement.	Useful comment but reference too old.
8863	8	5	14	5	20	It is not clear how the list achives 'Transport mitigation measures' . New technologies etc can achieve reductions in emissions via policies that enforce them. I think this phrase should be replaced by 'mitigation of GHG emissions in the transport sector' or similar. Also, point 1) 'deploying new technologies for low-carbon fuels' seems to exclude just low-carbon fuels and just new carbon fossil fuel based technologies. It might be better to say 'deploying new technologies AND/OR low-carbon fuels'	Will amend
11597	8	5	14			delete: "measure"	Accept
3985	8	5	14	5	21	Add "GHG" in between "Transportation Mitigation" otherwise is sounds like transport demand reduction	Accept

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15763	8	5	15			There is a general over-confidence by low carbon fuel standard supporters and advocates that low carbon fuels are just around the corner. On a global basis, one can't assume that Brazilian sugarcane ethanol will be available for everyone.	Low C fuels can also include green electricity and hydrogen
14740	8	5	15	5	17	Please order measures along impact/viability: 1st efficiency and technology switch, 2nd fuel switch	Accept
17120	8	5	18	5	20	DELETE: modal shift and the reduced need for motorized transport relative to a reference case. [High agreement; robust evidence]REVISE TO: well harmonized multi-modal transport.	Declined. Phrase does not include reduced demand
11598	8	5	2	5	13	I think it would be fair to highlight as follows: "The biggest emitters of GHG in the transport sector are LDV, trucks, aircraft and marine ships."	Re-ordered
15803	8	5	2	5	3	statement of doubling is too vague. Should give range based on say 10-50-90% probability	Details in main text. Usage of doubling is OK for summary.
6473	8	5	2	5	4	The argument on emissions becoming double by 2035 has not been provided in the chapter	Agree. Text modified
2258	8	5	2	5	4	There is no evidence that emissions of greenhouse gases hav any harmful effect on the climate. This information is thus not a cause for concern so the whole Chapter is unnecessary. It is also surprising that while the supposed, unproven theory relies on changes in the atmospheric concentioin of greenhouse gases. you seem here to be exclusively concerned with emissions. which are not necessarily related to concentrations	Rejected. This comment refers to content that is covered by IPCC Working Group I.
14741	8	5	21	5	41	The distinction in demand and supply is a bit odd. I would recommend to follow the scheme: 1) Vehicle technology (i.e. efficiency improvement, technology switch - reducing energy intensity); 2) Fuel switch (i.e reducing carbon intensity) 3.) Avoid/Shift strategies (i.e. behavioural measures to reduce activity)	Will amend to match ASIF structure
5182	8	5	22	5	35	Transport behaviour is very much shaped by infrastructure, transport system speeds and prices. Supply indeed needs to become more efficient with energy and using lower carbon energy sources, but the main challenge is to change the infrastructure. If you want people to use rail on medium distances than invest in rail and not in additional slots on airports. Strong example is the fast change from air to rail on the Madrid-Barcelona route, that went far beyond scientific prognoses of an absolute maximum of 35% between rail in rail+air market (Roman, C., Espino, R., & Martin, J. C. (2007), Competition of high-speed train with air transport: The case of Madrid-Barcelona. Journal of Air Transport Management, 13, 277-284) (while it reached already 60% by 2011 just after opening of the line (McWhirter, A. (2011). No pain by train. Available at: http://www.businesstraveller.com/archive/2011/may-2011/special-reports/no-pain-by-train#). So it really is important to add supply on the level of infrastructure choices as well. The very large investments in high speed rail in Japan, China and Europe have strong impacts on modal split and carbon emissions. Furthermore there is an important link between electric rail and supply of electricity, which means that sustainable energy production directly affects the emission factors of rail (e.g. see Åkerman, J. (2011). The role of high-speed rail in mitigating climate change - The Swedish case Europabanan from a life cycle perspective. Transportation Research Part D: Transport and Environment, 16, 208-217).	Agree Modal shift driven in part by investment
3986	8	5	23	5	24	The suggestion of CNG as a lower carbon transportation fuel needs qualifying. CNG from hydrofracturing may not be significantly lower than gasoline.	Amended
17124	8	5	24			ADD: Good quality of fuel (e.g. lower sulphur in the fuel) is critical for advanced powertrain with aftertreatment system. High sulphur level in the fuel may penalize fuel economy penalty to regenerate the catalyst. INBETWEEN: redece emissions. & New technologies (UNEP. The Role of Low Sulphur Fuels. Available at: http://www.unep.org/transport/pcfv/PDF/SulphurReport.pdf)	Too detailed or Exec Summary. Add to 8.3.3

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16267	8	5	24	5	24	It is better to modify the phrase "such as to compressed natural gas (CNG)" to "such as to biofuels" because substitution of biofuels for petroleum products is easier to implement and can reduce larger amount of GHG emissions from the transport sector.	Some debate on biofuel emissions covered elsewhere - but CNG should be mentioned. Agree.
15764	8	5	26		31	Some of these technologies are currently very expensive. When the business model for developing countries is the Tata Nano, it's hard to envision a lot of expensive, advanced technologies for non-OECD countries. This is especially true for areas that have price controls on gasoline and diesel.	Too detailed for Exec Summary. Add to 8.3.3 - fair comment.
17121	8	5	26	5	28	ADD: Reduced energy intensity on road can be achieved by eco-driving and improved traffic flow. AFTER: "Reduced energy intensity can result from 26 improved designs of internal combustion engines, power trains and vehicles, including the use of 27 new lightweight materials and better aerodynamics." [8.3.5]	Point included
2725	8	5	28	5	31	It is better to say: "Sustainable renewable energy based propulsion systems (such as battery electric, hydrogen and methane fuel cell, and various heat engine drivetrains) coupled with low-CO_2 energy carriers (electricity, methane and hydrogen produced from renewable energy sources) can reduce lifecycle greenhouse gas emissions almost to zero." All these already exist in the market.	Not only renewable energy for low C carriers.
18898	8	5	28	5	29	It is my understanding that with the e-bikes in China this is actually not anymore a matter of the future but already practiced today. Please consider changing taking this into account.	Agree. Reworded. I think the original sentence "in the longer-term..." is a statement for vehicles.
16268	8	5	29	5	29	It is better to modify the phrase "coupled with low-CO_2 energy carriers (electricity, methane and hydrogen produced from low GHG sources)" to "and/or low-CO_2 energy carriers (electricity and hydrogen from low GHG sources and biofuels)".	Agree. Amended
16264	8	5	3	5	3	According to the IEA Energy Technology Perspectives 2010 (IEA, 2010, p. 73), the share of the transport sector in the global CO_2 emissions is projected to be almost unchanged from 2030 to 2050 in the Baseline scenario, although it is projected to increase from 2030 to 2050 in the Blue Map scenario. A further explanation should be added to this view.	Agree. Reworded. Scenarios covered in Ch 6.
15862	8	5	32			"iso-butanol drop-in fuel for aircraft" – hard to see this happening since isobutanol has a lower energy density than jet fuel	Agree, But not necessarily for aircraft
15765	8	5	32		33	Is iso-butanol truly a drop-in fuel for aircraft? Seems like there would have to be a lot of work done before that would be approved for use. Plus, the lower energy density relative to jet fuel would likely be considered a significant disadvantage.	Deleted,
17122	8	5	32			DELETE: such as iso-butanol ; REASON: Iso-butanol is not drop-in fuel. A researcher has indicated that blend of ethanol (component in existing fuel) and butanol may cause dry corrosion of aluminum parts in the fuel line. (Takashi Tchida (2004), Corrosion Engineering, Sangi Co. Ltd. 53, 44-49)	Deleted,
5243	8	5	32	5	32	Conventional biofuels are already straining the global food system and prices. Do not encourage.	Noted. There are different positions on this. The role of biofuels is covered thoroughly in Ch.11 respective the annex to Chapter 11.
2803	8	5	32	5	32	The perspective regarding biofuels is a very controversial issue (as discussed in page 24 line 26-27) and does not seem to be relevant to be discussed under [High agreement, robust evidence].	This high agreement statemrnt was just for first paragraph - but point taken.
5391	8	5	32		35	variations always exist; statement lacks information without some qualifier	Agree, Reworded
16269	8	5	32	5	32	It is better to modify the phrase "including "drop-in" fuels such as iso-butanol" to "including microalgal biofuels and "drop-in" fuels such as iso-butanol".	Accept
11599	8	5	36	5	41	You mention only costs, but e.g. infrastructure provisions (e.g. cycle paths) as well as non-provisions (e.g. no parking spaces) has also decisive impact. Please add and balance.	Accept

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11600	8	5	36	5	41	Please add demand side measures on freight transportation.	Already included. in the ASIF framework that we have adopted, A stands for avoiding transport, but I would agree that the chapter does not adequately explore the various ways in which companies and economies decouple freight demand from output. Reference should be made, for example, to the 'transport prevention' part of the EU's Marco Polo II program for freight transport.
5244	8	5	36	5	41	Here, as elsewhere, there is no mention of the challenges for rural populations. Nor is there any recognition of the challenges of rural dwellers in those latitudes (or heights) where inclement winter weather conditions require for safety reasons 4X4 vehicles or the additional costs of winter tyres. One gets the impression that the authors are all from comfortable urban situations.	Accept
16272	8	5	36	5	37	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 modal choices could bring about a significant reduction in GHG emissions from the transport sector, especially from a short- to medium-term perspective.	Accept but too old references
8864	8	5	38			(number of journeys (km or t-km))' - this needs to be corrected. As it stands it has almost no meaning.	Accept
5183	8	5	38	5	38	There is ample evidence that we should not aim at reducing the number of trips, but at reducing average distance per trip. So please replace "(number of journeys (km or t-km))" with "(p-km and t-km)". In most transport modes the amount of emissions is equivalent to amount of p-km and t-km not the number of trips itself (only in aviation shorter distances might increase average emissions per pkm/tkm). Furthermore, reduction of the number of trips would directly affect the mobility of people and have strong negative impacts on economy and social aspects, while the distance at which we do our shopping, have our holidays and choose to live from our work depend very much on the speed of the transport system and to a lesser extend the cost of travel. See e.g. Banister, D. (2011). The trilogy of distance, speed and time. Journal of Transport Geography, 19, 950-959. Hupkes, G. (1982). The law of constant travel time and trip-rates. Futures, 14, 38-46. Peeters, P., & Landré, M. (2012). The emerging global tourism geography – an environmental sustainability perspective. Sustainability, 4, 42-71. Schäfer, A. (1998). The global demand for motorized mobility. Transportation Research - A, 32, 445-477. Schäfer, A. (2000). Regularities in travel demand: an international perspective. Journal of Transportation and Statistics, 3, 1-31. Schäfer, A., & Victor, D. G. (1999). Global passenger travel: implications for carbon dioxide emissions. Energy, 24, 657-679. Zahavi, Y. (1976). The Unified Mechanism of travel (UMOT) model. report to Mr. Harold B. Dunkerley. Available at: http://www.surveyarchive.org/Zahavi/TheUMOTModel.pdf. Zahavi, Y., & Lang, P. J. (1974). Traveltime budgets and mobility in urban areas. In. Washington DC: US Department of Transportation.	Accept. Some evidence trips being avoided due to combining trip objectives, internet shopping, video conerencing ,use of social media.

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8039	8	5	38	5	38	please add after '(...) of journeys (km or t-km)': "by making them more attractive through infrastructure improvements and improving their quality".	This wouldn't reduce distance travelled.
17706	8	5	38			I suggest the balance of the executive summary deserves re-thinking. To my eye, the influence of the transport environment on how people get around is under-sold. There is mention of infrastructure elsewhere in the summary, but the sentence on behaviour change does not mention what is obvious - what people choose will depend on what is available. Price signals are important, and might be applied in the short-term, but operate at a superficial level. If radical changes are required, then surely substantial changes will be needed in urban design, land use and regulation.	Accepted. Reworded
18899	8	5	38			"t-km": Please define.	Accept
15766	8	5	39			Education can only do so much. If there is not a tangible value proposition for the consumer, it's not going to happen.	Agree
12879	8	5	39			Not the costs of transport tend to be inelastic, but transport demand tends to be inelastic with respect to variations in costs. Change formulation.	Accept
5392	8	5	39		39	it is the demand for transport, not its costs, that are inelastic	Accept
8360	8	5	41			Price signals, demand management fixes and so on will not be enough to manage travel demand. Infrastructure for non-motorised and other modes of mobility will have to be built as well.	Accept
2804	8	5	42	6	15	This paragraph only highlights "short term and cost effective mitigation strategies (p5 line 42-44). However, also important in this section are "the technologies which require RD&D investment but also expenditure on infrastructure" - which we can call "long-term measures". Statement on the long-term measures should be also highlighted in bold.	Accept
17761	8	5	44			before suggesting mitigation measures, indicate how much reduction are we talking about	Accept
7397	8	5	45	5	46	This statement is very critial to be included in the excutive summary and the evidence provided in the chapter does not really support the statement.	Accept. I agree….we haven't done a great job of establishing $/ton values in the chapter, so what's the basis?
15767	8	5	45			What is considered "substantial"? Short-term will be easier than long-term, barring a significant breakthrough in technology (batteries, fuel cell technology, etc.)	Accept
15861	8	5	45	5	47	“The potential is substantial" what does this mean? Quantify!	Accept
17123	8	5	45	5	46	DELETE: and at relatively low mitigation costs ($/t CO2). REVISE TO: however, incur additional costs and might not be a viable in every county. (McKinsey & Company (2009). Roads toward a low-carbon future: Reducing CO2 emissions from passenger vehicles in the global road transportation system, p.10 -11. Available at: http://www.mckinsey.it/idee/practice_news/roads-toward-a-low-carbon-future-reducing-co2-emissions-from-passenger-vehicles-in-the-global-road-transportation-system.view)	Accept
17762	8	5	46			how much is "low mitigation cost"	Will quantify. good question
11601	8	5	46	5	46	What's a low carbon price?	Will quantify "low mitigation costs". good question

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
16270	8	5	46	5	46	The phrase "at relatively low mitigation costs ($/t CO2)" should be deleted. This is because the IEA Energy Technology Perspectives 2008 (IEA, 2008, pp. 80-82) estimated that the marginal CO2 emission reduction costs might be higher for the transport sector than for the other sectors, and because the IEA World Energy Outlook 2010 (IEA, 2010, pp. 54) indicated that the transport sector is more costly to cut CO2 emissions than in most other sectors.	Will amend accordingly. Because of the high price of transport fuel, much mitigation can be accomplished at low cost IF one uses a low discount factor to account for fuel savings….but things get pretty uncertain at higher levels of mitigation, and depend on highly uncertain cost reductions for advanced technology.
16271	8	5	46	5	46	The phrase "Incremental developments" should be described more clearly. I can't understand what this means as it is.	Amended.
13210	8	5	6	5	6	Are not some mechanical actions also energy consuming, e.g. for crushing ?	Not on page quoted. Not clear
16265	8	5	9	5	9	These transport sub-sectors were also major emitters of NOx, a precursor of ozone (T. Takeshita, 2012. "Assessing the Co-Benefits of CO2 Mitigation on Air Pollutants Emissions from Road Vehicles." Applied Energy 97, pp. 225-237).	Section 8.1 to be amended
15859	8	5	1			The Exec Summary should be more quantitative and succinct. For example, include some quantitative results, via a table or chart, such as $/tonne CO2 mitigation costs, well-to-wheel gCO2/MJ or gCO2/passenger km-traveled intensities (e.g., results from sections 8.6.3, 8.6.4). Might consider using the “bullet point” format used in Chap. 10.	Agree needs to be more quantitative but data limited. Format of exec summaries to be determined. Tables not usually included. probably one of the reasons we didn't do it is because we don't have the numbers.
2651	8	5	2	5	2	The doubling of transport emissions by 2035 is presumably absent any mitigation policies beyond what is currently in place. It should be noted that this growth trajectory is absent future policy intitiatives.	Amended.
2652	8	5	23	5	24	CNG may be a bad example to use, given some recent suggestions that methane leakage from fracking is potentially quite bad. Suggest the example of CNG not be highlighted in the text of the executive summary.	Amended. handle this with an "if fuel cycle emissions can be appropriately controlled, e.g. methane leaks"
2653	8	5	39	5	39	"costs of transport tend to be relatively elastic". It is not the cost response rather the response of consumers to price. Suggest rephrasing as: "response to price change is relatively inelastic".	Amended.
2806	8	5	1	7	21	Several terms are used after "mitigation", such as, "mitigation measures", "mitigation strategies", and "mitigation actions." Please make sure if they are properly defined and consistently used throughout the chapter.	Noted.
3461	8	5	5	5	9	Include the annual growth rate observed from AR4 and AR5 regarding the GHG transport emissions	Will quantify
2710	8	50				Row 16: Does this education include eco-driving initiatives?	Yes
12906	8	51	11			The section on Financing low carbon transport looks rather short and is mainly dealing with funding - and not with financing. The latter may include transport- and energy-realted taxes	Disagree. Value capture is financing. Could be longer….
6492	8	51	12	51	20	The section needs to describe the local government financing for good low carbon transport instead of only looking at international mechanisms. By promoting cobenefits, the low carbon transport can be financed by the same means as traditional financing of transport projects. For promoting low carbon transport, not only projects which reduce emissions needs to be promoted but the projects which increase emissions when built needs to be stopped.	Agree. Added a sentence.
2468	8	51	16		18	These figures need updating - there are more transport CDM projects now (still mainly BRT).	OK
13697	8	51	16	51	16	Share of CDM projects in transport sector should be updated according to UNEP Riso Centre: CDM pipeline, download at www.cdmpipeline.org, updated monthly	Have looked them up and changed text. Still very low %

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
11185	8	51	16			Now more than 3 transport CDM projects are registered.	OK
5411	8	51	16		20	It is hard to argue that the Global Environment Facility and the World Bank's Clean Technology Fund have played a crucial role in climate change mitiation…..so it seems a bit of overkill to argue that, unless these specific funds start to focus on transport, then transport uniquely will not reduce its carbon emissions and will become the major carbon emitter while the other sectors benefit from these terrific initiatives. Tone this stuff down.	Disagree. CDMs have saved 1 billion tones of ghg and the others all matter.
15849	8	51	20			80% transport-related GHGs seems too high. Cross check reference with others (e.g., IEA)	Will check.
13906	8	51	21	51	22	Regarding NAMA for Transport, see Lefevre, B., 2012, Incorporating cities into the post 2012 climate change agreements, Environment & Urbanization, Vol 24(2): 1–21; Bakker, S., Huizenga, C., 2010, Making climate instruments work for sustainable transport in developping countries, Natural Resources Forum, Vol 34, Issue 4, pages 314 - 326; Huizenga, Stefan Bakker, S., 2010. NAMAs in the Transport Sector: Case Studies from Brazil, Indonesia, Mexico and the People's Republic of China,IDB Publications 8603; Dalkmann, H., Binsted, A., Lefevre, B., Huizenga, C., Avery K., Bongardt, D., 2011, Cancún can, can land transport?, Bridging the Gap, GIZ;	Added Lefevre reference. Thanks.
5412	8	51	26		30	Revenues around a rail station may well go up, but this means little unless the TOTAL land value goes up….otherwise, it's just a redistribution…..welcome, but the local governments don't get a windfall.	Disagree. They are extra value due to agglomeration economies.
15850	8	51	28	51	30	Not clear why owners would want to pay higher taxes to live right beside a rail system that generates more noise and congestion in their backyard???? Seems like this would decrease property values. Unless you are referring to urban homes served by rail within a walking distance of say 1-2km?	Added 'near to' instead of 'around'. Can be very close as well.
4427	8	51	3	51	6	The technology-based solutions may face barriers of availability of capital and unwillingness to pay. These barriers exist in both developed and developing regions. Key examples are the slow adoption of HEV and dithering on EV rollout in developed world LDV fleets.	Agreed. Added.
11186	8	51	30			Land adjustment also contributed to capital investment to support mass transit in Japan (Tsukuba Express Rail).	Agreed. Added.
5413	8	51	35		38	this list is a list of solutions, not barriers	Disagree. They are policies which illustrate institutional barriers.
5291	8	51	38			ADD: Also included sectorial, are a non transversal approach to urbanism as well as economic and political perceptions of the costs of reducing car mobility.	Don't understand the english.
4068	8	51	42	51	43	This new world economy is described in glow terms but seems more like a scenario.	Disagree. Widespread acceptance except in America.
5414	8	51	42		47	this is far too promotional, esp. the OECD cite	Ditto (i.e. as in comment answer no 4068). Have added ADB new report.
2469	8	51	48			The decoupling argument is central to sustainable transport - and seems only to occur here.	Agreed.
7402	8	51	11	51	33	Note that in the context of green growth and greening the transport sector emphasis has to be on low emissions rather than only low carbon	Agreed. Changed.
13893	8	51	11	51	33	This section schould emphasis the key importance of redirecting investments (instead of looking for new money). See Dalkmann, H., Sakamoto, K., 2011, Transport, Investing in energy and resource efficiency, UNEP Green Economy Report	Agreed. Added a sentence.
13904	8	51	11	51	33	On current state of (Public + Private // National + International) financial flows see Sakamoto, K., Dalkman, H., Palmer, D., 2010, A paradigm shift towards sustainable low-carbon transport. Financing the vision ASAP, ITDP	Grey literature.
13905	8	51	11	51	33	This section should emphasis the necessity 1) to analyse the impacts of financing decisions, 2) to reallocate budget and redirect investments (instead of looking for new money) towards sustainable transportation. See Sakamoto, K., Dalkman, H., Palmer, D., 2010, A paradigm shift towards sustainable low-carbon transport. Financing the vision ASAP, ITDP	Ditto.
2711	8	51	11	51	33	Discussion is very much focused on developing countries. Would be good to say something about how US, EU, and Japan finance more sustainable transport - what are political difficulties?, etc.	Disagree. Value capture section is developed world.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
13888	8	51	24	51	24	"ADB and eight other big banks pledged to invest $175billion for the creation of sustainable transport worldwide" needs reference	Agreed. Added.
2712	8	51	38	51	39	Where is the evidence that 'auto dependence' is built into a culture? I see this much more as being an outcome of economic incentives.	Huge evidence. Just look at TV ads.
2713	8	51	42	52	4	This paragraph and discussion of a 'Sixth Wave' strikes me as highly speculative, suggest this be deleted in the name of brevity.	Disagree. Its critical.
17776	8	52				there is a loose sentence at the end	Line is in 8.9 should be fixed.
2471	8	52	18		27	There are two sets of figures here - one the 4x increase and the other a total decarbonisation of transport by 2070 - both need very careful presentation as it is not clear how they have been arrived at - and whether they both encompass the expected increase in travel over that period - or whether the numbers are based on current levels of travel - I have not seen any figures to suggest that transport can be decarbonised by 2070 - even if we just consider the use of carbon in fuel - let alone the embedded carbon in the system and vehicles and the carbon costs of manufacturing the fuel to be used. Do these figures include aviation (and shipping)?	Text says sector "could be practically decarbonised by 2070", but comment is accepted, a more direct language will be attempted and clear specification that this is a conclusion obtained from top-down scenario analysis. Should be considered
4069	8	52	20	52	26	The assessment that 2 degree C is no practical to achieve in this century should be made clear here and in Chapter 6.	Reject. Both Chap 6 and 8 are working on the assumption that a stabilization path at 2C is within reach.
18911	8	52	23			"the sector could be practically decarbonised by 2070": Looking at the ranges in Figure 8.9.1 it seems that there are only very few sceanrios that show decarbonization at that time, so it seems that it would be good to put this statement in context - particularly as other parts of the chapter state that decarbonizing the transport sector is more challenging that other sectors. So increasing the coherency would be good.	Accepted text will be revised. ….the path to total decarbonization of this sector is pretty hairy….especially from a full lifecycle view…you have to do things like adding CCS to biomass fuel production, getting electricity completely off even natural gas, etc…..and make amazing progress in a variety of fields.....quite unlikely, I suspect. of course it does, just from simple arithmetic….transport is simply too large a sector to be omitted…..but then, what does this mean? 80% mitigation? 70%? Without numbers, it's a trivial observation.
4070	8	52	25	52	26	Also, this should be a key message. "Top-down scenarios analysis demonstrates that a transformational pathway to achiee a stabilization at 2 degrees Celsius relies heavily on transport sector mitigation.	Agree. No stabilization path to 2C can be envisioned without major mitigation from transport (proportion will need to be included).
15851	8	52	27			dangling sentence…	Accepted. Will be corrected.
5343	8	52	27	52	27	Sentence incomplete.	Accepted. Will be corrected.
11650	8	52	5			Whole section. Uherel et al, AtmEnv 44, 2010 made a good summary of transport scenarios and impact on GHG. Please take note and reference.	Accepted. Thank you for this reference.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
7403	8	52				Add a subsection on synergies related to transport impacts on other sectors growth and mitigation opportunities	Interesting suggestion.Several cross-cutting discussions between chapters are attempting this type of discussion (e.g. Impacts of Tourism) potentially seeking to understand synergies. Some key results may be reflected in here but most likely in the other chapters/sectors. No separated section is planed for transport synergies. G: Under consideration
7406	8	52				Assess consistency between top-down and bottom-up results and how down-scaling is achieved in the reported results from the IAM models	Accepted. This work is under way should be reflected in SOD
2470	8	52				This Section is too weak as the scale and speed of change needed in transport to meet (or help meet) CO2 targets is not here - the approach suggested is too dirigiste - it needs a strong introduction	Accepted. Introduction can better reflect on the scale and needed speed of transformation. G: Agree
3164	8	52	1			I though section 8.9 could be compressed and put up front with other discussions of drivers.	Rejected. Section 8.9 cannot be replaced within the Chapter. Under consideration
2714	8	52	5	52	6	Title of sub-section: I found this type of terminology confusing and loaded with jargon. Please simplify title of sub-section. How about simply: "Pathways to Sustainability".	Rejected.Section 8.9 Title is fixed for all Chapters.
2472	8	53		54		The 3 key figures here are also confusing - are they linked or independent of each other? The first 2 seem to relate to the 3 scenarios, but the 3rd talks only about transport futures (high technology, high efficiency and the middle pathway). The credibility of this chapter is reliant on this section and it needs to be totally transparent in what it is saying. Also there is the question of the relative contributions (to what target) that can be made by less travel (not really discussed), shorter journeys (not really discussed), urban form and modal shift (discussed to some extent) and technological change.	Accepted. A renewed discussion on existing and top down scenarios is to be approached for the SOD. Agree new info should be added. important comment….how credible are these scenarios…are the scenarios from the first two figures simply normative, i.e. defining what has to happen to achieve these levels of forcing? If so, why should we believe the scenarios are robust?
15852	8	53	8			2011? Did you mean 2100?	Accepted. Typo it should be 2100. or 2050…clearly one or the other, probably 2100.
3841	8	53	8	53	8	Replace "kilometers travelled by 2011" by "kilometers travelled by 2050".	Accepted. It should say "by 2100"
5210	8	54	1	54	3	Suggestion to make a separation between physically impossible solutions, economically unlikely ones and pure political choices. I feel that building certain infrastructure is 90% a political choice, a choice that can not really be substantiated by economic or social research. Why chose Switzerland to go for its highly efficeint rail system and did Brazil braek it down? Why is China investing heavily in high speed rail and USA not at all? Seems mainly politically founded, not environmentally or even socio-economically.	Interesting suggestion. A wild card type of scenario, maybe possible as scenario methodologies evolve. However, difficult to see it in practice for this report. Agree. a terrific thing if we could do it….but the scenario studies I've seen don't do a lot of questioning about probability

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
11652	8	54	20	55	10	Uherek et al, AtmEnv 44, 2010 made a good summary of transport scenarios and impact on GHG. Please take note and reference.	Accepted. Thank you for this reference. OK
3842	8	54	26	54	26	Replace "switching on a massive scale from liquid fuel to " by "switching on a massive scale from fossil liquid fuel to".	Accepted.
3843	8	54	26	54	26	Switching from liquid fuels to gaseous fuels is a well known technology and usually cost-effective, already used in many countries. Why shall it require long time to be deployed?	Reject. Comparatively the infrastructure system for gas for vehicles is not as advanced as liquid fossil fuels even in the places where currently distribution is more advanced. even natural gas might not be cost-effective in most places, given the cost of the tanks, but for large GHG reductions we need hydrogen…..and there's no question this is a long-term solution
15854	8	54	30	54	33	Might consider a chart showing impact of sectoral analysis on GHGs so it does not get lost in text	Accepted. This willl be done.
5415	8	54	30		31	The 20% seems, in context, to be 20% of total demand….is it?....or is it 20% of a portion of total demand?	Accepted. This percentage will be reviewed and better supported with references in SOD.
7404	8	54	31	54	33	Model shifts and behavioral changes are represented in top-down models through elasticities -- so their impacts on transport demand might have already been included.	Not clear what the reviewer suggest to do.
13118	8	54	31			Fig.8.9.4 is from IEA2012, (not IEA2009).	IEA 2012 not then published?! Since added
15853	8	54	8			Not clear what GEA scenarios refer to? Are these used elsewhere? Consustent with IPCC? Might inckude link or explain. Also what does "fossil liquids" refer to? LPG? LNG? Be clear on this.	GEA Scenarios refer to the bottom-up pathway development exercise published as Global Energy Assessment in 2012. Parallel with ETP 2012 publication. The session discusses both.
8379	8	54	20		25	This has already been said and can be removed.	Accepted. Repetition will be avoided in revised text.
8380	8	54	32		33	The enormous growth rates in Indian cities means that there are important uncertainties about what to expect in the future. For instance the Nano car was believed to be a big hit for millions of Indian families and now it seems that it will not. There are simply too many unknown aspects and this will have to be discussed up-front such as mentioned on line 37. One of the uncertainties is the role of public transport; trains, buses and so on. Trips by public transport are forecasted to be cut by half – what means of transport is likely to replace busses and trains in growing cities in India? The reduction of travel on public transport is a global trend and as such a reality that should be discussed in chapter 8 in relations to emission and sustainable transport. The various processes of gentrification of public space and of systems of transport by means of expensive BRT's and metros bring about more of marginalisation and social divide. The phenomenon of peak car use is still very limited and taking place in a certain socio-political setting. So far, peak car, is a small trend with limited impact and not a global trend. The reduction of public transportation is a global and significant trend.	The scenarios or pathways for transport transformation in this session will be further elaborated in SOD. Some of the uncertainties described by the reviewer wiill be further discussed.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
2473	8	55				Issues of path dependence and lock in need a higher profile - they need discussion earlier in the Chapter, and whether any technology should be looked at as a replacement or a niche - the future will probably have many elements - there is no replacement for the car and the best option is probably for a super efficient ICE? But issues relating to transition from one well established technology to another new one are not covered, nor the potentially huge costs of such a transition.	Accepted. The reviewers rasises some important issues that will be addressed in the reivew of pathways in SOD.
3844	8	55	13	55	15	This chapter is being prepared by scientific-minded people that traditionally have their major interest in new technologies. The discussion in section 8.9.2.1 has only 3 lines dealing with mitigation technologies already in commercial use, while more than one page is dedicated to second generation biofuels, electric and hydrogen powered vehicles. Readers will be very much interested in the ones that are already available (first generation biofuels and hybrid cars)	The priority depends on whether we should be focusing on moderate GHG reductions or on large ones
2775	8	55	21	55	36	But Pakistan has achieved over 80% share (3.2 million units) for methane vehicles in less than 20 years. Reasons are: 1) road vehicle lifetime is very short compared to power and heat plants, b) conversion into methane capability is very easy and fast, c) technology is mature and widespread, with over 16 million vehicles now globally, d) almost all major manufacturers offer OEM methane vehicles, e) fuel is obtainable globally. Therefore, with political will transformation can be done quickly. Technology is mature and affordable. No need to allocate time for research, development, innovation or reaching large cumulative production volumes. Transition requires proper policy only.	Well, perhaps, but given limits on how much natural gas is available, and the problem with proliferation of coal fired generation plants, the best use for gas is likely to be replacement of coal-based generation
5211	8	55	21	55	23	This long development time for new technology again necessitates to consider to use more current low carbon technology by investing in it. E.g. in stead of trying to make the global car fleet fully electric, switching to zero carbon rail transport can be done right from 2012 onwards, as all technology is there and existing infrastructure is underused. Same for trying to get complicated technical and bio-fuel solution for air, while high speed zero carbon rail is an existing and proven technology.	I can't agree…..massive mode switching seems highly unlikely….it's worthwhile to get what we can get, but I don't see this as a real substitute for developing major new technologies. will amend
4071	8	55	22	55	23	"It can take 25-60 years from the start of research and development until an innovation achieves wide spread use such as in the road vehicle fleet." This is one of the more sobering, realistic statements I have read in this chapter. How does this historical analytic fact play out in the rest of the section 8.9.2 sectoral transformational pathways - implications from a bottoms-up perspective? This seems to be a disconnect with the "New World Economy" scenario on page 51, lines 42-48.	Noted. Section has been significantly restructured, now covered in Section 8.9.2.1. Section covering Sixth Wave rephrased. For assumptions of IAM scenarios see mainly Ch.6.
5344	8	55	24	55	26	Not sure sunk investments applies to EVs. Electricity production and delivery infrastructures are well-established given potential for home charging, and PHEVs will make use of existing petrol/diesel infrastructure.	Reject.It does apply to public charging.
5416	8	55	5		7	The McCollum and Yang study is normative….it asks, what would have to happen to achieve an 80% reduction. It doesn't spend a lot of time (or any time?) trying to ask, how likely is this? (Not meant as a specific criticism of this study….virtually none of these studies ask such a question, at least explicitly). However, it becomes a bit tricky how to use this type of study.....do we really want to imply that somebody has done an analysis that this is a realistic possibility, when that question has hardly been asked?	Accepted. Uncertainties will need to be highlighted.
11653	8	55				Appears like a duplication of 8.3.1. Delete redundancies	reject.It is not normative.It presents a scenario.
13890	8	55		57		Public budget reallocation from non-sustainable transport funding to climate-friendly transportation funding should be discussed here.	Accepted.
8381	8	55	36			At the end of this chapter on page 57 one of the most important issues is finally formulated. The challenge that this chapter will have to deal with is presented but it is far too late to do this on page 57. This is what you should present at the beginning so pls, introduce this part at the beginning and outline the chapter accordingly to answer this question.	Structure fixed. Section will be reviewed and placement considered but also covered in the revised storyline

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
2776	8	56	1	56	5	The cost of North African unrest in 2011 on EU transport was equal to building cost of 130.000 methane filling stations. It is multiple times the amount needed for a comprehensive filling station network.	Not clear what the reviewer suggest to do.
2475	8	56	18		19	BRT does not mimic metros - it is a very different concept.	Accepted. Will be rephrased. Yes we can write a few lines to explain this
11282	8	56	18	56	25	Also worth citing here for a discussion of public transit and bus rapid transit systems in various countries and cities: UN-Habitat (2009): Global Report on Human Settlements 2009: Planning Sustainable Cities, pp. 162-163; as well as UN-Habitat (2011): Global Report on Human Settlements 2011: Cities and Climate Change, p. 100-103. [available for download at http://www.unhabitat.org/pmss/listItemDetails.aspx?publicationID=2831 /// http://www.unhabitat.org/pmss/listItemDetails.aspx?publicationID=3086	Accepted. Thank you for this reference. Discussions from these docs could be included
2474	8	56	3			The evidence cited here is not convincing - needs to be more specific - based on one study?	Accepted. More references will be searched.
5292	8	56	31			ADD: A study for Lyon shows that the car's major advantages over TCs are its speed and flexibility in complex itineraries. Hence, indirect measures which 'pressure' without coercing may be more political feasible and yet efficient in creating a modal transfer: reducing car speed limits – but not TCs'-; increasing the number of lanes reserved for TCs and bikes; decreasing number of parking places increases travel time through research for parking place; pedestrian friendly traffic lights…) (Stéphane la Branche. « La gouvernance climatique face à la mobilité quotidienne. Le cas des Lyonnais ». Revue Environnement Urbain/Urban environment. 2011).	Accepted. Reference willl be included.
2778	8	56	32	56	34	Electric cars may create a modal shift away from public and non-motorized transport, since they are appropriate in urban light traffic only. Also, they may not replace ICE cars for the same reason, but instead lead to additional car demand in households.	Accepted. No disagreement on this.
3590	8	56	43	56	45	This sentence is another illustration of far too ambitious expectations, showing the need to come back closer to reality when making recommendations to policy makers.	Disagree with reviewer. No action suggested by reviewer. .I think the statement is obvious and perhaps a bit trivial….of course it will take action on all fronts
2777	8	56	8	56	10	Text "The lead time for transport infrastructure development is considerable, which makes swift changes in the capacity of for example, public transport hard to achieve" is incorrect. Very many cities (both industrial and developing) have shown that diesel buses can be replaced by methane buses within a few years. Some cities (both industrial and developing) have shown that also diesel taxis can be replaced by methane taxis within a few years. These have been achieved using many different kinds of policies.	Reject. The text referst to infrastructure leading to increasing capacity. The reviewer's comment refers to fuel switching feasibility. Different points. I don't think the term "capacity" is about fuel changes such as this…which perhaps can be made reasonably quickly
13891	8	56	22	56	25	Indeed, TransMilenio has been successful in many ways, but the absence of integrated land use has also lead to minimize its positive impacts (see Lefèvre, B., 2008, Visión a largo plazo e interacciones "transporte-urbanismo", los excluidos en el éxito del SBR TransMilenio de Bogotá, CIUDAD Y TERRITORIO Estudios Territoriales, XL (156)) which is a pity given the . The nowadays situation is far to be idyllic. It is one of the reasons why Bogotanos are voting against BRT and why the last two mayors were elected to build a metro .	Accept. It will be considered. Either add the need of integrating NMV and land use plans or drop this.
2716	8	56	42	57	35	Section 8.9.2.2 is very speculative, suggest this be shortened significantly.	Entire section will be reviewed in SOD.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
17780	8	57				"Massive GHG increase" - how much increase?	Accept. More precision in next SOD version.
8565	8	57				CITED STUDY NOT IN REFERENCES "For example, a detailed survey in the US has shown this phenomenon to be as much a cultural change as the result of rising fuel prices (David et al., 2010). COMMENT: should be deleted... ADDITIONAL COMMENT: The US Department of Energy, Energy Information Agency does not anticipate a "cultural shift," and is projecting an increase in light vehicle travel of 37 percent from 2012 to 2035.	Accepted. Will be considered. New references are available.
2476	8	57	20			More needs to be made of this - it is now quite a widespread phenomena in many developed countries - including many in Europe	Accepted. Will be considered.
5345	8	57	26	57	26	Developed nations of Asia is very small % of Asia. Not clear you can generalise the experience of Japan, South Korea, Taiwan and small city-states (HK+Singapore) and apply to China, India, and elsewhere.	Accepted. Will be considered.
3423	8	57	5		17	a very vital alinea for this chapter	Agree.
2717	8	57	23	57	23	David et al reference is missing. I'm skeptical of the conclusion that US culture has changed; what was the basis for the research in David et al?	Accepted. Will be considered. David et al is a large survey of young population. Other studies are available Florida R (2010) The Great Car reset……..the only culture shift I can see is some signs that young people are not so quick to learn to drive and purchase cars…but I wonder whether this will continue if the economic situation eases up
2718	8	57	28	57	29	EKC does not predict how wealth (or income) affects environmental policy. Rather it is an association and is critically dependent on democratic procedures. For example see the following reference: Mariano Torras, James K Boyce, 1998, Income, inequality, and pollution: a reassessment of the environmental Kuznets Curve, Ecological Economics, Volume 25, Issue 2, May 1998, Pages 147–160	Accepted text will be revised.
2719	8	57				This section could be shortened. You really just need to state key points, i.e., that climate policy must take into account the development needs of poorer countries, but these policies could lead to better outcomes on all sustainbility critiera if implemented now.	Accepted Will be considered.
4072	8	58	27	58	31	This statement is very close to being policy-prescriptive - "… follow clear political vision and agenda …" Instead, I recommend using words like "Assessment of effective strategies show…"	Accepted Will be considered.
4073	8	58	38	58	40	"The efforts for building and reinforcing regional networks and links to disseminate the various strategies … remain of paramount importance." No reference to this statement. This statement borders on being a policy-prescription, almost a policy recommendation.	Accepted Will be considered.
15855	8	58	4			"live" not "leave"	Accepted. Will correct.
8022	8	58	4	58	4	this should be 'will live in 2050'	Accepted. Will correct.
3593	8	58	41	65		This chapter is incomplete. There is a need for an integrated policy sub-chapter, targeting organisational solutions, public private partnerships, supply chain solutions, customer purchasing behaviour changes, etc.	Will refer to Policy chapters
8382	8	58	4		19	Pls develop further. GOOD! Up front -State of art is described but not what should be done to reverse this development. Pls go ahead and develop this part!	Under consideration

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
13892	8	58	4	58	11	"Urban areas where 70% of the population will leave in 2050 have a central role to play in global efforts for climate mitigation". Yes and what should be discussed here is if yes or not cities have the capacity to act (competences, funding, legal right to innovate etc.) which is often not the case. (See C40, ICLEI lobby; HAMMER, Stephen, Kamal-Chaoui, Lamia, and Alexis Robert. Cities and Green Growth: A Conceptual Framework. OECD Regional Development Working Papers 2011/08. Organization for Economic Cooperation and Development. December 2011. ; Lefèvre, B., 2012, Incorporating cities into the post-2012 climate change agreements, Environment & Urbanization, vol 24(2))	Accepted. Will use reference and expand discussion within limits of space. Thank you for reference.
8383	8	58	40			In this final paragraph a crucial phrase is formulated that underlines magnitude of the challenge of IPCC to deal with. Why is it hiding back here? Important points should be mentioned much earlier according to academic practices.	Accept. Some text in session will inspire some of the key summary for policy makers.
15744	8	59	19	61	32	Wrong titles: section 8.10.1 is labeled “Road transport” but is only addressing cars, section 8.10.2. is labeled “Rail transport” but also addresses light-rail and buses.	Will amend but HDVs also covered in 8.10.1 and light-rail comes under rail. there is one paragraph on HDVs, but seems mostly about trucks
3424	8	59	26			if integration of services is possible. This is not clear enough for me. The statement is followed by policy examples that, in my understanding, do not really serve as examples of integration of services.	Will amend. it's not clear if the author intended the next sentences to be examples of integration of services….I don't think so, they were just examples of other policies.
4074	8	59	26	59	30	Does the reference Hao et al 2011 describe and quantify the "significant co-benefits"?	Yes, the paper quantifies the energy saving (which can be easily converted to GHG reduction) from vehicle purchase and driving restriction. see fig. 06.
6707	8	59	3	59	12	Adding to market-based mechanisms, it should be noticed that voluntary CO2 emission reduction approaches are effictive for the transport sector. Recent studies show that voluntary CO2 emissions reduction schemes and, in particular focuses on the voluntary plan by the Japanese airline industry. Econometric analysis identifies statiscally significant improvement of 3-4% in CO2 emissions intensity (CO2/PRK) subsequent to initiation of the voluntary plan in 1998. See:Katsuhiro Yamaguchi (2010) Voluntary CO2 emissions reduction scheme: Analysis of airline voluntary plan in Japan Transportation Research Part D: Transport and Environment, Volume 15, Issue 1, January 2010, Pages 46-50 http://www.sciencedirect.com/science/article/pii/S1361920909000856	worth looking at, but remember that Japanese culture is quite different from Western cultures….."voluntary" might not mean the same thing…might have quite a bit of societal pressure
10008	8	59	3	59	5	This part should include "voluntary target scheme" because 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 reference sources are same as for No63.	To be amended. worth looking at, but remember that Japanese culture is quite different from Western cultures….."voluntary" might not mean the same thing…might have quite a bit of societal pressure

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
6708	8	59	31	59	36	Adding to market-based mechanisms, it should be noticed that voluntary CO2 emission reduction approaches are effictive for the transport sector. Recent studies show that voluntary CO2 emissions reduction schemes and, in particular focuses on the voluntary plan by the Japanese airline industry. Econometric analysis identifies statiscally significant improvement of 3-4% in CO2 emissions intensity (CO2/PRK) subsequent to initiation of the voluntary plan in 1998. See:Katsuhiro Yamaguchi (2010) Voluntary CO2 emissions reduction scheme: Analysis of airline voluntary plan in Japan Transportation Research Part D: Transport and Environment, Volume 15, Issue 1, January 2010, Pages 46-50 http://www.sciencedirect.com/science/article/pii/S1361920909000856	To be amended. worth looking at, but remember that Japanese culture is quite different from Western cultures….."voluntary" might not mean the same thing…might have quite a bit of societal pressure
14299	8	59	37	59	39	Fuel efficiency standards in the EU have made a significant difference to reducing road transport emissions, and the role they have played should be acknowledged as one of the areas where regulation has made a large contibution to reducing carbon intensity. For example, in the UK the distribution of new car CO2 has significantly moved to lower levels. See Committee on Climate Change (2011), "Meeting Carbon Budgets - 3rd Progress Report to Parliament", Fig 4.12, p155 (http://hmccc.s3.amazonaws.com/Progress%202011/CCC_Progress%20Report%202011%20Single%20Page%20no%20buttons_1.pdf).	To be amended. well, "widely used effectively" is pretty strong already….but concrete examples always help.
5417	8	59	37		39	Compromised is a bit too strong…..a 10-20% rebound effect is important, but too many critics of standards use the rebound effect as an excuse to say standards are not worthwhile.	Rebound effect covered in chapter. Differs between OECD and LDCs
9167	8	59	37	61	31	I am curious with the cost consequence of the efficiency standards - are there any alanlyses available?	Most studies of standards provide some idea of effectiveness, but this is ambiguous because lots of other things affect fleet fuel economy…like gasoline and diesel prices. most studies of standards provide some idea of effectiveness, but this is ambiguous because lots of other things affect fleet fuel economy…like gasoline and diesel prices
7405	8	59	6	59	12	From economic perspectives, unless there are seious market failures, market-based mechanisms will outperform vehicle efficiency and fuel standards on controlling GHG emissions in the transport sector.	Needs supporting references
15856	8	59	6	59	9	other options include fee-bates and fuel taxes	Amended. these are discussed….we can ignore this comment
11003	8	59	3	59	4	It is indicated that emission trading or carbon tax is effective in transporting sector, but emission reduction by voluntary approach must be also effective.	True where it works - eg Japan. Needs references. apparently so in Japan, but I wouldn't think they'd be that effective elsewhere
8722	8	59				Additional reviews of implemented policies (if required) can be found in this document for completeness: AEA, 2012. Next phase of the European Climate Change Programme: Analysis of Member States actions to implement the Effort Sharing Decision and options for further community wide measures: Transport Sector Policy Case Studies http://ec.europa.eu/clima/policies/effort/docs/esd_case_studies_transport_en.pdf	Accept. if appropriate, this could be added to citations

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
4075	8	59		61		Section 8.10.1. Road transport. Reduce page length by making a table, brief description of policy types: Demand Reduction; Energy Intensity; GHG Intensity; Short-Lived GHG Species.	Accept
8385	8	59	24		36	This part is simply not good enough and it needs to be strenghened.	Agree but space constrained. Link to Policy chapters. perhaps, but would require more space…I do agree that this is a very important section, would love to see it stronger
8384	8	59	28		29	Demand reduction examples - referring to TDM is not enough since the social activities of a person seems to be neglected. Why bringing up Beijing and Shanghai as nice cases dealing with the issue? This is an elite version of traffic policy and there are other more democratic ways of dealing with the issue that serve as good examples. □	The cases of Beijing and Shanghai were selected as representatives of reducing vehicle use through strong policy intervention. Till now, four cities in China has implemented similar policies, with many more cities likely to follow. agreed, limiting vehicles is not a likely solution for most democracies….perhaps add to pricing discussion, show where it's used and level of success. HAO: The cases of Beijing and Shanghai were selected as representatives of reducing vehicle use through strong policy intervention. Till now, four cities in China has implemented similar policies, with many more cities likely to follow.
13894	8	59	31	59	36	Inequality and social acceptability of carbon tax should be discussed (See Deroubaix, J.F., Leveque, F., 2004, The rise and fall of French Ecological Tax Reform: social acceptability versus political feasibility in the energy tax implementation process, Energy Policy 34 (2006) 940–949)	Agree
3466	8	59	31	59	36	Subsidies in oil destilates are widespread in the Word. It should be mentioned that this issue should be addressed in the future in order to contribute with the reduction of GHG emissions from transport sector	Will address fuel subsidies (IEA data). I agree that fuel subsidies should be addressed
8435	8	59				I suggest to discuss with major details all the policies and examples that have been used in the world to promote NMT (i.e., traffic calming, etc). In a lot of towns cycling is one of the most important strategies to reduce car use, and the co-benefits are enormous as stated elsewhere in the Chapter. Furthermore, the importance of intermodality must be better highlighted.	Also see Policy chapter 13-15
2433	8	6				Much more of a leadership role is needed from the developed countries as their emissions levels are far higher than those elsewhere - also real scope for reduction	Agree. Added later in text
2434	8	6				Note interconnectedness between transport and energy (and CO2) as most of transport energy is carbon based, and between transport and the Built Environment (Ch12).	Is covered in text Page 6 line 26
2435	8	6				Related to the general point above is the more than doubling of transport related CO2e - how can the authors see any major change in the future, based on the past trends?	Covered in text. Too detailed for Exec summary
2436	8	6				The risk of failure in the transport sector is high - this is not apparent in this Chapter - there is too much talk about choices and optimal packages - the importance of non motorised transport and public transport is totally underplayed in Ch8.	Noted.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
11602	8	6	1	6	1	Behaviour change can also be cost-effective, not only technology. Too one-sided	Amended. also, which ones? Some developments would be very expensive….the statement is way too general
11603	8	6	10	6	15	"Improvements need investments…" That is the industry logic, but this means that you precanonise a high-tech path. Low tech is cheap and effective! Think of a small, low-weight, low power car….	Agree needs to be included
4338	8	6	10	6	12	need to provide actual figures (millions of US$) on R & D n energy efficient transport	Try to quantify
2726	8	6	10	6	12	It is better to say: "Developing innovative and improved transport technologies will require RD&D investment but also expenditure on infrastructure, such as high-speed rail networks, methane and hydrogen filling stations, public recharging points for electric vehicles, cycle lanes and bus rapid transport systems." In EU compulsary methane and hydrogen filling station requirement for all Member States has been proposed.	Rejected. The ES was restructured. Hydrogen is mentioned.
15288	8	6	10	6	10	"RD&D" to be "R&D"	Rejected. RD&D means RD and demonstration
15295	8	6	11			I'm surprised we are promoting high-speed rail. Specialized equipment, high-speed drag, largely vacant track, big stations, etc. generally means (much) higher LCA energy requirements per person-mile traveled than cars (& most airplanes). Best thing in developed countries is probably to fill up energy-efficient cars; best thing in developing countries is probably conventional rail; so I'd change to dynamic ride-sharing as an (ICC) technology in this line.	Noted. See discussion in 8.3.2.4
16880	8	6	11		12	Re public recharging for electric vehicles -- recently published papers seem to make case this is less critical than previously thought. Most people who have plug in electric vehicles charge them at home. They do not feel the need for public recharging stations.	Noted. See inclusion in section 8.3.4.2. Still, need to take global view with very different settlement structures.
18900	8	6	11			It is my understanding that besides "high speed rail" there are other important options, e.g. better integrated rail networks, so please consider widening the focus here.	Agree - in text but not a complete list of examples
15769	8	6	14		15	Re: plug-in hybrids -- true, but currently very expensive and unlikely to come down in price any time soon.	Possible - but exemplifies transitional steps. unclear…..tell me what happens to battery prices
2727	8	6	14	6	15	Full electrification can not be a goal for urban road transport, since it is not applicable at all to heavy freight transport and can only partially cover heavy personal transport. Renewable methane and hydrogen are needed, using them in ICEs and fuel cells, including plug-in-hybrids.	Hydrogen and methane added.
8866	8	6	16	6	20	The way this pargraph reads now seems to suggest that people find diffucult to change their travel habits what I am sure it is not what the authors mean and there is no additional text supporting this statement. If there are appropriate alternatives available and incentives in place, then people in developed countries will also change their travel habits.	Noted. This is one of our key messages being questioned - World regions with existing and mature transport infrastructures in place may find mitigation options through improving technologies easier to implement than changing travel patterns, whereas regions with rapidly developing infrastructures are more dynamic in terms of travel demand and modal choice and hence may have greater flexibility in their mitigation potentialopportunities. Authors don't read the paragraph this way

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
17763	8	6	16	20		ensure that the bolden statements are consistent with the message in other chapters?	Noted. This is one of our key messages being questioned - World regions with existing and mature transport infrastructures in place may find mitigation options through improving technologies easier to implement than changing travel patterns, whereas regions with rapidly developing infrastructures are more dynamic in terms of travel demand and modal choice and hence may have greater flexibility in their mitigation potentialopportunities. Authors don't read the paragraph this way
11604	8	6	16	6	20	That's contentious. You can argue that in DEV supply lacks behind demand. Hence there is no time, money and capacity for mitigation in addition to demand satisfaction, hence no real flexibility. Vice versa, affluent countries have the means, time, liberty, capacities for change!	Noted. This is one of our key messages being questioned - World regions with existing and mature transport infrastructures in place may find mitigation options through improving technologies easier to implement than changing travel patterns, whereas regions with rapidly developing infrastructures are more dynamic in terms of travel demand and modal choice and hence may have greater flexibility in their mitigation potentialopportunities. Authors don't read the paragraph this way
15770	8	6	16		20	This sounds good, and makes sense, but it would require a commitment on the part of govt to ensure the most cost-effective, from a GHG perspective, technologies are employed.	Noted. This is one of our key messages being questioned - World regions with existing and mature transport infrastructures in place may find mitigation options through improving technologies easier to implement than changing travel patterns, whereas regions with rapidly developing infrastructures are more dynamic in terms of travel demand and modal choice and hence may have greater flexibility in their mitigation potentialopportunities. Authors don't read the paragraph this way

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
2805	8	6	16	6	38	In order to make the logic clearer to readers, I think this section looks better better if moved after p7 line 7. Then, it reads: "Optimal mitigation packages, and barriers differ between world regions due to variations in local transport demand" → "World regions with existing and mature transport infrastructures in place may find ..., whereas regions with rapidly developing infrastructures are ..."	Will consider but bold are the key messages
5184	8	6	16	6	20	Even in countries with mature infrastructures very large sums are invested in road, rail and (air)port infrastructures, funds that can still be redirected to low carbon transport modes. Furthermore, most of these countries are rich, so have the means to invest additionally in new low carbon infrastructures.	Will consider but bold are the key messages
17707	8	6	17			Readers would be interested to see in the summary a statement on whether present technologies could deliver sufficient savings in efficiency to meet carbon targets, given "business as usual" trajectories in km travelled, or whether there will need to be reductions in VKT.	Noted.
16273	8	6	18	6	22	Same as above.	Accept but too old references
8361	8	6	19			But perhaps some of the rapidly developing countries are less flexible when it comes to implementing alternative policies? Political ambitions and leadership skills are prerequisites for success. The experience of managing motorisation in different political, economic, cultural and technical contexts is largely missing in this part. Pls include. Political scientists seem to have been missing in the writings of chapter 8?	Accepted.
14742	8	6	2	6	3	Phrase is redundant	Amended
16276	8	6	24	6	25	The IEA (IEA, 2001. "Saving Oil and Reducing CO2 Emissions in Transport") indicates that the vehicle market is becoming increasingly global. Hence, I can't agree that there are also major regional differences in "available" technologies.	Not just road vehicles being referred to
15296	8	6	26			I don't think hyphens between built environment & land use are needed here. That's really only when those terms are modifying another noun.	Accept
16274	8	6	26	6	32	Same as above.	Not just road vehicles being referred to
5393	8	6	28		29	quantitatively, technology has far greater potential, in a much faster timeline, than does land use policy….there's no doubt such policy is important, but don't oversell it	Needs to be mentioned. "in the longer term" added
15297	8	6	29			I don't know why "However, there are" is used here. These ideas are not in conflict. I would say "There are also…	OK. I don't have a problem with the "however"
15298	8	6	33			The reader doesn't understand why climate change feedbacks would make light rail more likely. (I don't either. :-)) I'd rewrite this sentence to give a more specific example. Perhaps you mean to say, "If highways are flooded, only rail systems may be operational"? Hard to imagine, but I'm not an expert on climate change accommodation. (I just remember the Loma Prieta earthquake taking out a section of the Bay Bridge, so BART & ferry became important modes across that bottleneck point.)	Amended
2728	8	6	33	6	38	Rural train transport is the most vulnerable transport technology to the effects of climate change.	Noted.
5394	8	6	33		34	not at all clear why climate change would push people into light rail and away from private vehicles…is this backed up in the text?.....light rail's lack of flexibility could be a hindrance as the climate evolves	Agree. Amended
3987	8	6	33	6	34	The statement that "Positive mode transport change (e.g. from private vehicles to lightail)…." Need justification. What is the empirical basis for this statement?	Agree. Amended
14743	8	6	35	6	36	This phrase is odd and implies a strange message!	don't agree, but need references to other reports
16881	8	6	35		38	Can you provide context? How large are these impacts relative to today or relative to projected emissions if no change had occurred in polar region?	Too detailed for exec summary. Is in text

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
3988	8	6	39	6	43	The bold summary on optimal mitigation packages seems out of place. In particular it ends with "high agreement, medium evidence." But the immediate preceeding paragraph on feedback loops refers to section 8.5 where the evidence is characterized as: "Impacts are very dependent on regional climate change and the nature of local transport infrastructure and systems. Such impacts have not been well studied and sufficient information does not exist to determine their net positive or negative forcing impacts on many feedback scenarios." Thus, this summary section should either move or the statement of evidence and agreement should better reflect the text below.	Rejected. There is a difference between the paragraphs. The summary is about mitigation, the preceding paragraph is about climate feedback - somewhat related, but not a great deal.
8865	8	6	4	6	9	This paragraph needs to revised: transport also emits SO2 and other substances and by no means emits aviation ozone.	Accept. at least: yes, ozone is NOT an emitted gas, it's produced in the atmosphere
10763	8	6	4	6	9	It is also important to mention that these effects operate on very different time scales. See e.g. figure 1 in paper by Berntsen and Fuglestvedt, PNAS, 2008, vol 105 no 49.	In text section 8.2
14269	8	6	44	6	45	I'm not sure what the relevance of sustainable development as an objective is in this context. It might be desirable for various reasons, but in the context of mitigating climate change the long-term pathway should meet objectives solely relating to climate.	meeting a single climate objective seems pretty unrealistic….disagree
17764	8	6	45			state what are the "multiple objectives"	Too detailed for exec summary. See text
14744	8	6	46	6	46	The non-OECD class needs to be further disaggregated: BRICS and developing countries.	Rejected. For the issues highlighted in the ES a further differentiation is not needed.
18901	8	6	46			The listed ragions "OECD, DCs, non-OECD" overlap.	It is EITs - not DCs
15863	8	6	5	6	9	Note that retrofits invalidate warrantees and if done poorly can actually worsen emissions.	Reworded
15768	8	6	7			Retrofits would need significant govt support to implement unless there is a financial incentive for the consumer, e.g., natural gas might work in some areas with cheap gas, but particulate traps for diesels would need a govt mandate.	Agree but too detailed for exec summary. Section 8.3
13873	8	6	28	6	29	"Transport Demand Managementpolicies to frame urban expansion due to demographic growth" could be added in "such as facilitation of growth in city centres rather than urban fringes"	Amended
2655	8	6	10	6	12	The ability of infrastructure spending on rail, cycle lanes, BRT, and other alternative modes is really very dependent on getting the walking environment right. Should emphasize that detailed planning is needed to achieve the benefits from these systems.	Amended
2656	8	6	33	6	38	Second sentence in paragraph seems out of context. I'm unsure how relevant adaptation is to this chapter, could be a place to save pages by deleting some of this.	Adaptation relevant to transport
2654	8	6	9	6	9	Ozone is not emitted, but is caused by photochemical reactions. NOX emissions from aircraft affect ozone levels.	Amended
17131	8	60	18	60	21	ADD: Scrapping scheme reduces air pollutant emissions (NOx, PM) at the same time. For example, in Italy, due to the full replacement of EURO 0, EURO 1 and EURO 2 vehicle by newer technology models, total CO2 saving would amount to 8.74 million tons per year. (Sustainable Mobility CO2 in the Road Transport Sector, The Integrated Approach A study by OICA, 2010, p.5-6, International Organization of Motor Vehicle Manufactures (OICA) Available at: http://www.oica.net) AFTER ORIJINAL TEXT: Policies that encourage the early scrapping of vehicles and restrict imports of older vehicles can help decrease the average fleet age, and hence carbon intensity (g CO2/km). Conversely, extending the life of a vehicle can help reduce its life cycle emissions (Kagawa et al., 2011).	Amended but scrapping schemes are expensive with a lot of "free riders". I'm a bit dubious that we should push scrapping schemes….expensive, a lot of "free riders"

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
13119	8	60	2			Please show 2015 (target enacted) and 2020(target propsed) in Japan, if available.	Check if legislation enacted. depends on whether standard is enacted
13426	8	60	5			Japanese government has not decided the new standard after 2016 yet.	Will update if they do. depends on whether standard is enacted
5249	8	60	6	60	7	Would feebates reflect (and moderate) the situation and costs for rural dwellers facing occasionally deplorable road conditions in winter or as a result of flooding? Why should they be penalised for buying, for example, a 4X4 to seek to safeguard their lives against deplorable road conditions?	Will consider but hard to incorporate without references. all regulations and broad pricing schemes are problematic for some portion of the population….not clear how to moderate this here
8721	8	61	20	61	20	In a number of Asian and southern European cities, motorized two-wheelers are banned from city centres to prevent excessive particulate emissions.	Accept but need references. car-free areas should be mentioned, along with this….though this is an anti-pollution measure, not a demand reduction one
3845	8	61	26	61	31	Probably, it may deserve to quote the efforts on GHG mitigation through the use of biodiesel and ethanol used in diesel type engines. For the last technology see the site BEST - Bioethanol for Sustainable Transportation at the web.	Covered elsewhere but can mention
8020	8	61	32	62	4	Please mention and describe shortly 'Integraler Taktfahrplan' ('integrated regular timetable') which is a central quality to increase the attractivity of passenger rail in many countries.	Accept
11364	8	61	9	61	19	Could the following point be considered in this paragraph? "Carbon taxes for new vehicle registration and fuels strengthen the consumer preferences toward diesel vehicles over gasoline vehicles. It was shown that the shift from gasoline to diesel contributes to the climate mitigation when all the components including short-lived climate forcers are considered (Tanaka et al., 2012, Environmental Science and Technology, 10.1021/es204190w). However, such a climate benefit becomes smaller when newer vehicle emission standards are introduced."	To be amended. perhaps, but I suspect the net GHG benefit is variable…hare do use just one reference here
6924	8	61	17	61	19	Please provide a more specific reference to WGI AR5.	Accept. sounds reasonable
2721	8	61	33	61	33	Rail transport is affected not just by relative travel time; comfort and convenience can be a major factor.	Accept. sure, but not sure this is necessary…travel time and probably cost are crucial
2477	8	62				ETS is only mentioned here - surely this is one of the most important potential measures that needs to be introduced globally - and not just for aviation, but for all transport?	Accept but references needed. I would think emissions trading works best for larger entities (like airlines)….not clear to me it's worth pushing for other transport areas, esp. LDVs
2478	8	62				The institutional and organisational issues - the decision making processes and the involvement of the huge number of stakeholders in transport must feature in this Chapter - it is no use having a solution to a problem and find that it cannot be implemented. The questions of governance at all levels - global, regional, national and local cannot be ignored.	Accept
8018	8	62	11	62	11	I did not find (Kuhn, 2011) in the References	To be deleted as not peer reviewed.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
18229	8	62	15			On this data it is important to highlight that technical measures taken by the IMO in 2011, through which are created the Energy Efficiency Index and the Management Plan for Energy Efficiency of Ships (SEEMP), will entry into force internationally from 1 January 2013. Afterwards, from 2013 to 2014, all necessary measures must be implemented to start decreasing, by 2015, up to 10 % of ships CO2 emissions, in accordance with that prescribed in Annex VI of the MARPOL on regulations for the prevention of air pollution from ships, through the inclusion of new regulations on energy efficiency.	To be amended. OK if we can understand the EEDI better
15117	8	62	20	62	21	There are no standards for age of aircraft even for Safety. The standards relate to the airwothiness (design, manufacture, certification and maintenance) and operation of aircraft.	Amended
8019	8	62	20	62	39	From the Special Report 'Aviation and the Global Atmosphere' we have known the warming effects of contrails and cirrus clouds (e.g. RFI = 2.7). Please add state-of-the-art intelligence on this issue in 8.10.4	Amended
15118	8	62	23	62	25	Implementation of emissions reduction measures is not limited to EU States. States in other regions are also acting to reduce emissions from civil aviation through various measures.	Accept
8017	8	62	23	66	23	please add: '(...) fuel-efficiency standards. But even 15 years after the adoption of the Kyoto Protocol and asigning a mandate to ICAO to address mitigation no global mitigation measures in aviation are in affect.'	Accept
15119	8	62	25	62	25	For more clarity, this sentence should start with: ICAO member States....	Accept
15120	8	62	27	62	27	The list of economic measures adopted/explored by ICAO includes also emissions trading	Accept
15121	8	62	29	62	35	The statement in this paragraph is not accurate. In 2010, the 37th Session of the Assembly of ICAO endorsed among other things: (1) a global aspirational goal of 2 per cent annual fuel efficiency improvement up to year 2050 ;(2) a medium term global aspirational goal from 2020 that would ensure that while the international aviation sector continues to grow, its global CO2 emissions would be stabilized at 2020 levels and (3) develop a global CO2 Standard for aircraft aiming for 2013.	Amended
5212	8	62	29	62	32	The reduction of 1.5% per year in energy consumption is very unlikely to be achieved for more than one decade ahead (see e.g. Peeters, P. M., & Middel, J. (2007). Historical and future development of air transport fuel efficiency. In R. Sausen, A. Blum, D. S. Lee & C. Brüning (Eds.), Proceedings of an International Conference on Transport, Atmosphere and Climate (TAC); Oxford, United Kingdom, 26th to 29th June 2006 (pp. 42-47). Oberpfaffenhoven: DLR Institut für Physic der Atmosphäre.	Amended
17132	8	62	43	62	45	DELETE: However, this additional capacity can induce demand for transport and, over time, lead to even greater congestion. An increase in road infrastructure can increase distance traveled proportionally (Duranton and Turner, 2011). REVISE TO: Building more roads often induces more demand, but where appropriate, the total CO2 emission will be reduced even considering such an induced demand. (-Traffic Flow Improvement Measures, Ministry of Land, Infrastructure, Transport, and Tourism, Japan Available at: http://www.mlit.go.jp/singikai/infra/kankyou/2/images/shiryou3.pdf -Road Infrastructures to Avoid Global Warming, Ministry of Land, Infrastructure, Transport, and Tourism, Japan Available at: http://www.mlit.go.jp/road/singi/bunkakai/5_3.pdf) ADD: The increase of traffic volume is one of the main causes which induce congestion. However, other causes include the obvious lack of road infrastructure especially in developing countries. Appropriate design of the route and traffic signal control, peak-time shift of commuting could be the solutions.	Amended

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
14300	8	62	6	62	8	The measure the IMO has adopted (the Energy Efficiency Design Index or EEDI) is positive, but technically it may not reduce emissions from shipping, since it only affects emission intensity. If demand increased faster than intensity improved, then emissions would increase.	Amended
18228	8	62	6		8	To enrich this report, it is recommended to enhance information referring to mandatory measures adopted by the IMO in relation with reduction of greenhouse gas emissions, since such measures are barely mentioned. This with the purpose of referring to the established in the International Convention for the Prevention of Pollution from Ships (MARPOL), the Annex VI and the amendments adopted to prevent air pollution from ships activities.	Accept
14301	8	62	9	62	12	While sulphur emissions are important (and the IMO has taken action to reduce them), the reason the EU are considering indepedent action on emissions is more directly related to climate change. Specifically, international shipping is the only sector which is not currently covered by the EU's climate change targets.	Accept
2722	8	62				Mention lower speed for ships as a carbon reduction policy.	Accept
2723	8	62	36	62	39	Provide an update on the status of aviation within the EU ETS. Are airlines complying?	Will do
11283	8	62	40			The content of this section can be enriched by including elements of the section "Contemporary Appraoches to Linking Spatial Planning to Urban Infrastructure" of the Global Report on Human Settlements 2009, also with regard to its table 8.2 "Approaches linking spatial planning to urban infrastructure" (p. 161). UN-Habitat (2009): Global Report on Human Settlements 2009: Planning Sustainable Cities, pp. 155-157, 160-165. [available at http://www.unhabitat.org/pmss/listItemDetails.aspx?publicationID=2831	Accept
5419	8	63	19		21	"Comparing" London to Surabaya seems a strange comparison….I assume that Surabaya is a very poor city…..it is so far removed from a city like London that it's modal split has little to offer by way of comparison, at least in this discussion.	To amend
3846	8	63	27	63	32	Remove the sentence since it is a repetition. This text has already been discussed. Search for the reference "Trubka et al, 2010", in your paper, to identify earlier discussion.	Accept
5420	8	63	42		45	Here and elsewhere in the text, esp. in the first two sections, a large number of citations are used to back up a fairly general comment…..this may just be a personal quirk of mine, but I prefer a bit more judicious use of citations, esp. for such general comments	Is a literature assessment
5418	8	63	7		8	Not clear what this means…..toll projects have failed to achieve projected reductions in traffic volumes and hence revenue???? Seems that failure to achieve traffic reduction implies MORE revenue, not less.	Agreed. Accept
8386	8	63	37		40	This part should be moved to the first pages of chapter 8. Pls move it.	Accept not policy - to 8.4. or repeat it
8388	8	64	1		22	On this last page a number of comments are made that will fit well into an early presentation of current challenges in the sector of transportation instead of written as final comments. The entire chapter would improve if you re-work the outlined and explore the content of the comments made in the last part of the chapter.	Agree. I agree…these comments are both general and important, should be moved up front
8387	8	64	11		25	Wordings are weak and most of this has already been said. Sharper writings are required – due to the magnitude of the problems and the state of the art of existing solutions. For instance a low-carbon transport system is not sufficient or good enough to alleviate all sorts of problem being discussed. Pls elaborate on the IPCC version of sustainable transport.	Accept. agreed, although not sure how we can do this

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
5293	8	65				COMMENT: There are cases of national levels land use and mobility measures and objectives. In 2012, the French national government established compulsory Territorial Climate and Energy Plans for all public administrations representing at least 50 000 people. The PCETs include: 1) both mitigation and adaptation measures (experimental for the last); 2) an energy component; 3) EU 20/20/20 objectives. The PCET supersede all other planning documents: mobility, urban planning, transports, land use, construction, non carbon mobility… All texts and policies related to these issues must conform to PCETs' goals. However, the legally binding aspect concerns only administrations. The plans are voluntary for other actors on the territory (industries, small firms, universities…) who are encouraged to sign a charter and act on the emission linked to transports. No penalty (so far) has been planned for communities who do not reach their targets. The different PCETs are supervised from far by the National Environment and Energy Agency (ADEME, which also developed a carbon footprint evaluation method). The emphasis is on policy innovation through new linkages between services, and efforts at mainstreaming the 20/20/20 climate objectives throughout the sectors, departments and institutions. Hence, efforts at decreasing cars in daily life are impulsed by a national legislation.	Accept - to be amended
3591	8	65				It is almost impossible to read this table. See comment 14	Draft only. at the very least, expand the table to fill the page
5213	8	65	1			More far reaching infrastructure planning is missing. The point is that the increase of long distance passenger transport by air, including all possible theoretical technologocal efficiency improvements, still may take up 20% of current global CO2 emissions by 2050, thus blocking a sustainable emissions path for theglobal economy by then (e.g. Bows, A., Anderson, B., & Peeters, P. M. (2009). Air transport, climate change and tourism. Tourism and Hospitality: Planning & Development, 6, 7-20).	Accept
8209	8	65	1	65	4	What is the most 'original' source of this Table? I saw a very similar Table in GIZ's report "Sustainable Transport: A Sourcebook for Policy-makers in Developing Cities - Module 5e: Transport and Climate Change" (2007) pp35, table 16, which was written by Holger Dalkmann and Charlotte Brannigan. Please be careful to cite the sources, and do more literature review.	Will check
4343	8	66	1	66	17	international data of freight flows is notoriously weak. This section needs to mention that there is no data on urban logistic flows, average length of haul per commodity nor per value basis. There are no data on carbon emisssions at the level of individual supply chain sectors such as sub industries	Drawn attention to some new data-bases some which we should use for the next draft. This is partly true. There is certainly a need for greater harmonisation of the measurement and reporting of carbon emissions from freight transport. This should be mentioned in the report. On the other hand, there is an emerging consensus on the key measures that should be applied to cut freight-related emissions. The particular mix of measures will vary with a country's level of development, size, industry structure, resource endowment etc. this is implied by lines 10-11….this is just a more detailed and specific example of it

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
8023	8	66	1	66	17	"Developing the capacity (analytical and data) for multi-objective evaluation is an important part of the process of cultivating sustainability and climate mitigation thinking and culture in the long term." from p.56, l.39 is worth being mentioned in 'Gaps in knowledge'	Accept
3592	8	66	10	66	11	Add text such as: "The effects of mitigation measures are difficult to quantify for freight transport, and the trial approach under real business condition is needed in order to prove the technical feasibility and economical viability of the solution. However, poor policy support for innovation and shortage of knowledge on the collection of the right kind of data leads to a poor knowledge base on innovative and effective solutions in freight technology and organisation. Therefore, the lack of clear data leads to a slow market uptake of innovation such as city logistics and low carbon vehicles. There is also a need for comparative studies of costs-benefits of different green logistics, city-logistics and low carbon freight vehicle solutions"	Some useful suggestions which will be separately evaluated and would be worth incorporating . This is partly true. There is certainly a need for greater harmonisation of the measurement and reporting of carbon emissions from freight transport. This should be mentioned in the report. On the other hand, there is an emerging consensus on the key measures that should be applied to cut freight-related emissions. The particular mix of measures will vary with a country's level of development, size, industry structure, resource endowment etc Useful suggestions here, particularly on the role of innovation and the difficulty of getting data on the implementation of carbon reducing measures in the freight sector. Since draft 0 was released, the report of the EU Strategic Transport Technology Plan has been published which addresses the issues raised here. I don't love this language, but I guess that lines 10-11 are just too skimpy and perhaps not helpful to policymakers
11655	8	66	2	66	2	Why particularly aviation?	Has specific problems
17171	8	66	2	66	2	Aviation data is gathered, but not publically available; there could be a plea for cost-free aviation data.	Agree - not the place here though
12160	8	66	2	66		The sentence "...particularly for aviation" is disconnected, without good connection. So, I recommed to remove "...particularly for aviation".	Accept
13895	8	66	29	66	38	Cost issues should be discussed (potential reduction at what cost ?)	In earlier sections
5294	8	66	9			ADD: A study on mobility in Lyon shows that modal transfers on the same journey was one of the key factors encouraging the use of the car due to lost time and comfort (Stéphane La Branche, « La gouvernance climatique face à la mobilité quotidienne. Le cas des Lyonnais ». Urban environment. 2011°	this is too specific and limited for this section

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
11654	8	66				I think it would be good to mention the major uncertainties for the future development: Oil price; price, capacity, lifetime of batteries; price 2nd generatin biofuels; transport demand.	Agree: could be added but space constraints. there is a difference between unknowables (oil price, future cost and performance of new technologies) and gaps in knowable knowledge….I suspect we need to focus on the latter here, and perhaps, at most, just provide a general statement of the former
15857	8	66	1			This section suggests that all of the gaps are in understanding of consumer behavior. This is surprising; there are a lot more gaps than this. Actually, it seems that customers will respond to value in choosing more efficient and lower GHG transportation. Seems like the bigger gaps are in having soundly based and well-informed and analyses that accurately point out and project value to customers among various options. This type of orientation is lacking in this chapter. Additional Gaps to consider: better data for transport fleets in developing world, more data that provide well-informed analyses to allow customers to accurately gauge value and choose among various options	good comment…
3467	8	66	2	66	17	Regarding gaps in data, it should be mentioned that in most of developing countries, there is no accurte or reliable information about the fleet by type of engine (diesel, gasoline, LPG, etc.). This information is relevant in order to analyse substitution process and its impacts	relevant
6493	8	66	2	66	17	The statements does not address the core problem i.e. lack of data in developing countries and cities to do accurate analysis of Carbon emissions as quoted by many researchers. The data is either not sufficient to do quality analysis and gain insights or not routinely collected to understand the impact of policies and investment.	relevant
8014	8	66	24	66	24	Please specify to "(...) increase into the future, if no drastic mitigation (...)": Only some mitigation won't reverse the trend.	Accept
8015	8	66	42	66	42	please insert 'less fatal accidents' after 'health'	reduction of fatal accidents may occur, but only with specific mitigation measures such as urban planning and increased transit share….frankly, a large shift to bicycling seems likely to increase fatal accidents, not decrease them….we need to be careful in defining co-benefits
11656	8	67				Clean up multiple duplications.	Accept
17765	8	7	1			what are these "improved techniques"	Detailed in 8.6. the current statement is overly general
15771	8	7	1		3	Again, unless there is significant govt intervention, this comes down to what is most cost-effective for the consumer.	Amended
11273	8	7	11	7	12	Are "travel cost savings" really a co-benefit of reducing CO2-emissions? If there are travel cost savings economic theory suggests that there is an increase in CO2 emissions (since cost savings are at least to a certain degree reinvested to travel)	Rebound effect discussed elsewhere. disagree….perhaps 10-20% reinvested in travel,and even that may be viewed as a benefit to the traveler
14270	8	7	16	7	17	These factors are not specific to transport - they apply to all sectors.	Accepted.
14746	8	7	16	7	17	???	agree, statement isn't clear Deleted,

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
14747	8	7	18	7	20	Examples?	agree, statement is so broad as to be of little valueToo detailed to list in Exec summary
16275	8	7	18	7	19	Same as above.	agree, statement is so broad as to be of little valueToo detailed to list in Exec summary
15300	8	7	20			Comma needed before "such as".	Done
15301	8	7	21			I recommend a thoughtful statement to round up this Exec Summary, which reads like a series of generic statements that go both ways (so they can't be wrong) & don't really clue the reader into useful specifics. I imagine this Exec Summary is going to get a fair bit of editing once the body of the chapter is revised to reflect reviewer comments, and I hope its start & end can be more like an Intro/overview & Conclusion/summary. Thanks!	Agree
8867	8	7	8	7	21	Text in bold and the following seem to contradict each other. The text in bold talks about co-benefits of mitigation and the following text focuses on mitigation as a co-benefit, forgetting that mitigation has co-benefits in terms of reduced air pollution etc.	Differs rather than contradicts. doesn't seem contradictory, just a bit different
15804	8	7	8	7	10	statement about co-benefits is not quantified and no justificaiton in text given for statement that co-benefits may exceed costs	Agree. Section being re-drafted
15299	8	7	8	7	10	I'd love to see a section reference [8.x] for this statement.	Agree
2657	8	7	13	7	14	"The risks of technology failure in transport sector…" This seems like a vague comment, please be more specific about what is meant and why there may be risks.	agree…too much hand waving
8870	8	8				This figure is out of date and shall be omitted (reduces also the length of the chapter). Figure 8.1.1.b is sufficient to show the regional differences	and it's not really discussed…I agree it doesn't serve much purpose here. Deleted,
4334	8	8				need to use GDP data expressed in purchasing parity levels rather than standard GDP	Deleted,
4335	8	8				need to provide figures for freight transport emissions of carbon dioxide	This is total transport. Drawn attention to some new data-bases some which we should use for the next draft
15313	8	8				sorry to see this is in b&w. will this be color in the final report? I'm afraid I can't distinguish most of those short lines, so this is not such a useful figure to have right now. Y axis label should probably be "Transport sector's share of…" rather than Transport sector share in.	Deleted,
15745	8	8				Figure 8.1.1.a needs to be coloured.	Deleted,
14748	8	8	1	16	30	Chapter 8.1 and 8.2 needs improvement: A lot of complicated, nested phrases and redundancy.	To be re-written
15305	8	8	11			"movement of freight" reads better as "freight movement" here. (more concise writing :-))	Amended. Editorial
15306	8	8	12			sounds better as "the world's projected growth in transport" (rather than "the projected world growth in transport"	Amended. Editorial
15307	8	8	13			"the transition" reads better as "this transition"	Amended. Editorial
12882	8	8	13	8	15	Give citations for this statement.	Done. also: do most integrated assessments even CONSIDER "social acceptability and behavioral impacts
15308	8	8	14			please give an example (or two) of "stringent strategies" (in parentheses); thanks!	Amended. agree..this is just too vague
15309	8	8	17			demands overlapping with *systems* sounds odd (they are distinct things); perhaps we mean to say overlapping with "demands on the electric power system"?	Agree
15310	8	8	21			"to industry" should be "to industry's share"	Amended

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
15311	8	8	22			do we mean to say "anthropogenic" emissions when we say "total GHG emissions"? I find 14% unexpectedly low & wonder why it's not at least 20%. Please try to be more specific here, so the reader knows why the drop from 27% to 14%.	Amended. 14% correct. agree, but low value implies denominator is total, not anthropogenic
15312	8	8	22			", 22%" should be "and 22%", since the final item in this list is non sequitur/distinctive (beginning with "but")	Reworded
3818	8	8	23	8	27	Very difficult to read the figure in black and white.	Deleted
15314	8	8	26			not sure why there are spaces on either side of the slash for GDP/capita in this title. (They are properly not in the y-axis label.) Personally, I'd say "GDP per Capita" in the title.	Deleted
15302	8	8	5			I'd say "congestion and crashes" not just congestion. Roadway crashes actually tally (in the US) to 3 times the cost of congestion (but they are less common, so people tend to neglect their serious toll).	Amended. good suggestion
12880	8	8	6			Add 'and noise pollution' after higher greenhouse gas (GHG) emissions	Added
15303	8	8	7			comma needed before "including".	Added
8869	8	8	8			This sentence seems to refer to the current situation and this needs to be made clear	Rejected. This is a general statement.
16277	8	8	8	8	8	It is better to modify the phrase "Each requires" to "Motorized transport modes require".	Cycling needs food energy. rather, "each mode"……
15304	8	8	9			comma before "infrastructure" should be an "and" (since the next item in this list is an infinitive, which would be inconsistent w/o the "and")	Agree
12881	8	8	9	8	10	The proposition of the sentence - the transport sector has the potential to decarbonize its energy supply at relatively low mitigation costs - needs to be clarified and proved by literature quote. It seems that the literature on economy-wide mitigation assessments derive the transport sector to be the least cost-efficient sector to decarbonize.	Amended. yes, we haven't shown this, and the proposition is doubtful
5395	8	8	9		10	decarbonization certainly is possible, but it is unlikely to happen at "relatively low mitigation costs"….and I don't think you have shown this.	Agree - reworded
16278	8	8	9	8	10	Same as the comment No. 7.	Not clear which comment this is
13874	8	8	10	8	10	"relatively low mitigation costs" need to be referenced as this assertion is debatable	Amended
2658	8	8	14	8	15	"…that consider social acceptability and behavioural impacts." - this statement is vague, please be explicit about what you mean about both 'social acceptability' and 'behavioural impacts'	Amended. agree that it's not quite clear what this means
6474	8	8	15	8	17	– It is not very clear as to what is meant by “Depending upon technology developments, future transport end-use demands could overlap to a greater extent with electricity supply systems” – It’s not technology alone which would impact the future transport demand	Amended. reviewer seems to misinterpret statement….the developments affect whether batteries will be the primary driver of transport….implying "overlap" with electricity supply systems
2659	8	8	15	8	17	"Depending upon technology developments…..could overlap to a greater extent with electricity supply systems". This statement is again vague; any decarbonization strategy in transport by necessity will require electricity from renewables with a small portion of biofuels. So 'could' is a weak way to word this.	Amended text. don't agree. Not appropriate
3462	8	8	19	8	23	Please mention that transport efficieny is lesser than those observed in other sectors, so most of the energy used in this sector is wasted.	Rejected. Space constaints and difficulty to soundly compare (which references?), incl. other low efficiencies (coal-fired or biomass-fired steam power plants, geothermal, etc.).

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
2660	8	8		8		Delete table 8.1.1a as 8.1.1b shows intended point more clearly	Figure (not Table) deleted. referring to figures, not tables….not clear to me that the figure is all that useful…..though I'd love to see a figure that measures transport energy or GHG emissions vs. per capita income, with discussion. Not appropriate
17170	8	80	35	80	36	IEA 2009a and IEA 2009b are the same reference	Amended
2437	8	9				This figure shows the scale of the problem - 1970 to 1990 with a 60% growth in CO2 emissions in transport and a further 36% to 2010 on a higher base - so a similar absolute increase. This is key - recent history does not suggest any reduction	Noted
17766	8	9				no one can see the "indirect N2O emissions" in the figure	Agree. Will amend or incorpoate into "other"
10764	8	9			9	It should be noted how CO2 equivalents are obtained. The picture would probably look quite different if a different time horizon or metric was used instead of GWP100.	Not in this chapter. Will be outlined in Chapter 1. suggest this be handled up front, not continuously repeated
10765	8	9			9	It should be noted how CO2 equivalents are obtained. The picture would probably look quite different if a different time horizon or metric was used instead of GWP100.	Not in this chapter. Will be outlined in Chapter 1. We suggest this be handled up front, not continuously repeated
2807	8	9				Please indicate the source.	Accpeted.
2808	8	9				Please indicate the source.	Accpeted.
16286	8	9		9		I think that this figure is unnecessary as long as Fig. 8.1.2.a exists.	Shows regional differences
14749	8	9	-	9	-	Error in the legend - REF?. You need to explain the regional abbreviations - MAF?	Agree.
15315	8	9	8			I'd make the "from 1970-2008" into "from 1970 to 2008" (to be consistent & to remove that low-riding hyphen ;-)). Odd to see no dark green for top band of this & the prior figure (for indirect N20 emissions). That makes readers think something is missing, or why even show that in the legend if it really doesn't factor in. Probably should have that in the "Other" categories shown.	Agree. Will amend or incorpoate into "other"
15116	8	9	9	9	9	To which year do the percentages 6.8% and 8.2% refer?	Amended - 2008
2661	8	9		9		Spell out acronyms at top of table 8.1.1b	Amended
2662	8	9	3	9	6	Reference to AR4 - can this be updated with more recent information on growth rates?	Good to refer to earlier report- Now reworded
3411	8	all				Impressive piece of work!	OK
17134	8	Page27				COMMENTS: - Only gasoline fueled Auto-motor vehicles are set to be baselines - GHG emissions per passenger km travelled should be compared based on annual average occupancy of vehicles. Besides, this figure needs to also include updated PHV and BEV LCA results, otherwise this would mislead readers and societies. - There is a comparison study on LCA of CO2 emission between next generation vehicle including HV and EV and public transportation including LRT, etc. (Y. Yamada, H. Kato, N. Shibata and K. Ito, Nagoya University (2011), The Institute of Life Cycle Assessment, Japan 2011, A Methodology for Choice of Low Carbon Transport Mode Fitting to Travel Scene and Transport Situation Based on LCA). This study showed the result that automobiles can be lower carbon emitter compare to public transportation considering mass movement transportation situation, transportation situation in low DID population density and future technological innovation of fuel efficiency improvement.	Noted. Figure changed. The figure does base values on average occupancy. Assumed vehicles were empty.