Expert Review Comments on the IPCC WGIII AR5 First Order Draft – Chapter 1

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
9098	1					Totally appropriate concept	Noted
17119	1					This chapter does not have any acknowledgement of the global climate advocacy efforts of local governments that has focused through Local Government Climate Roadmap in 2007. A major outcome of the process was the Global Cities Covenant on Climate - the Mexico City Pact which has an international secretariat and regularly monitors progress of signatories. carbonn Cities Climate Registry in an important effort of local governments for measurable, reportable, verifiable climate action, which captures information of more than 170 cities worldwide as of July 2012. Recognition of local governments as governmental stakeholders in para.7 of Cancun Decisions is also important reflection of all these efforts in to UNFCCC processes.This is partciularly important because many of these efforts have been realized or intensified since the relase of AR4. I believe the chapter should also have a bit more reference of theissue of urvanizatuon and global GHG emissions since there are significant number of pages in the whole WGIII Report.	Accepted - Added sentence, "A large array of mitigation actions have also been planned and orchestrated by local governemnts, including cities that are working in concert on climate change issues through parternships such as the C40, and there is some evidence that these efforts are intensifying. " [cite para 7 of Cancun decisions on local action/cities; add cross-reference to chapter 15]
17739	1					Overall, this chapter should be checked by the authors once again when other chapters have been finalised. At the end, there should be a paragraph on identifying each chapter and what these are about.	Noted
5460	1					This chapter attempts to summarize changes in emissions, changes in how emissions are viewed (multiple perspectives here) and emissions in a broader context of a paradigm shift in how climate change is considered- here in a much broader context of sustainable development. While the authors present a range of figures- the grouping of figures in 1.7 seems both too complex and too simplistic. (b) in this figure dramatically shows the importance of world trade - this deserves a clearer emphasis and additional discussion- perhaps best to put this in a seperate section. The discussion of sustainable development and the interaction with climate change is critical and is an important part of the chapter- but some type of figure to illustrate what is potential with this interaction would be very helpful for the reader	Rejected, it is not practical to address sustainable development coherently in a figure, and there are lots of ways to organize the material here.
4138	1					It would be helpful it you could develop section 1.5 and maybe merge it with section 1.4 because it seems that the latter already contains some material on key issues focused on by subsequent chapters.	Taken into account - we will streamline at final
4139	1					Please review section 1.3 in light of chapter 5 discussions. If you feel that this section contains redundant and/or inconsistent duplications of chapter 5 discussions, please revise your sections.	Accepted - we have redrafted and streamlined
4140	1					It would be useful if your Introduction to the report also said something about its underlying assessment philosophy and related key issues in the science-policy interface. This discussion should be related to the AR5 roadmap (section 1.5) because one key purpose of the framing chapters is to establish transparency over normative assumptions that are implicit in the concepts and methods used by later chapters to assess transformation pathways. The need to do this arises from our assessment philosophy. Please liaise with the Co-Chairs and chapter 2 authors (section 2.4.5.3) to discuss how to introduce the AR5 assessment philosophy.	Taken into account - we will streamline at final
8910	1					Please make sure that all abbreviations are explained in the text and that legends to figures include the abbreviations used in a figure.	Editorial – copyedit to be completed prior to publication
4469	1					In general, the Figures are hard to read, even on a high-resolution computer screen. This will be a problem for those accessing the Report online.	Figures will be re-designed for print and on-screen display for final draft.
2347	1					<no comment here as cells could not be enlarged to fit the text>	no comment text submitted to database
2353	1					Exclude findings/results from the introduction. Those should go to the "technical summary" and the SPM. I recommend to focus the introduction to "what did we do and how did we do it" in AR5 WGIII.	no action needed--we will have figures and tables in chapter 1

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9782	1					Environmental impact categories beside Global Warming Potential and trade-offs between them, should be stressed throughout the report	Noted - we already discuss interactions between impacts. No further action needed
9777	1					(a)and (b) is not good only to give "change in emissions", suggest to give us as "emission in 1900,1990 and 2008"	Rejected, exactly that information is presented elsewhere in the chapter and in the whole report
16200	1					Needs a legend for the abbreviations of the regions	Taken into account - figures will be re-designed for print and on-screen for final draft.
18013	1					It is general position of the developing world that the principle and provisions of the UNFCCC should not be changed. The current negotiation under the Durban platform does not have the mandate to modify or replace the UNFCCC. So it is important that this section dose not send wrong signals to the UN process.	Noted.
17480	1					Resolution of 1.7a is so poor as to prevent reading or review	Taken into account - Figures will be re-designed for print and on-screen display for final draft.
17481	1					Captioning is quite inadequate. For panel a, there should be some guidance as to interpretation, i.e., helping reader to "read" the graph. Axis labels and legends are so small as to be unreadable even when viewed on screen at 100% size.	Taken into account - Figures will be re-designed for print and on-screen display for final draft.
17795	1					General: It would be useful to explain in the first pages also - why little focsu has been given to other sectors then energy which had however as of AR4 a significant mitigation potential - e.g. households. I find it interesting that the authors rely a lot on the recent big energy reports e.g. GEA, WEO, IPCC etc - rather then having a slightly less global reports biased approach. If it is really so that in the other areas	Rejected. No action needed.
17796	1					contl little progress has been done - then there should be a call for more research or analysis.	Noted
17798	1					contl would explain why these initiatives or not others have been selected	Noted
17799	1					The reference to the Fukushima accident and the implication for energy choices, e.g. a divided europe - might be elaboated in a way that it includes " the concern for population health of the Fukushima accident - has lead to a diferential approach between and within countries - also time will show how long the fears will prevail	Noted, no action needed.
17802	1					The style of the chapter in general could be improved - it has initial important developments - but does not outline for example the particular choices done in additional or more in depths analysis in the remaining chapters - it further does not shine - for referrences, and in some parts it appears to be a bit biased and narrow minded. A bit more relying on AR4 - and clearly evolve from some of the key messages - reported from wg 3 in the synthesis report could be important	Taken into account - we will streamline at final
17803	1					General: It would be useful to explain in the first pages also - why little focsu has been given to other sectors then energy which had however as of AR4 a significant mitigation potential - e.g. households. I find it interesting that the authors rely a l	Taken into account - we will streamline at final
17801	1					In paticular Figure b - could be better worked out - and with the raw data - of the 1,b,c,d - could not linkages created???	Rejected, these are already quite complicated; adding more linkages is probably impractical
15265	1					I consider the approach of Chapter 1 is very pragmatic, and it is crucial for the real challenge to the global worming. Especially, regarding with the current situation of the world, the realistic description on the hardness to stop warming at +2oC (P22L19), and on climate problem location as one of the wider array of urgent priorities that governments face (P22L44) are plausible.	Noted

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17399	1					In general, I recommend caution with portraying the climate change mitigation challenge as exclusively linked to energy to the exclusion of agriculture, forestry and other land uses. See Ch 1 pp 15-16 for quantitative basis for giving adequate attention to AFOLU. Also, Fig 1.5 illustrates the significance of AFOLU in many regions. Further, changes in land use offer mitigation responses that can both reduce GHG emissions and also sequester atmospheric C.	Accepted - added discussion of land use.
15455	1					While the report as a whole deals with gender issues quite substantially, the Introduction does not refer to women specific issues, or problems of gender. Since there is now substantial literature on gender and climate change issues, as well as a vast literature pertaining to feminization of agriculture and pastoral economies, and feminization of poverty - both tangentially and directly implicated with climate change related vulnerability and adaptation - the Introductory chapter MUST introduce the problem of gender, and the need to have a women focus on adaptation strategies.	Noted - no action needed; there is no literature to engage nor other chapters to engage
18124	1					c) Figures a and b may be a bit too small - I had to blow it up to 300% to see the details.	Figures will be re-designed for print and on-screen for final draft.
5313	1					is written very well and well balanced, also highlighting the trade-off between investment in green house gas mitigation and other important issues such as poverty reduction and so on.	Noted
5314	1					Chapter 1 is written very well and well balanced, also highlighting the trade-off between investment in green house gas mitigation and other important issues such as poverty reduction and so on.	Noted
3048	1					The following comments apply only to the rebound and energy efficiency aspects of the models listed in Table 1.8. Accompanying this submission is a Word document, "Rebound Comparison of Models Listed in Figure 1.8.docx" containing a table comparing all the models across the dimension of rebound-relevant features. These seven features are: - Production function form - Factor substitutability - Factor prices - Efficiency technology method - Multi-factor technology gains considered? - Productive ("embedded") vs End-use energy consumption distinction? - Consumer re-spending effects considered?	Rejected - relevant for another chapter; chapter 1 draws on chapter 6, where the models are discussed in greater detail.
3049	1					While many of these models are extremely rich in detail, fundamental determinants of energy efficiency rebound, and thus of energy use itself, are perhaps underdeveloped by comparison to other model features. No model considers all the rebound-relevant characteristics listed above.	Rejected - This is not a EMF model intercomparison document. It just reviews what is out there.

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3050	1					A number of the models use some version of a CES production function, sometimes with nestings of Cobb-Douglas or Leontief. It is known that CES functions are fairly "rebound-flexible," but have the disadvantage that energy use in response to price and rebound effects of efficiency gains are determined overwhelmingly by the energy elasticity of substitution. Therefore, these models' energy results are largely determined by modelers' choice of this elasticity's numeric value. This points to modelers needing to be careful in selecting the parametric value and clear in reporting it so comparisons can be made. Ideally, this value will be econometrically measured, not simply assumed. Merely assuming a value is tantamount to pre-determining the results. The simplicity of the CES function also suggests that models would benefit from a less arbitrary choice of production function, more general and more flexible. A rigorous comparison of production functions for uses such as these is given in [H.D. Saunders, "Fuel conserving (and using) production functions," Energy Economics 30 (2008) 2184 2235.]. The importance of the core substitution elasticity in CES production functions is shown there and in [H. Saunders, "The Khazzoom-Brookes postulate and neoclassical growth," The Energy Journal 13(4) (1992) 131 148]. There is also the thorny question of how to nest these various production functions, as the nesting scheme matters to the results. Turner and her colleagues [karen.turner@stir.ac.uk] have expended considerable effort looking at this question.	Rejected - relevant for another chapter; chapter 1 draws on chapter 6, where the models are discussed in greater detail.
3051	1					Models using some form of the Kaya identity face all the problems listed above related to the energy intensity term.	Noted
3052	1					Since factor substitutability is such a key driver on the production side, the more explicit the model in depicting this, the more credible the result.	Rejected - relevant for another chapter; chapter 1 draws on chapter 6, where the models are discussed in greater detail.
3053	1					For those models using a production function approach, the manner in which energy efficiency gains are introduced is important. Arguably, a factor-augmenting approach is best, as it fits most closely with engineering concepts and can be econometrically measured. The AEEI concept creates some issues when introduced in the traditional way to a CES function. That is, when translated into an equivalent factor-augmenting expression, the functional form is difficult to interpret in anything resembling a commonsense engineering depiction of the efficiency technology being implemented. The article cited previously shows how factor-augmenting technology terms can be measured econometrically [ref: H.D. Saunders, "Historical evidence for rebound in 30 US sectors, and a toolkit for rebound analysts," (2011, under review) available at http://works.bepress.com/harry_saunders/9/] and another reference shows how such terms can be assessed consistent with engineering principles [for detail on obtaining engineering assessments of energy-augmenting technical change see also H. D. Saunders. "Specifying technology for analyzing rebound" in: Energy efficiency and Sustainable Consumption: Dealing with the rebound effect. Ed. H. Herring and S.Sorrell. Palgrave Macmillan, 2009. link available at: http://works.bepress.com/harry_saunders/12/].	Rejected - relevant for another chapter; chapter 1 draws on chapter 6, where the models are discussed in greater detail.

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3054	1					No models explicitly incorporate consideration for technology gains that apply to other factors of production, with the exception of WITCH, which introduces a neutral technology gain parameter (TFP), and the possible exception of MESSAGE, if it considers technology gains for other factors via its annual "recalibration" approach. Technology gains for other factors have a huge impact on energy consumption [H. Saunders, "The Khazzoom-Brookes postulate and neoclassical growth," The Energy Journal 13(4) (1992) 131 148] and [H.D. Saunders, "Historical evidence for rebound in 30 US sectors, and a toolkit for rebound analysts," (2011, under review) available at http://works.bepress.com/harry_saunders/9/]. Research is needed to evaluate this effect on energy use more explicitly to improve forecasting.	Rejected - relevant for another chapter; chapter 1 draws on chapter 6, where the models are discussed in greater detail.
3055	1					None of these models apparently incorporates the ability to partition energy efficiency gains as between productive and end use sectors. Some use a traditional Residential/Commercial/Industrial/Transportation partitioning, but none distinguish efficiency gains in households and for personal transportation (where utility maximization is the driver) from energy efficiency gains in the productive part of the economy (where profit-maximazation is the driver). The productive side of the energy economy (including commercial/industrial/commercial transportation sectors) is where energy becomes "embedded" in the goods and services provided. Efficiency gains are likely to have very different effects in these two components of the energy economy.	Rejected - relevant for another chapter; chapter 1 draws on chapter 6, where the models are discussed in greater detail.
3056	1					None of these models seems to take advantage of new research on end-use consumer "indirect" or "re-spending" effects. Several researchers have found fairly significant rebounds owing to these effects [Druckman, A., Chitnis, M., Sorrell, S. and Jackson, T., 2011 Missing carbon reductions? Exploring rebound and backfire effects in UK households. Energy Policy, 39, 3572-3581.] and [Thomas, B. A., Azevedo, I. under review, 2012 Direct and Indirect Rebound Effects for the U.S. Household Using a Partial Equilibrium Model. Working paper available at: http://www.andrew.cmu.edu/user/ilimade/Ines_Azevedo/Home.html] and [H.D. Saunders, "An Income-based Analysis of Historical US Energy Consumption" Available at: http://works.bepress.com/harry_saunders/27 (2012, under review)]. Any discussion of rebound should acknowledge direct and indirect effects on both the end use side and the production side of the energy economy. These effects may be strongly additive.	Rejected - relevant for another chapter; chapter 1 draws on chapter 6, where the models are discussed in greater detail.
4368	1					A general comment on chapter 1: I find it difficult to appreciate the cost of implementing mitigation and adaptation measures. May be it would help to compare estimation of this cost against other expenses such as the cost of the recent economic crisis, the cost of military conflicts around the world, etc	Noted
10460	1					A good chapter and mostly well written. Need to avoid personal pronouns though throughout.	Taken into account - we will streamline at final
10676	1					Show 2100 chart from Unger as well, to demonstrate how importance of emissions depends on time horizon? Although this is shown in Figure 8.2.1, I'm not sure that readers of the current draft would go to the transport chapter to find it.	Rejected - figure has been replaced
10374	1					We suggest to adopt more models from developing countries, so that to convince developing countries taking part in mitigation. Our model also produce the BAU emissin, in which emission in 2100 and 2050 is about 70 GTC and 48GTC respectively. So we may suggest to include some other models from developing countries, especially the IAM which is different with the ones AR5 has selected.	Rejected - relevant for another chapter; chapter 1 draws on chapter 6, where the models are discussed in greater detail.
9923	1					Resolution is too low to read the data and legend clearly.	Taken into account - figures will be re-designed for print and on-screen for final draft.
9924	1					Resolution is too low to read.	Taken into account - will be done as part of final check

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9925	1					Assumptions for economic growth, technological change and population growth etc. vary in different models. So BAU emissions from different models are non-comparable only if all the model assumupations are also list as complements.	Rejected - relevant for another chapter; chapter 1 draws on chapter 6, where the models are discussed in greater detail.
18420	1					main messages and changes since AR4	No action needed
9928	1					It's very helpful to highlight issues learned after AR4, but as a response to those issues should be reflected in the following chapters. So that we can see the progress IPCC made after AR4.	Noted
17003	1					The lack of any discussion on hydro is a glaring omissions. Both large-scale and the potential for micro-hydro, especially in non-grid-connected areas.	Rejected, hydro's potential in mitigation is comparatively limited.
18425	1					Energy supply Again, the tone is rather optimistic, because it emphasizes the growth of alternative sources of energy (which is true) but does not acknowledge completely the trends in coal, and oil, especially horrible sources like tar sands. Regarding shale gas, the report does not fully recognize the potential problems with this source, in terms of delaying investment in cleaner energy technologies. □	Accepted - added a declarative statement about coal and more discussion on drivers of emissions
18426	1					International organizations and agreements It is interesting that the report recognizes the growing of different forms of institutional structures in dealing with climate change, such as G-20 and g-8. But, no surprise here, it fails to acknowledge that the failure of UNFCCC in 2009 is due to structural problems of that kind of negotiating platform. The review of the research agenda of RI and climate change is excessively concentrated in liberal-institutionalism agenda, and does not acknowledge constructivist and especially global governance approaches. □	Accepted, will add some mention of constructivist work, but if you look at the reference to Hafner-Burton et al (2012) you will see that work cited heavily
3310	1					I find this section and its graph nearly inscrutible.	Noted - all figures completely redone
10675	1					Short-lived forcings (especially methane, ozone and black carbon) are a hot policy topic given the recent UNEP report and the formation of the Climate & Clean Air Coalition. I am not sure that this section - plus the reference to a slightly obscure section of the transport chapter - contains sufficient detail and perspective given its policy relevance. For instance, it does not cite Shindell et a. (2012) "Simultaneously Mitigating Near-Term Climate Change and Improving Human Health and Food Security", published in Science, which underpins the UNEP report and is highly relevant. I think at least two points are missing from this discussion. First, these emissions are not limited to the transport sector: they are relevant to biomass burning for energy and larger fossil fuel plants. Second, action on short-lived forcings are not a substitute for mitigation of CO2: peak temperature limits such as 2 degrees can only be met by bringing CO2 emissions to near zero; emission rates of short-lived forcings then add some additional warming to that peak. But the reverse is not true: bringing short-lived emissions to zero cannot limit peak warming under conditions of non-zero CO2 emission rates (this could be demonstrated by reproducing Shindell et al. Figure 1, but critically extending it to beyond the point at which temperature peaks in the 'CO2 measures' scenario, if the data are available). I would like to see these points discussed, perhaps in a more appropriate section of the report such as chapter 5 or section 1.4.	Accepted - cites to Shindell, UNEP on "black carbon", and Victor, Kennel, and Ramanathan (2012) in Foreign Affairs added in section on short-lived climate pollutants
18427	1					Emission trajectory I think this part could be more assertive regarding the path of emission rate, putting numbers and showing how far we are from a stabilization path.	Taken into account - text was rewritten and plans to update the figure showing the gap

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12514	1					Generally, the discussion in Chapter 1 and specifically in this section does not treat energy efficiency and demand side measures generally with the fortitude that they deserve. As important as supply side measures are, this imbalance should be addressed. Numerous studies since the early 1970s have documented the benefits of energy efficiency and indeed its crucial role in mitigation. The draft documents this extensively in later sections. There is no doubt that energy efficiency at scale is an essential strategic approach to reducing emissions and climate risk, and additional discussion to that effect is in order.	Noted, we can add two more sentences on efficiency
10833	1					I understand what you are trying to do here, to show different perspectives at lookin at emissions, but since you only cover four, you are opening yourself to a critique for what you have missed… The main point is not to miss the most obvious ones. For example, what about annual emissions (the current approach), what about historic emissions (as often debated), etc. I am surprised that these two are not included. Then there are others, such as ability to pay...	Taken into account - we will be adding cumulative emissions
18129	1					a) Overall it would be good to elaborate if the discussion on perspectives refers to all GHGs or only CO2. For figures 1.7a and b, it is clear that the former refers to all GHGs whilst the latter only to CO2. However for figures 1.7 c and d, elaboration on this is required as ranking and persepctives may vary depending on the GHGs considered and the data sources used (especially for more uncertain sectors like forestry). Transparency here is therefore important. b) The axis marking for the y-axis for 1.7a is very difficult to read - CO2?	Noted - all figures completely redone; rest of text is pretty clear about which ghgs are covered
4472	1					This section is unduly pessimistic. It should be expanded to include the results of as Stern (2009) and other estimates that place the global effort that would be required to de-carbonize the global economy by 2100 at around 1 to 2 percent of global GDP. This is surely a very large effort, but it is possible. The models are not the same as reality; projections of what is feasible or not over a 100-year horizon need to be much more heavily qualified than they are in this section.	Rejected, section on achievable targets totally rewritten to make conditions clearer
18133	1					Geoengineering is mentioned several times in this section. What is entails should be briefly described.	Rejected, term will be explained in Glossary
12193	1					General comment for the chapter: Chapter 1 is an introductory chapter. Reading chapter 1.4.5 it is not quite clear to me, what the task/function of the chapter is. Is it to structure the following research on related topics in the report? Is it to provide an overview on past research results in this field since AR4? As it is organized now, it is very general and not comprehensive/balanced, reflecting the literature or possible questions of this topic. The text includes only one reference. What about the related body of literature on “collective action”, for example?	Noted. This wil be clearer when we add a roadmap to other chapters and when the SPM figures out its key messages
4142	1					You might want to consider additional questions for the FAQs, e.g. "What is new in the AR5?" or "Why and how does the AR5 assess recent findings on climate change mitigation?".	Rejected, a topic like "what is new" is too broad. No action needed
10266	1	0				Highly balanced descriptions have been done in this chapter. Excellent.	Noted

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9093	1	0				The analysis not only must be focused in the total rise of the emissions of the greenhouse gases (GHG), but also starting from the real bases of the very high emissions originated in developed countries, and those emissions issued in the developing countries which are in comparison very little. The developed countries are responsible for the base emission of GHG that has led to the climate change now threatening humanity due to their historical and systematic policies of excessive consumption of good and the irrational appropriation and exploitation of the countries` natural resources and also the natural wealth of the developing countries. That is the reason, why in the analysis of the mitigation, it is essential to include transparent considerations that lead to the change these policies from developed countries.	Noted. This will be clearer when we add a perspective on cumulative emissions.
13357	1	0				This chapter is very fine in many ways. It is well structured, throughly researched, and its overall argument is clearly put. Given this, please forgive the fact that, for brevity's sake, I'll offer corrective comments and criticisms which may make the tone of my response seem unduly negative.	Noted
2151	1	0				<no comment here as cells could not be enlarged to fit the text>	no comment text submitted to database
2152	1	0				The key messages of the executive summary do not yet come across in a clear manner. Currently the executive summary is to a large extent a (apologies!) collection of key elements of AR5. In my view it needs to be organized around the set of 5-10 key messages which are the essential ones. Those are the ones which you want to bring to policy makers, businesses, and other decision makers. (Former consultant cannot avoid the advice: Take 1 single piece of paper and write down what those 5-10 messages are)	Noted
2153	1	0				I recognize that the discussions needed in AR5 on mitigation are broader than in AR4. The main audience of this report are policy makers and businesses who should be motivated to action, as well as the broader public who want to understand what climate change means to the world. Their main questions are still "What can we do to limit global warming? Can we stabilize at 2°C warming? Which measures would need to be pursued and how much reduction contribution do they have? And what will mitigation cost?" Now, the executive summary does not really answer this central set of questions, which should be amended substantially.	Noted. Some of those questions are answered. Executive Summary will be developed further along with chapter.
16913	1	0				A well written and professional chapter; however its exact role in relation to the full report and depth of connection to its contents is unclear, and it does have some specific problems. Focusing on the “six arguments” feels a bit unusual for an introductory chapter – but it’s a lot better than anodyne summary so I would incline to keep it.	Noted - No action needed. Our inclination is to keep the 6 arguments as well, but we need to see what comes from the SPM.
16914	1	0				The overall “tone” emerging in chapter 1 is pessimistic. This would reflect reasonable judgement – particularly viewed from a North American or ‘current global trends’ perspective - but I think should be more cautious (see some of specific comments below); history is marked by discontinuities. It looks like the language on 2 deg.C has already been quite carefully crafted (“the current trajectory is inconsistent..”), but it is important that the overall message on 2 deg.C is anchored in Chapter 6, and presented with care and consensus.	Taken into account - tone adjusted slightly but message remains the same
4829	1	0				With my background in environmental psychology I am happy to see that the WG III report takes findings produced by social science much more into account than previous reports. However, the introduction does not reflect this scope properly as it is strongly dominated by behavioural economy. I would like to see more references to later chapters in the introduction already since this will be read by more people than the whole report.	Noted.

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4315	1	0		0		This figure only goes back to 2000. It therefore gives a misleading impression that recent prices are exceptional. It also uses actual prices rather than correcting them for inflation. This exacerbates the misleading impression. http://inflationdata.com/Inflation/Inflation_Rate/Historical_Oil_Prices_Chart.asp gives a much more accurate message.	Rejected. Quoting nominal prices is fine. Our point is not a long discussion of oil prices but some context.
18401	1	0				1. It would have been very nice to have right here some information in advance (what can be done, what have been not done) about the economic potential for mitigation.	Noted - some of this will be addressed through our discussion of what is achievable and the updating of the EMF chart on emissions gaps
18402	1	0				2. The chapter is not well balanced within countries and groups of countries. Nothing to say also in an elegant way about performance or results of Annex 1 countries with regard to commitments of the Kyoto Protocol. BRICK´s seems to be the bad guys. Remember that the lowering on emissions after 1990 was due to emissions of so called economies in transition due to economic crisis. This is well documented and IPCC cannot ignore it.	Noted. We have four (soon five) different persepctives on mititgation Some make the BRiCs look good; others bad.
18403	1	0				3. Executive Summary	no action needed
18577	1	0				As a reader I expect to find an overview of the report, what it itends to do and also of main learnings.	Noted - this will be addressed when we add a roadmap to the report and also the SPM for the report overall
18578	1	0				Ideally the introduction should help the reader to navigate through the extensive material.	Noted - this will be addressed when we add a roadmap to the report and also the SPM for the report overall
18579	1	0				The chapter is at least readable but some sort of declared ambition is lacking.	Noted - some of this will be addressed through our discussion of what is achievable and the updating of the EMF chart on emissions gaps
18580	1	0				Addressing CC an important component of SD. Hardly a lesson as such but an important insight/ wider perspective	Noted.
18581	1	0				Financial crisis/macroeconomic situation. Figures/date referring to 2009 and 2010. Will be pretty old and partly outdated when published. The interesting (and most sustainable?) part/conclusions: Globl economic growth is shifting to the BRICS Sharp rise in “embedded” emissions Lower turnover in capital stocks in historically industrialized countries. Slow down in practical impact of policies	Noted - we have addressed all these points already in the text; however, financial performance figures might need updating
8989	1	0				A fundamental framing issue that Chapter 1 must contend with is whether the assessment report will deal only with flow of current emissions or analyze this in the context of stock of emissions. Ignoring the role of the stock of gases in the framing chapter will make the whole assessment disconnected from reality and risks the presentation of an irrelevant report.	Taken into account - added chart on stock
8990	1	0				It is important for the chapter to recognize the macroeconomic and development contrasts between developing and developed countries. The issue of lifestyles and consumption constrasts between developing and developed countries is not analyzed. The contrasting level of industrialization and urbanization is also ignored. It would be useful to discuss the distinction between luxury emissions in the developed countries, part of which is made possible by the exports from develoing countries produced with high emission and the survival emission in developing countries where the majority of populations still do not have access to modern sources of energy.	Noted - Most of these points need to be addressed in later chapters; some of the macro differences are addressed.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
8991	1	0				The chapter highlights the global financial crisis but misinterprets its impact and its meaning. The discussion suggests that developing countries growth are decoupled from developed countries, and does not refer to analytical literature that the decoupling is mostly a myth. (For example, see Akyüz, Yilmaz. (2012). "The Staggering Rise of the South?" Research paper no. 44. The South Centre. Geneva and Izquierdo, A., Romero, R., Talvi, E. (2007), "Booms and Busts in Latin America: The Role of External Factors", Working Paper 631, IADB Research Department.) That the developing experienced deep economic downturns at the onset of the crisis in fact demonstrates that the "decoupling" hypothesis does not apply. The recovery in developing countries follows from the economic stimulus measures undertaken in response to the crisis – monetary easing and investment – which also helped in the quick recovery in commodity prices. The chapter mischaracterizes the growth of the BRICS during the crisis, but even in August 2012 the growth rate of all the BRICS has declined, mainly as a result of the slow growth and threatened recurrence of recession in the developed countries.	Taken into account - removed disucssion of causal reasons for the crisis
8992	1	0				By emphasizing the recent and future trends emissions, the chapter inaccurately characterizes the climate change issue, shifting the blame to developing countries. This approach de-emphasizes the role of developed countries for the the long-lasting stock of CO2 which conflicts with the global climate change regime which recognizes the responsibility and leadership of developed countries to take action and address the problem. As a matter of accurancy, it is necessary for this chapter to have a comprehensive treatment of the role of the stock of emissions and historical responsibility.	Noted - we will consider expanding point on emissions
8993	1	0				The chapter should put the use of the Kaya identity in its proper place. It is a well-known principle in social science that identities by themselves do not generate policy implications. An identity helps to categorize quantitative elemets of a total but ignores the relationship between the parts. For example, many of the arguments in the right side of the identity can be interdependent. The Kaya identity is particularly inaccurate when it is applied on country categories, ignoring levels of per capita income and emissions and irrespective of level of development and economic structure. For example, developed countries already have a larger proportion of GDP in highly technology and in services which have lower emissions. Developing countries still have a large proportion of their economies and their people in low skill, low productivity jobs and will require greater manufacturing activities which are more highly polluting than services industries.	Accepted - Added p.17., line 18: "Within broad groupings of countries—industrialized, and emerging and other developing—patterns are broadly similar, except for the energy intensity per unit of GDP due to shifts in time caused by different stages of industrialisation and subsequent shifts towards a more service-based economy, with related higher and lower levels of emission intensities." And modify p. 17, line 33-34: "Slowly the CO2/TPES ratio of these regions is converging—ultimately to similar levels, taking into account geographical differences."
7856	1	0				Despite the claim to the contrary, the chapter is writtten in a value-laden language and contains many implicit value judgments. These should be made explicit and debated in chapter three.	Noted
10829	1	0				Particularly in section 1.3, there is the use of "Annex I", "Annex II", and "Annex B". The first two relate to the UNFCCC and second to the KP, and "Annex I" is different to "Annex B". This is confusing for all but those deeply in the process. I suggest a box/FAQ define what "Annex I", "Annex II", and "Annex B" are and if they refer to the UNFCCC or KP. Following this, make sure the usage in section 1.3 is correct.	Accepted. Annex definitions will be part of the Glossary

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
18390	1	0				This chapter is an overview of this IPCC Report but must contain some general points like: (a) Greenhouse gases are a stock pollutant as opposed to flow. (b) The cause is anthropogenic. (c) Mainly due to industrialization of the advanced countries.	Noted
18391	1	0				Mitigation can be over time. Who should bear the responsibility? Cannot be the rich nations alone but also developing countries but the latter must be compensated since they did not create the problem—transfer of technology, carbon permits etc.	No action needed
18392	1	0				There is very weak evidence for macroeconomic decoupling, so it should not be taken as an article of faith. Citibank says a one percent decline in US activity lowers the rest of the world's activities by 0.3 per cent or more.	Noted. Text adjusted, evidence is mixed.
18393	1	0				So with a global slowdown, industrial activity gets lowered worldwide—good for the environment—but R & D etc also take a hit.	No action needed
18394	1	0				Some more discussion on uncertainty, fat tails, especially in general equilibrium.	Noted, we have adjusted the text, issues will be discussed in Chapter 2
18395	1	0				Emphasize the point made about linking emissions to consumption rather than production. With international trade not all of China's emissions are for consumption in China.	Accepted - we have made this point and will embellish it with discussions of cumulative emissions
5425	1	0				I find the text rather biased. Intermittency is flagged as a problem for renewables, but it is not mentioned that there are proven solutions to most such problems. In contract, neither accidents, waste storage or profilation issues are noted for nuclear energy, and the Fukushima accident is mentioned as if it were a public relations issue.	Accepted, need to verify that discussion is balanced with advantages and flaws of all major technologies mentioned/illustrated.
12907	1	0				Chapter 15 argues that the subnational governance level is important and that innovation is not just about technology but about situated sociotechnical systems. For example on Chap 15 p64 it is stated that 'Cities have become a critical site for the mobilisation of climate mitigation policy' and that 'new logics and practices for urban development' can realise climate change objectives 'achieving widespread 'transitions' to low carbon urban development' These are extremely important points yet the introductory chapter conspicuously fails to acknowledge them. If Chap 1 is intended to give an overview then it needs to address these issues much more directly and explicitly.	Noted.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
18416	1	0				There is a sort of tension in this chapter: on one hand, the intention to show that the current GHG emission path, climate modeling, and lack of profound mitigation measures are leading humanity towards a dangerous climate change scenario. On the other, there is some kind of optimism in relation to international arrangements (considering the failures of UNFCCC as temporary setbacks and highlighting actions taken by g-8, g-20 and BRICS) and national actions regarding climate mitigation. For instance, in the same page (22) the 2C target is both considered almost impossible (when talking about climate modeling) and then uncertain (when talking about global political responses). However the tension, I think that the predominant vision in the chapter is the second one, which tries to highlight positive trends in low carbon political economy. Those positive trends exist, but they are by far overpassed by the scientific evidence regarding the degree of the climate problem. In this way, the scenario built in the chapter is inaccurate. There is an unsurprising problem regarding the use of non-scientific UN vocabulary, such as developed and developing world. In my opinion it should be used the much realistic and accurate classification of the World Bank in four groups: High-income countries, Upper- middle-income countrie, Low-middle income countries and Low-income countries. The acknowledgement of growing emissions in the emerging world is always treated with delicacy and moderation, as if the path of emission growth in these countries was not that threatening to climate stability.	Noted - this tension is unavoidable and part of the central tension in the socioeconomic literature, so if the chapter has a tension that is good. But our writing team needs to check if we have the right tension and also if we should shift usage in terminology.
10372	1	0				Learn from the financial crisis in 2008, the security of nuclear energy should be reconsidered and should be highlighted in AR5.	Rejected. Nuclear security has no relation to the 2008 financial crisis.
10373	1	0				Financial crisis has been mentioned in 1.2.1.2 as one of the issues learned after AR4. But please pay attentions to avoid provoking financial crises in mitigation in the future. If substaintial mitigations are implemented in the US and China, which are the major economic leaders over the world, it would be dangerous for the world economy. So we suggest to take optimal economic growth considered in mitigation actions. Based on our research, an EKC can be obtained with optimal economic growth. I will submit our paper, which is about optimal growth with mitigations, for your reference.	Noted, we reference the discussion of energy modeling under different scenarios and the possibility of higher-than-expected costs as well as lower-than-expected costs.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
2332	1	0				In this chapter, there is lack of attention on Least Developed Countries and small islands under climate change scenarios and economic globalization. Climate Change and Economic Globalization are referred in multi dimensional and multi-scale contextual view. However, the analysis is mainly based on the new concept of double exposure to accentuate winners and losers of both processes simultaneously on region, sector, social group and Economical perspectives. Economic globalization signifies uneven development creating many social crises such as poverty, spatial division of labor and unemployment through capital flow and capital accumulation. Ironically, winners of economic advancement would lose dignity i.e. East Asian Crisis in 1997. Conversely, climate change might affect any person or geographical location without concerning socioeconomic status. Climate Change vulnerabilities cause starvation, declining production and economic recessions. Karen O'Brien and Robin Leichenko (2000) distinguish double winners and double losers of both global processes through the concept of double exposure (O'Brien & Leichenko, 2000, 227). In the regional perspective some geographical areas such as Sub Saharan Africa suffer from climate change and economic globalization. Many African countries are exacerbated from lack of advantages of Globalization and devastated climate changes. On the other hand, Agrarian Capitalist class, who captured economic dominant in Mexico gain lot of advantages, makes suppression on rural farmers. This sectoral perspective is applied to realize the rapid climate changes in Mexico in 1998 which alleviate the socioeconomic level of rural farmers declining below poverty line. Thus, I would like to suggest for reconsideration of the bottom line of this arguments while report always dealing with BRICS, emerging economics in developing countries perspective. # Necessary reference for this argument:- O'Brien, Karen L. & Leichenko, Robin M. 2000, "Double Exposure: assessing the impacts of climate change within the context of economic globalization" Global Environmental Change 10, Elsevier Science Ltd. 221-232.	Noted - Ch.1 needs more "granularity" outside Annnex-I and BRICS.
4212	1	0				Chapter 1, or an Executive Summary, needs to be clear about the path to mitigation. A possible statement appears in Chapter 6, p5, line 29 "all countries must ultimately bring their emissions toward zero to meet any stabilization goal." However, this statement is too weak and fuzzy. Does "ultimately" mean 2050, 2100, or some, too late, date like 2500? Are "emissions" net emissions after sequestration measures are considered? If not, near zero emissions would be infeasible. Does "toward" mean an easy 10% reduction or a very challenging 90% reduction?	Taken into account - text to be improved
4213	1	0				Chapter 1, and the report throughout, should be clear on the key roles of the private sector (businesses and individuals) which needs to understand the needs for, accept its roles in , and act to achieve GHG reduction. Public policies should encourage such actions to be rational economically and desirable socially, but private buy-in and initiative is essential.	Taken into account - text added on businesses

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
11387	1	0				The authors seem to take the view that “green growth” is separate and distinct from “sustainable development” in terms of the conceptual framework and the policy approach. This view reflects the approach that has been pushed largely by the policymakers of developed countries in, for example, the context of the Rio+20 process in relation to the concept of “green economy” as well as through the work of the OECD through its “Green Growth Strategy.” However, it should be noted that in the Rio+20 outcome, green economy concepts (which have often been understood as also including green growth concepts) and policies are to be “in the context of sustainable development and poverty eradication as one of the important tools to achieve sustainable development” and that countries that seek to apply and implement green economy policies “can choose an appropriate approach in accordance with national sustainable development plans, strategies and priorities.” Politically at the multilateral policy level, therefore, the conceptualization of green growth as distinct from sustainable development is not accepted, particularly by developing countries. Instead, it is merely among the many approaches that various countries can use in order to achieve sustainable development. The Introduction Chapter should reflect this political consensus that was adopted in Rio+20.	Noted
11388	1	0				The discussion in the section on “International institutions and agreements” does not sufficiently discuss the point that UNFCCC gridlocks may be the result of political differences rather than the result of the policy architecture or the design of the UNFCCC itself. In not doing so, it creates an implication that there is a need to revamp or replace the UNFCCC given the difficulties in obtaining agreement under the UNFCCC. This kind of message, if not adequately corrected, could be used in the future to argue for a shift away from a UNFCCC-based and –centered multilateral policy regime for climate change to a new regime that moves away from the UNFCCC’s principles, provisions, and conceptual approach	Rejected. We have cited a variety of perspectives on this. No further action needed.
11389	1	0				There are inconsistencies in the sourcing of references. While most references indicated in the bibliography come from peer-reviewed academic or scientific journals or official publications or reports of international organizations, a non-peer-reviewed speech of the head of an international organization and a news release from the same organization are used in at least two instances to support assertions in the text in relation to the impact of the global economic and financial crisis on global economic relations – assertions that then become part of the argument for stressing that the future responsibility for global emissions will come from “emerging economies”. Given the important role that such assertions play in setting the overall paradigm of the Introduction Chapter with respect to the “emerging economies” and their role in climate change mitigation, such assertions should be more adequately referenced and supported, and should also be balanced by a discussion on the continuing important role of developed countries in the context of their historical responsibility for GHG emissions	Noted, team will check references
11390	1	0				There are also inaccurate references to the Copenhagen Accord and its proper context within the UNFCCC framework of decisions. The Introduction Chapter seems to assume that the Copenhagen Accord was an official product of the UNFCCC when in fact it is not. It was merely taken note of by the UNFCCC COP15 in Copenhagen, rather than being adopted as an official UNFCCC COP decision. As such, it is not an official UNFCCC document	Rejected - We wrote delegate "took note" of the Copenhagen Accord. No such expression as adopted.
16078	1	0	0			Whole Chapter : Overall a fairly well designed chapter, good reading, fairly balanced views. Maybe needs more focus on the goal of IPCC WGIII in the present work, such as "can we do it"? "can we do it in our present knowledge"? Can we do it in the present framework of negociations?	Noted - some of this will come from the SPM. That, in turn, will feed into the roadmap that our chapter offers for the rest of WG3, which we will draft in Vigo
4025	1	0	0	0	0	Overall, the chapter is well written, though there is always room for improvement. Thank you.	thank you

Expert Review Comments on the IPCC WGIII AR5 First Order Draft – Chapter 1

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
4316	1	0	0	0	0	It claims that some change in climate is “inevitable". If it means that the climate changes naturally, then it is what everyone knows. If it means that “dangerous man-made global warming" (the redefined meaning of climate change) is inevitable, then it goes against even the P CC who claim that they have no more than a 90% confidence level. I would also point out that this confidence level is unsubstantiated by the data and by the IPCC's own assessment of uncertainties. It needs to be changed.	Rejected. It doesn't mean either of these. It means that because of buildup of gases already (and building that will occur in future) that the climate will change.
3685	1	1				The report seems very concise and well written. Congratulations to the entire team	thank you
3686	1	1				Executive Summary page 3 line 21 the write up is very good, it accepts the academic work of “how public opinion influences the design and stringency of climate change mitigation policies”.	No action needed
3691	1	1				I am not sure the document summarizes the public opinion research, if not it is good two add two or three pages. I am ready to write if needed.	Noted
3692	1	1				New References	Noted - no action needed, insufficient information
17744	1	1				For the executive summary - consider the formats used in chapters 16 and 10	Noted
4849	1	1				Ch.1 Introduction	Rejected, insufficient information
4865	1	1				MISPRINTS etc.	Rejected, insufficient information
9188	1	1				terminology: geoengineering should be SRM or CDR? Otherwise define geoengineering.	noted - refer to glossary that explains the term "geoengineering"
9189	1	1				it should be noted the costs presented here is assuming that the governmental intervention is cost effective - often it is not the case. As such these are minimum cost estimate.	Noted
5755	1	1	1	33		Please revise all citations, embedding in the text failed in many cases and there are far too many brackets, even in the references' section.	Editorial – copyedit to be completed prior to publication
18404	1	1	2		12	gives the impression that the mitigation effort has been consistent with the target of important emission reduction and concentration stabilization, but that is not the case. Giving a positive impression is not bad as policy for the report but the chapter need to answer the question if emission continues to increase since AR4. See rows 42 to 46, see also page 13, rows 20-21 and 1.3.1	Rejected - counterfactual comment. Text is balanced.
18405	1	1	27		27	I miss the argument that mitigation is not in contradiction with development policies. I´m sure there is literature on that issue.	Rejected - insufficient information
17004	1	1	33			Who are the "G8+5"?; again, these nations should be listed so a complete snapshot of the current situation in the world is given, while also allowing posterity to read this report and assess what each nation has done, what impact it has had, etc.	Accepted - text added to list G8+5 countries
18406	1	1	43		43	“widely discussed policy goal”, not a scientific one. The chapter continues to quote the target without explicit consideration to science. Later on the chapter there is a sentence related to science “been elusive”. I think scientist do not approve such kind of goals and are no committed to approve that. This goal have never been discussed from the scientific perspective.	Rejected - statement is incorrect. There is massive scientific work analyzing the goal.
12215	1	1	1			This chapter is very well written, it has a good structure, is highly interesting, and the main points are clearly communicated. Congratulations!	thank you
3364	1	10	1	10	4	Shale gas has some issues with GHG emissions related to extraction. As currently deployed the GHG footprint could be worse than for coal. There are deep issues with the dynamics of gas deployment, which can make it either good or bad, depending on the context. For an argument on this, see Daniel Schrag: "Is Shale Gas Good for the Climate?". More generally, authors should be careful with examples, because there are always a lot of dependencies, and rarely black/white technologies...	Rejected - this is too much detail for this chapter
16998	1	10	10	10	11	Incomplete thought	Taken into account - combined with other comments

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
9267	1	10	11	10	20	Please note that the Global CCS Institute will be publicly releasing its annual Global Status of CCS Projects Report in October 2012 (as it will for its update in 2013 in about October 2013). This report contains the most recent global assessment of the number of large-scale CCS projects segmented by their: location, sectoral application, project lifecycle status and scale of capture capacity (tonnes of CO2-e). It also contains comprehensive project survey analysis on both policy and regulatory matters.	thank you - reference to the report has been added
17734	1	10	12			replace the word "carbon" by "CO2" or "carbon dioxide" - to be consistent with all other chapters	Accepted - word replaced with "carbon dioxide" as suggested by commenter and to maintain consistency with IPCC Special Report
13021	1	10	12	10	12	This is the first introduction of the term "carbon capture and storage (CCS)." It is recommeded that the term be revised to the formal term "carbon dioxide capture and storage (CCS)" to reflect the Glossary since this is, in fact, the first introduction of the term.	Accepted - word replaced with "carbon dioxide" as suggested by commenter and to maintain consistency with IPCC Special Report
10462	1	10	12			Add reference to IPCC Special Report on CCS in 2005	Rejected - reference is not needed; since 2005 a lot has happened, and most of it relates to issues we discuss--about incentives to invest and such
3547	1	10	13	10	13	"450 ppm" should be "450 ppm CO2-e"	this comment is correct but the paragraph has been revised and relevant sentence has been removed
14789	1	10	13		14	"…450ppm, which roughly corresponds with stopping warming at 2 degrees" This is neither a scientifically accurate nor politically helpful characterization. This concentration corresponds with a roughly 50% chance of EXCEEDING 2 degrees of warming.	Rejected - this is a good point but the paragraph has been revised and that sentence has been removed
9921	1	10	13		14	A more detailed and convictive statement on the relationship between 450ppm by 2050 and 2degree by 2100 should be given.	this is a good point but the paragraph has been revised and that sentence has been removed. Also this issue is treated in Section 1.3.3
16895	1	10	14		20	Is it possible to reframe this? -- chapters 6 and 7 make very clear that economic modeling shows how important CCS is in terms of a low cost mitigation technology -- the cost of CCS is a large determinant in the likely CO2 price in a tightly constrained cap.	Taken into account - the paragraph has been revised
12612	1	10	15	10	18	The GCCSI clasification of a large scale CCS project includes a number of enhanced oil recovery projects that do not monitor or verify their emissions. The IEA CCS Technology Roadmap has a more widely accepted number of five large scale projects which currently store 6.5 million tonnes per year.	Taken into account - CCS project data has been updated, referencing the Global CCS Institute 2012 report
12613	1	10	15	10	18	On a per tonne of CO2 basis CCS costs can be as low as $15/tonne which is no more "extensive" than other CO2 mitigation technologies.	Rejected - no scientific evidence/publication provided to support changes suggested by the reviewer
12655	1	10	15	10	18	The GCCSI clasification of a large scale CCS project includes a number of enhanced oil recovery projects that do not monitor or verify their emissions. The IEA CCS Technology Roadmap has a more widely accepted number of five large scale projects which currently store 6.5 million tonnes per year.	Taken into account - combined with other comments
12656	1	10	15	10	18	On a per tonne of CO2 basis CCS costs can be as low as $15/tonne which is no more "extensive" than other CO2 mitigation technologies.	Identical to previous comment

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
4092	1	10	15	10	15	mid-2011 - update here and elsewhere.	Accepted, we will update
18411	1	10	16		16	Is correct to say “avoided emissions” with respect to CCS or better “stored emissions”?	Rejected - the word avoided is fine.
7149	1	10	16		18	The sentence about the savings in CO2 emissions, is positive and maybe even hopeful, but I wonder if it should be placed in context as it represents only about 0.1% savings in the global annual emissions.	Rejected - this may be true but what really matters is marginal cost PLUS volume. Text fine here. No action needed
17648	1	10	16	10	18	The number 33 million would also be more informative if it were put into perspective, e.g. through a comparison of number of projects and avoided emissions in earlier years.	Rejected - this may be true but what really matters is marginal cost PLUS volume. Text fine here. No action needed
16999	1	10	16	10	18	Put this number in context - comparable to the emissions of country XX	Rejected - this may be true but what really matters is marginal cost PLUS volume. Text fine here. No action needed
16198	1	10	17			Put 33 MtCO2e into context of global annual emissions as a percent (e.g. it is about 0.1% of annual emissions of ca.35 billion t CO2e))	Rejected - this may be true but what really matters is marginal cost PLUS volume. Text fine here. No action needed
9246	1	10	18	10	20	"absent" should read "absence", but it's not correct. Things have moved on from the 2010 source cited. Australia has extensive storage regulations, for example. This site gives a more recent overview: http://www.iea.org/newsroomandevents/workshops/name,27053,en.html. Note that the Gorgon project, which will be the largest storage project globally, and at the scale required for climate mitigation (if reproduced!) has regulations in place, and that's in a nature reserve.	Taken into account - the text revised, made more generic and the point about commercial incentives is pulled out into a separate sentence.
14358	1	10	20			Try to say whether CCS can become cost competitive over say a decade, and how much the extra cost is now (50%?1000%?). How much of a carbon tax would it take to make CCS competitive?	Rejected - other chapters do this in some detail
4853	1	10	21		36	The regulatory framework of the EU on renewables is also an important development since 2007.	Rejected - this is too much detail for here
10417	1	10	21	10	36	Enumerate. Where are the percentages?	Rejected - this is too much detail for here
17000	1	10	25			Is this statistic true globally? Or only for specific regions?	Accepted the word "globally" has been added
5316	1	10	27	10	28	It should be made clear that the rapid growth of renewable energy installations is merely a consequence of high subsidies (Mainly feed- in tariffs, notably for PV) rather than a success of the market.	Rejected - this point is made elsewhere and varies a lot; no further action needed
5317	1	10	27	10	28	It should be made clear that the rapid growth of renewable energy installations is merely a consequence of high subsidies (Mainly feed- in tariffs, notably for PV) rather than a success of the market.	identical to 522
11021	1	10	29			This should recognise the potential for renewably-generated electricity to replace petrol and diesel, via electric vehicle uptake. After ‘transportation through’, insert ‘electric vehicles and’.	Rejected - too much detail for here
16896	1	10	29		36	It might be interesting to readers to think about wind as a wholesale electricity commodity -- its value depends on the price of other fuels. Rooftop solar on the other hand tends to compete with the price of retail delivered electricity, so in some markets it is likely to be competitive without subsidy in the not distant future.	Rejected - a useful thought, but too much detail for here
3879	1	10	29	10	30	"including next generation fuels that have lesser impacts on food security and the environment." - Where are they. Be more careful avoiding creating false expectations to the reader. Be more realistic, describing the huge technical and economic difficulties faced by these technologies after 100 years of unsuccessful trials.	Rejected - this is covered in other chapters; no need for more detail here

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
6433	1	10	32	10	33	Since AR4 considerable progress has been made in modelling the integration of renewables and it is demonstrated that this is not 'diffilcult'.. References will be given in the review of Ch 7. I recommend that this progress be reported in the executive summary. I also suggest that 'variable' is more accurate than 'intermittent' in respect of renewables. It should be remembered that nuclear and coal-fired electricity plants regularly have intermittent outputs due to plant failures whereas in a geographically distributed renewables system occurences of complete failure to generate are rare. Finally it should be noted electricity system operators have for decades satisfactorily managed variability in demand; so managing variability on the supply side is not a new phenomenon per se.	Taken into account - revised text says "variable and intermittent". Chapter 7 can deal with this in more detail, but the point that it is not "difficult" strikes me as incorrect.
10463	1	10	32			The term "intermittent" implies on/off which is not correct for wind, solar, wave so the term "variable" is used. Suggest change here and elsewhere.	Taken into account - here and a few other places where there is discussion of "intermittent" renewables is revised to say "variable and intermittent".
11022	1	10	33		35	Treatment of solar is too negative given potential for solar PV prices to reach parity with cost of coal-based electricity within a decade. See U.S. Department of Energy. (2010). $1/W Photovoltaic Systems: White Paper to Explore A Grand Challenge for Electricity from Solar: Advanced Research Projects Agency.	Rejected - outside the scope of the chapter. Topic is covered in chapter 7
4468	1	10	33	10	33	Why single out solar of all the renewables as being particularly in need of feed-in tariffs, etc.?	Taken into account - sentence has been revised so as to not single out solar
6810	1	10	33			The misinformation and anti-solar propaganda is extraordinary in a document that purports to be concerned about climate mitigation: there is no evidence that solar is difficult to integrate into the grid - on the contrary. Also, feed-in tariffs are not subsidies - they are a contractual power purchase guarantee at a fixed price. And there is plenty of evidence that even solar PV is nearing grid parity with coal. There are new coal fired pwer plants likely to come on line soon in the US or Australia. Last year, Australia had - against all odds and without much support at all - the largest renewable electricity increase worldwide.	Rejected - the sentence has been revised per other comments
10464	1	10	33			Better to quote chapter 8 of IPCC 2011 which covers this specific issue of integration.	Accepted - cross reference added to chapter 8, IPCC 2011
4093	1	10	35	10	36	particular reference could be made to the absurdity (e.g. under UK Planning Guidance PPS 22 and definitions of the UK Planning Inspectorate) of defining palm oil as a renewable source of energy for simply burning in proposed electricity generating plants EVEN WHEN THE ASSOCIATED CARBON DIOXIDE EMISSIONS, HABITAT & SPECIES LOSS ARE POINTED OUT, WITH REFERENCES.	Rejected - too much detail for this chapter
14790	1	10	35		36	For "fears for fod security" reference recent scholarship on biofuels demand and food price volatility by Tim Wise, Tufts University "The Cost to Mexico of U.S. Ethanol expansion"	thank you; I think the point stands and we already have many references. No action needed
2567	1	10	35			For contested biofuels better refer to SRREN Ch 9	Accepted - added cross-reference to SSREN (IPCC 2011), chapter 11
3880	1	10	35	10	36	"Some biofuels are contested due to fears for food security and high lifecycle greenhouse gas emissions of some fuel type". Why not present some successful cases like ethanol (Brazil and Thailand) and biodiesel (Argentina). Always preference is for failures? Probably failures call more attention than successes but this report is not a popular newspaper. Only nuclear energy deserve been reported as a success (see next paragraph in the text), even after Fukushima?	Rejected - We talk about the difficulties precisely to be balanced

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
6434	1	10	37	10	42	There is a growing recognition of the down-side of energy efficiency namely the 'rebound effect' which is mentioned in Ch 1. I suggest that the 'rebound effect' is significant enough to rate mention in the executive summary.	Rejected - This is a complicated topic and is extensively covered in the ch 15 . No need to repeat here. "rebounds" are no law of nature or economics and effects are mitigated under current (and presumably future) rising energy and C prices.
10063	1	10	37	10	44	The implementation of vehicle fuel economy standards can be supplemented as an important evidence.	Rejected - we think the text is fine. No action needed
7148	1	10	4		5	Provide a reference to support the statement (sentence) about the declining US coal use.	Accepted - references to EIA reports added
16059	1	10	45	11	8	One sided paragraph. 60 countries "expressing interest in nuclear" has no meaning (it could be said of CCS or of wave power for instance). Then Page11 line 3 only Germany is quoted when Switzerland, Spain, Belgium are in similar situations. China did slow orders after Fukushima. Line 7 p11 the term "accelerating" is misleading and should be deleted.	Taken into account - replaced phrase about expressing interest with "more than 20 countries currently that have never had commercial reactors have launched national programmes" and elaborated on the other points for more balance. "Accelerating" is fine here.
8406	1	10	45	10	45	It seems that the statement “Interest in the use of nuclear power has increased significantly since AR4” must be better sustained with data, not based only on IAEA data or some author’s opinion. It seems very difficult to believe, basing on the number of new plants already approved, that “Traditional countries with active nuclear power programmes have been contemplating replacing aging plants with new builds or expanding the share of nuclear power in their electricity mix”: in these countries (i.e., Europe, USA, Japan) the share of nuclear power in the electricity will stay stable or will decrease according to a lot of scenarios made by different researchers. The Fukushima accident is only another driver in this direction. In the IIASA Global energy assessment it is stated that prospects of nuclear energy are particularly uncertain because of unresolved challenges surrounding its further deployment.	Taken into account - the first has been revised. The IIASA assessment may be overly pessimistic; look at china and Korea, notably.
3365	1	10	45	11	8	Global aggregate numbers and trends of nuclear power plants don't substantiate the optimism on nuclear power reflected in this paragraph. More balance would be nice.	Taken into account - replaced phrase about expressing interest with "more than 20 countries currently that have never had commercial reactors have launched national programmes" and elaborated on the other points for more balance.
12510	1	10	45			Add after “AR4” -- “however, experience has been disappointing.” Even aside from the Fukushima Dai-ichi disaster, so-called Gen III+ or Gen IV reactor designs have been difficult to put through review and approval processes, more expensive than projected, and have encountered long construction delays. Many projects have been cancelled, and the private financial markets have withdrawn most support for new nuclear projects, leaving direct and indirect government finance or guarantees as the remaining financial support for the industry globally.	Rejected - this coment is true mainly in the OECD (and is overly american) -- paragraph on nuclear rewritten

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
2571	1	10	45	11	8	Apparent contradiction here. Has the interest in nuclear power really increased? Are there evidences, such as growth of actual reactor construction and installed capacity? The IAEA is an authoritative but not neutral source.	Taken into account - the evidence points in all directions; the discussion on nuclear is rewritten with more details for balance
6691	1	10	50	11	3	Japanese energy and environmental policies are coming under review now. We can't predict whether nuclear reacters will work or not. So, “and wiii probably leave many reactors shut in that country” should be deleeted.	Accepted - phrase is deleted
11719	1	10	50	11	3	[and will probably leave …..difficult to parse.] have to be deleted. IPCC shouldn't predict whether it will happen or not.	Accepted - phrase is deleted
9492	1	10	50	11	3	delete this sentence - Ohi Power Station Units 3 and 4 have been operated in Japan from June 2012	Accepted - phrase is deleted
10635	1	10	50	11	3	The statement is made with prejudication. It is still uncertain what patterns in nuclear power investment will be in Japan. There it should be deleted.	Accepted - phrase is deleted
17733	1	10	6			delete "one of the"	Accepted - deleted
4880	1	10	6		7	{Del} "already is {one of the}one of the	Accepted - deleted
15276	1	10	7	10	7	remove "one of the" before "fastest"	Accepted - deleted
11718	1	10	8			It's not clear the meaning of this sentence. Koh et al. shows advanced coal combustion technology will be very competitive and effective in reducing GHG emissions so, this sentence should be amended to [The future of coal hinges, in particular, the defusion of the clean coal technologies]. 1.Koh et al.:[Potential of Advanced Coal and Gas Combustion Technologies in GHG Emission Reduction in Developing Countries from Technical, Environmental and Economic Perspective. Energy Procedia, Volume 12, 2011], send attachment by another e-mail.	Accepted - Add to the sentence, after 'China and India", 'as well as the diffusion of clean coal technologies.'
3308	1	10	9	10	11	This sentence makes no sense.	Taken into account - combined with other comments
16058	1	10	9	10	20	The paragraph on CCS is well balanced. It could include Zoback M., Gorelick 2012 “Earthquake triggering and large-scale geologic storage of carbon dioxide” PNAS 109:5185–5189 that shows not implausibility of CCS, but the risk that quakes would limit very much the potential. Alas, the paper came too late.	Rejected - this is a good paper, but this is too much detail for an introductory chapter
13251	1	10	28	10	30	The use of renewable energy for heating can be included in this sentence.	Rejected - a useful point, but there are lots of such embellishments that might be added and we will exceed our space limits
8222	1	10	35	10	35	example may be given	Rejected - a useful point, but there are lots of such embellishments that might be added and we will exceed our space limits
13250	1	10	9	10	11	The second part of the sentence is no sense. Maybe, there is a lacking verb between "that" and "many", or the word "many" must be replaced with a verb.	Taken into account - this sentence has been revised for clarity
4302	1	10	9	10	20	refers to CCS: a note to the emission trading system an its lack to give CO2 a price „good“ enough to invest in CCS would be helpful. In Germany, CCS had two main obstacles: low ETS-prices and public opinion.	Rejected - text is ok. No action needed
3689	1	11				Page 11 line 34 onwards reference missing	Taken into account - references added on the engagement of international institutions on climate change topic

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
6807	1	11	1	11	8	There is no evidence for accelerating investment in nuclear power; to the contrary: much are overstated intentions. There is also plenty of evidence for failed investment, and extremely slow progress, practically a failure of that industry. Reference: http://www.worldwatch.org/node/5795 and http://www.worldwatch.org/node/5447, well referenced. See also Page 18, line 15 in this chapter which states this also.	Rejected - this comment is incorrect, and citing a worldwatch report for these points would be inappropriate. Text is balanced
17001	1	11	1	11	2	This statement needs to be re-assessed as Japan is beginning to re-activate some of their reactors	Accepted - phrase is deleted
9247	1	11	15	11	15	There is no mention that biofuels with CCS offer the only realistic large-scale way of reducing atmospheric CO2.	Rejected - the suggest comment is too extreme. We disagree that it is THE ONLY way to do this. No action needed
8708	1	11	15			this sub-section ends without noting the severe problems that siting new CCS facilities have encountered, and the technological uncertainties associated with CCS. It also does not quote the IEA on the peak oil issue, and it does not point out that conventional crude oil production has probably already peaked in the 2006-2008 period.	Rejected - we think the discussion on CCS is balanced. The paragraph has also be revised during editing.
2243	1	11	16	14	30	There is no evidence that emissions of greenhouse gases hav any harmful effect on the climate. The whole effort of this report should be changed to the task of dealing with the natural evolutionary c hanges which we face.	Rejected - beyond the mandate of WG III
18012	1	11	17	11	28	The discussion in the section of “International institutions and agreements” reflects part of the reason of the slow progress and the deadlock of the UNFCCC process, referring only to the architecture of the treaty frame work, leaving the lack of political unwillingness and non-action of Annex I country parties in silence. Comprehensive evaluation and analysis regarding the effectiveness and ineffectiveness together with the reason behind need to be elaborated more.	Taken into account - paragraph has been revised
4881	1	11	20			{Add} "The first {}session of the Conference of the Parties (COP)	Accepted - added 'session'

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
12511	1	11	22	11	28	Replace from "The main regulatory" to the end of the paragraph with the following -- "The main regulatory provisions of the Kyoto treaty concerned quantified emission limitation and reduction commitments for developed countries listed in Annex B of the Protocol. The initial five-year commitment period was set for 2008-2012, with further commitment periods contemplated. At its first meeting in 2005, the Conference of the Parties for the Kyoto Protocol launched an ad-hoc working group to develop emission reduction commitments for a second commitment period commencing in 2013. Subsequently, the UNFCCC Conference of the Parties adopted the Bali Action Plan in 2007, launching a parallel negotiating track to address broader emission reduction efforts incorporating further commitments by developed countries and nationally appropriate mitigation actions in developing countries, with financing, technology and capacity building support to be provided by developed countries. The Bali Action Plan also instituted a broader balanced work programme including the "four pillars" of mitigation, adaptation, financing, and technology transfer, with a view toward adopting a decision in two years. In 2009, the COP continued the two negotiating tracks and noted the separate issuance of the Copenhagen Accord, delineating a broad programme of climate response centered on an agreement to keep increased global average temperatures to 2o C. At Cancun in 2010, the COP launched global climate delivery channels for several of the pillars envisioned in the Bali Action Plan: the Green Climate Fund, Adaptation Committee, Climate Technology Center and Network. In 2011, the COP agreed Durban Platform for Enhanced Action and established a new working group to develop a Protocol, another legal instrument or an agreed outcome with legal force under the Convention applicable to all Parties to be completed no later than 2015 and enter into force by 2020. The COP also agreed to develop a work programme to raise the level of ambition on climate response informed by AR5 and the outcome of a 2013-2015 review of pathways to achieving a maximum of 2o C or 1.5o C warming. This combined, open ended effort will operate alongside the Kyoto Protocol pending a decision for continuation or termination.	Rejected - The suggested change is too long and is too detailed. Also some of the wording is not accurate -- no action needed
14791	1	11	22		25	"…which meant a successor treaty would be needed…" and "… negotiations on a successor treaty were under way…" The references to "successor treaty" are factually incorrect. With the UNFCCC's Kyoto Protocol's first commitment period coming to a close, its Article 3.9 would determine subsequent commitments under the KP: "Commitments for subsequent periods for Parties included in Annex I shall be established in amendments to Annex B to this Protocol, which shall be adopted...".	Taken into account - text has been revised for clarity. "succssor" has been replaced as suggested by the commenter
18015	1	11	23	11	24	the reference to a “successor treaty” in relation to the Kyoto Protocol” is legally inaccurate. The mandate of the AWG-KP needs to be reflected in a accurate way.	Taken into account - text has been revised for clarity. "succssor" has been replaced as suggested by the commenter
7344	1	11	23	11	24	It is inaccurate to suggest that "a successor treaty wouldbe needed to cover the period after 2012" when discussing the Kyoto Protocol. The Protocol in its Art 3 (9) makes provision for "subsequent commitment periods" - hence an amendment is needed, not an entirely new treaty.	Taken into account - text has been revised for clarity. "succssor" has been replaced as suggested by the commenter
11397	1	11	23	11	24	The reference to a "successor treaty" in relation to the Kyoto Protocol is technically and legally inaccurate. The objective of the negotiations that were launched in 2005 under the Ad-Hoc Working Group on the Kyoto Protocol was to define and establish the period and numerical emission reduction targets for Annex I Parties who are Parties to the Kyoto Protocol for the KP's second commitment period that would commence after the end of the first commitment period in 2012. The AWG-KP negotiations were and are, therefore, NOT about a successor treaty to either the UNFCCC or the Kyoto Protocol. The reference should be "a second commitment period would be needed to cover the period after 2012"	Taken into account - text has been revised for clarity. "succssor" has been replaced as suggested by the commenter

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
7345	1	11	24	11	26	It is inaccurate to describe the negotiations launched at Bali as on a "succesor treaty"; as noted above, the Protocol provides for subsequent commitment periods. In addition the mandate of the negotiations was for an "agreed outcome" which may not have taken the form of a treaty. Negotiations on the second commitment period of the Kyoto Protocol had been continuing since 2005 and were mandated to continue and resolve in 2009 as well.	Taken into account - text has been revised for clarity. "succssor" has been replaced as suggested by the commenter
18016	1	11	25	11	26	the reference to "negotiation on a successor treaty were just under way" in 2007 is also legally inaccurate. The mandate of the Bali Road Map negotiation needs to be reflected in a accurate way.	Taken into account - text has been revised for clarity. "succssor" has been replaced as suggested by the commenter
11398	1	11	25	11	26	The reference to "negotiations on a successor treaty were just under way" in 2007 is also technically inaccurate. The negotiations that were launched in Balic in December 2007 under the Ad-Hoc Working Group on Long-term Cooperative Action (AWG-LCA) launched "a comprehensive process to enable the full, effective and sustained implementation of the Convention through long-term cooperative action, now, up to and beyond 2012, in order to reach an agreed outcome and adopt a decision at its fifteenth session". It did NOT specify the legal form of such agreed outcome as a treaty (e.g. a new protocol). The legal form would be the subject of negotiations in the AWG-LCA. The reference should be accurate in terms of saying that the negotiations should be "on an agreed outcome" rather than "on a successor treaty".	Taken into account - text has been revised for clarity. "succssor" has been replaced as suggested by the commenter
7871	1	11	26	11	27	The flowery wording ("wide array of disagreement") is obscuring important issues. There was a lot of disagremment regarding the details of a treaty. However, among many nations was and is a general agreement that more ambitious emission cuts are urgently required and that high emitting countries must take the lead. In essence, the negotations were a complete fail for the US and China blocked each other. This report should acknowledge the lack of political will of some powerful countries.	Rejected - The wording is fine here. Also there is no practicality in blaming the US and china for a failure that has had many sources, not least because there is no scientific way to pin blame. No action needed
16060	1	11	29	11	43	This long paragraph seems to take positively the spreading of climate in many fora, a possible consequence of the limited progress in UNFCCC negociations. Maybe a word of caution is in order.	Noted - the idea is to signal the array of activities not to say if they are good or bad. Chapter 13 (cross referenced elswhere) looks at this in more detail
4882	1	11	29			{Add} "on climate {}change mitigation	Accepted - "change" added
4854	1	11	29		43	It would be worth mentioning also the GEF as an important complementary institution (financing inter alia mitigation projects in developing countries and IETs).	Rejected - text is ok. There are LOTs of unmentioned organizations here
9784	1	11	3	11	8	You discuss country policies from a strictly centralized perspective. Both, in industrialized and even more in developing countries decentralized energy systems will play a major role.	Noted - the previous paragraph AND the next paragraph talk about those kinds of systems. Text is balanced here
17002	1	11	3	11	4	What will this lost (zero-carbon) nuclear, baseload capacity be replcaed by? Coal?	Noted - Japan is looking at lots of actions--some involve restarting some reactors; some are renewables; lots are coal and right now there's a lot more oil and LNG. It is a mix. This kind of detail not necessary for this chapter. No action needed

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
2575	1	11	37	11	37	Rio+20 needs an update, namely in fossil fuel subsidies	Rejected - no action needed here. The previous sentence talks about fossil fuel subsidies through G20. The G20 reaffirmed that literally days BEFORE Rio+20 and Rio+20 didn't include any meaningful new commitments on this
17005	1	11	37			"Rio+20 process" needs to be defined/expnaded upon.	Rejected - text is ok
4883	1	11	40			{Add} "Organization – IMO {}(both focusing on emissions from bunker fuels)	Accepted - text added as suggested by commenter
17797	1	11	40			While mentioning particular initiatives, I would like to see added here the UN family, e.g. WHO initiative of health benefits in the green economy - which in practice analysis those mitigation measures that do have the highest benefit for human health; or the UNECE the PEP programe - working on transport health and the environment - the list could probably be very long - and may even be thought as an Annex - however otherwise the list of new initiatives appears otherwise to be biased. One way out could be choosing a list of crieteria that	Rejected - There too many organizations to name them all. Edits in response to 559 point to a paper that looks at this fuller range in more detail.
16061	1	11	44	12	12	The interest of academics in international trade is a fact and a good thing. But the rest of the paragraph takes for granted that WTO could have a positive role for mitigation. The reverse might be true, as shown by recent disputes on carbon quotas levied on aviation by the EC, a mitigation policy contested in the name of free trade.	Noted - it could go either way. Our job here is to report on the science.
12512	1	11	47			Add after “mitigation” -- “and adaptation”	Accepted - words added in text
16897	1	11	48		49	Suggest replace last line with the following: "as well as possible international trade of CO2 emission allowances."	the paragraph has been revised; comment no longer relevant
10465	1	11	5			Add "South" Korea	Accepted - added "South"
15243	1	11	9	11	15	what is the temporal scale used here for energy investment?	Rejected - the point is a generic one, not particular to a single temporal period
15533	1	11	9		12	The benefits of carbon pricing might be mentioned in this context.	Rejected - we mention that a lot elsewhere.
8407	1	11	9	11	15	“do not depend on government subsidies” Every energy transition has been based on huge government subsidies, either fossil or nuclear one. The problem is to switch government subsides from fossil to non fossil energy. I believe that this point must be clarified and underlined. As an example, according to IEA (2011, IEA analysis of fossil-fuel subsidies) without further reform, spending on fossil-fuel consumption subsidies is set to reach $660 billion in 2020, or 0.7% of global GDP. Phasing-out fossil-fuel consumptions subsidies by 2020 would slash growth in energy demand by 4.1%, reduce growth in oil demand by 3.7mb/d and cut growth in CO2 emissions by 1.7 Gt	this paragraph has been removed; comment no longer relevant
15289	1	11	9	11	10	Describing nuclear power as a promising system is perhaps controversial. Perhaps it should be clearly stated tha it is promising from a CO2 mitigation perspective	this paragraph has been removed; comment no longer relevant

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
7870	1	11	9	11	15	This is an implicit value-judgement in favor of nuclear energy and coal plus CCS. If you think that these energies are better overall than renewable energies you should say so and substantiate your claim with arguments. You seem to claim that while renewables will depend on subsidies, nuclear and CCS-coal do not. However, wihtout substantial government subsidies and tax brakes nuclear energy and coal would be more expensive than they are currently and CCS is supposed to raise the cost of generating power from burning coal by one third. If externalities such as damages from CO2 emissions are included, conventional energy gets even more expensive. On the other hand, renewable energies will get cheaper within the next two decades due to learning effects while fossil fuels will get more expensive. A recent German study estimates that by 2030 different forms of wind and solar energies will be as cheap or considerably cheaper than the conventional energy mix (fossil and nuclear) (Kost et al. 2012).	this paragraph has been removed; comment no longer relevant
4303	1	11	1	11	2	change: „and will probably leave many reactors shut in that country“ to „and will probably leave most - if not all - reactors shut in that country“. reason: recent activity by the Japanese governement due to continuing high intensity of protests and a new anti-nuke party (Greens). Phase-out is now basically a consensus (only the date is up to debate)	Taken into account - combined with other comments
4304	1	11	9	11	9	change: „these promising systems“ to „these systems“, calling CCS and nuclear promising is far from any consensus, especially in the European debate.	this paragraph has been removed; comment no longer relevant
4361	1	11	9	11	10	similar comment: presenting energy sources such as nuclear power as «promising» is of dubious meaning and could lead to believe that authors have a biased opinion. Low carbon energy production by no way does equal to desirable, as they can present other drawbacks.	this paragraph has been removed; comment no longer relevant
11023	1	11				Around Section 1.2.1.4: There should be some acknowledgment around here of the fact that without a price on carbon dioxide, energy generation is biased away from low- or zero-carbon technologies such as renewables. E.g. Insert around line 15: 'Another key issue in influencing investment patterns is that, without a price on carbon dioxide, energy generation is biased away from low- or zero-carbon technologies such as renewables.'	this paragraph has been removed; comment no longer relevant
9248	1	11		12		There should be mention that the UNFCCC recognised CCS as a way of reducing emmisions and provided guidelines for storage: http://unfccc.int/files/meetings/durban_nov_2011/decisions/application/pdf/cmp7_carbon_storage_.pdf	Rejected - the suggested add is not needed
14792	1	11		12		There is very little on the UNFCCC regime, and more on the WTO, etc. But, there is much experience with the UNFCCC that could be reviewed here: extent of compliance with UNFCCC (on targets, on finance and technological support), the effectiveness of the CDM, impact of various loopholes, etc.	Rejected - Chapter 13 deals with this in detail. Text is ok
8223	1	11				It would be interesting if the authors can shed light on the lessons learned from the fallout of Kyoto by major partners to the initiatives undertaken at G8, G8 +5, G20 and Rio 20 +. What are the successes and failures? Can any conclusions be made on the design of an international institution that could provide effective mechanisms for climate negotiation?	Rejected - We can shed light on this, but not in a way that is concise or fully scientiific. So here we just introduce the issues. See chapter 13 for more discussion on this

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
11579	1	11	16	11	43	This section is not clear on the emissions being referred to in the first sentenc., Is it to be assumed the authors are referring to all gaseous emissions?Its in the second sentence that it becomes more obvious its the GHGs, as the convention is mentioned. As the chapter seems to cover all agreements related to climate change, there should be a discussion on the vienna Convention and the Montreal Protocol that are good examples and lend credence from the UNFCCC that have universal acceptance. hereThe issue that first needs to be recognised here is that climate change is cross cutting issue hence the reason	Taken into account - added text to mention the Montreal Protocol. "...UN?based process. PROPOSALS EXIST WITHIN THE MONTREAL PROTOCOL ON SUBSTANCES THAT DEPELETE THE OZONE LAYER TO REGULATE SOME OF THE GASES THAT HAVE REPLACED OZONE-DESTROYING CHEMICALS YET HAVE PROVED TO HAVE STRONG IMPACTS ON THE CLIMATE. A wide array…"
18108	1	11	22	11	28	With regard to the Kyoto Protocol, the text states that a "successor treaty" was needed after 2012. Suggest framing this according to the language of the Kyoto Protocol which refers to the period of 2008-2012 as the "first commitment period" (eg: Arts 3 (1), (7), Kyoto Protocol) and which envisages the establishment of subsequent commitment periods under the Kyoto Protocol itself rather than negotiating a "successor treaty" (eg: Art 3(4), (9) Kyoto Protocol). The language as it stands could be misinterpreted to suggest that the Kyoto Protocol was only designed for the period of 2008-2012 which was not the case.	Taken into account - text has been revised for clarity. Combined with other comments
5385	1	11	29	11	29	climate mitigation ---- shoild be ---- climate change mitigation	Taken into account - combined with other comments
6785	1	11	37	11	37	It may be helpful to refer to the following: "Additionally, UN Secretary General Ban Ki-moon is leading a global initiative on Sustainable Energy for All to mobilize action from all sectors of society in support of three interlinked objectives to be achieved by 2030: providing universal access to modern energy services; doubling the global rate of improvement in energy efficiency; and doubling the share of renewable energy in the global energy mix."	Rejected - too much detail for this chapter
11680	1	11	46	11	47	Add the following refereed journal article citations before the reference to 'see also Chapter 13': Brewer 2003; 2004; 2010 The full citations are: Brewer, T. (2003). The trade regime and the climate regime: Institutional evolution and adaptation. Climate Policy 3, 329-341. Brewer, T. (2004). The WTO and the Kyoto Protocol: Interaction issues. Climate Policy 4, 3-12. Brewer, T. (2010). Trade policies and climate change policies: a rapidly expanding joint agenda. The World Economy 33, 799-209.	Accepted - added cross reference to ch 13 and to Brewer (2010) since it's the only article is since AR4.
17692	1	11	13	11	15	From the second sentence the statement is not clear… The idea is there but ist hard to catch	paragraph has been removed. Comment is no longer relevant
7011	1	11 of 33	15	11 of 33	12	Add "When energy services come out from solar flux, as is the case for renewables, fuel costs completely (or almost completely) disappear, as well as GHG emissions", after the final period in line 15.	paragraph has been removed. Comment is no longer relevant
15244	1	12	13	12	38	of interest but not mention of conflict resolution per se - see Ramsbotham et al (2011) "Contemporary Conflict Resolution", Chapter 12, 2011. Available at http://www.polity.co.uk/ccr/authors/woodhouse.asp accessed 13/9/12	Rejected - suggested change is not needed here
16062	1	12	13	12	38	Too many sources repeated, the paragraph is not focused. Also, Victor is quite relevant here in the discussion, but five quotes in one paragraph may be exagerated…	Taken into account - deleted Hafner-burton et al reference at line 26-27.
13366	1	12	13			Social scientists' rather than 'scientists'.	Rejected - text is fine. These are, in fact, scientists

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
13367	1	12	13	12	38	The referencing here is tendentious. For balance, significant scholarship by Keohane,Oran Young, the Norwegian governance school, and others should beacknowledged and included at this point.	Rejected - this a framing chapter and not the chapter on climate diplomacy and regimes. Excessive references should be avoided and instead only major reviews or pointers be included.
4474	1	12	13	12	33	It would seem appropriate in this paragraph to mention also the recent contributions in game theory as it has been applied to the climate negotiation problem. These may be covered in Chapter 13, but should be noted here also.	Rejected - Game theory remains highly theoretical, and chapter 13 deals with it in some detail. -- no action needed
17800	1	12	13	30		This whole paragraph could be brought up more to the point and be much more informative - either use a design/figure or bring it to the point - not just the information that three different type of new research has been done - what are the results?	Rejected - our task is to talk about what scientists have done since AR4
7872	1	12	13	12	38	What is the conceptual basis of this paragraph? The literature seems to rest on game theory, rational choice and neo-realistic schools of thought . This is only one - highly contentious - way of analyzing this important issue. One reason is that although it is often presented as value-free or -neutral it contains many normative assumptions. Also, such approaches alone cannot identify what SHOULD be done about climate change. Other perspectives should be included, such as institutionalism (e.g. Young 1999). For a rigorous criticism of (neo-) realism see e.g. Caney (2006).	Rejected - Young and Caney are pre-AR5. What is new that needs to be cited here? In fact, the reason we cite the Hafner-Burton et al piece is because it EXTENSIVELY reviews those varied paradigms. The conceptual basis of this paragraph is to talk about the center of gravity of research broadly on this topics. -- no action needed
17007	1	12	15	12	16	Cite specificially what section in Chapter 13 the reader can go to to learn about the "body of research… to explain why negotiations on complex topics… are prone to gridlock."	Taken into account - on the topic, added additional references to Murase (2011) and Yamaguchi (2012)).
13675	1	12	16	12	16	Insert "change mitigation" after "… such as climate".	Taken into account - combined with other comments
7150	1	12	16,22,25,27,29			Remove all unnecessary parantheses.	Editorial – copyedit to be completed prior to publication
13676	1	12	19	12	19	Insert "types of policy mechanisms to achieve mitigation cost reductions" after "… enforcement mechanisms".	Taken into account - edited sentence to say: "...the presence of enforcement mechanisms, SCHEMES TO REDUCE COST AND INCREASE FLEXIBILITY, and other attributes…"
6458	1	12	2	12	5	“Mitigations embodied” should be “carbon embedded”.	Taken into account - sentence has been revised
17006	1	12	2	12	5	Poorly worded sentence / not clear.	Taken into account - sentence has been revised
3309	1	12	23	12	25	I would consider adding a sentence after this one such as this: "However, some scholars believe that the normative structure of political legitimacy severely hinders the possibility of addressing climate change justly (Gardiner 2011)." Citation: Stephen Gardiner (2011). A Perfect Moral Storm: the Ethical Tragedy of Climate Change. New York: Oxford University Press.	Rejected - suggest sentence is not necessary. And adding another reference does not seem vital
8475	1	12	25		29	A particularly informative text here is Fen Osler Hampson's (edited "Madness in the Multitude: Security and World Order" Oxford University Press 2002	Rejected - adding another reference does not seem vital

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
6815	1	12	31		37	This seems like useful question, since the sources of ozone layer deterioration are equally clearly defined. On the other hand, it is a question that neeeds to be answered here: the fossil enegy system that is the source of much of GHG is so much more fundamental and pervasisve to/in the global economy, and so it is no surprise that a diffusion of respnse results - even distratcions and disinformation.	Rejected - The pieces we cite examine exactly this in great detail. We don't have space to address it further here
17735	1	12	39			In the section title replace the word "beyond" by "other than"	Accepted - change "beyond" to "other than"
13365	1	12	4			There is asomething awry with this sentnce. The word mitigations' is erroneous. Should the sentence read… '...also allows trade in goods, such as x, y, z, whose production processes are…etc'?	Taken into account - sentence has been revised
15446	1	12	40	12	46	A point that could usefully be made more explicit in this introductory section is the fungibility of gases for accounting purposes, through the choice of a basket.	Rejected - Other chapters deal with this, as does WG1. Other comments lead to edits about flexibility of commitments, and that is one of the central reasons for a basket. No action needed
17008	1	12	40			Might be worth inserting that CO2 from burning fossil fuels accounts for about 60% of global GHG (IPCC WG1, 2007)	Accepted - percentage is added
4884	1	12	41			{Cor} "Kyoto [Treaty] Protocol cover	Accepted - changed Kyoto Treaty to Kyoto PROTOCOL.
17736	1	12	42			replace the word "This" by "A"	Rejected - text is fine. No action needed
11349	1	12	42	12	42	Nitrogen trifluoride (NF3) is introduced in the second Kyoto compliance period (which can be mentioned in the foot note?).	Accepted - Added to the main text. "NF3 was added as a GHG under the Kyoto Protocol for its second commitment period."
4885	1	12	44			{Add} "mitigation {}of the emissions of these	Rejected - text is fine. No action needed
9785	1	12	5	12	12	The crucial issue is the starting point for the comparative assertion, when stating "Article 3 of the UNFCCC requires that “[m]easures taken to combat climate change, including unilateral ones, should not constitute a means of arbitrary or unjustifiable discrimination or a disguised restriction on international trade.” You risk to maintain the status quo of pollution havens and environmental dumping (for a comprehensive analysis of theories and empirical studies analyzing the interlinkage between competitiveness and environmental protection on a national scale: GÜNTHER, E.; HOPPE, H.; LAITENBERGER, K.: Competitiveness of nations and environmental protection. In: R. Hahn, H. Janzen, D. Matten (Hrsg.): The social responsibilities of business. Background, Core Issues and Future Perspectives. Stuttgart 2012, p. 467-495. http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2145420	Taken into account - added sentence "...have been a matter of long standing interest in climate diplomacy AND ARE CLOSELY RELATED TO A LARGER DEBATE ABOUT HOW DIFFERENCES IN ENVIRONMENTAL REGULATION MIGHT AFFECT ECONOMIC COMPETITIVENESS." cited Gunther et al.
10741	1	12	50	12	50	In addition to the reference given here to WGIII chapter 8 (on transport) a reference could also be given to WGI Chapter 8 on Anthropogenic and natural forcing, since this chapter gives an overview of the various forcing mechanisms.	Accepted - cross reference added to WG I chapter 8
10621	1	12	31			For new work on why institutional arrangements vary across issue areas (from regime integration to regime complexes to regime separation), see: [Johnson, T., and J. Urpelainen. 2012. A Strategic Theory of Regime Integration and Separation. International Organization 66(4): 645-677.] The article tests its theory by examining the degree of integration or separation among four environmental regimes: climate, deserts, forests, and ozone.	Accepted - Johnson and Urpelainen (2012) cite added

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
8224	1	12	13	12	38	While this paragraph explains what scholars have focused on, it would be nice if a summary of findings are also made available. This will provide readers a good knowledge of what has been going on.	Rejected - too much detail for the space we have.
5386	1	12	16	12	16	such as climate ----- should be --- such as climate change	Accepted - changed to "climate change"
7707	1	12	17			What is a definition of the term 'political scientists'? Is this term used before in AR5 or even in AR4?	Rejected - This is the second largest field of social science. We don't need to define it here.
4016	1	12				authors might wish to update information on (1) RF of black carbon whose best estimate of the central values is now from 0.0 to 1.3 W/m2. However the total effective forcing from all BC effects is unlikely to be greater than 1 W/m2 (section 3.3.7 of the report ref. to below); and (2) tropospheric ozone. For tropospheric ozone a central estimate is 0.35±0.10 W/m2 (section 3.5). Source: Integrated Assessment of Black Carbon and Tropospheric Ozone, available at http://www.unep.org/dewa/Portals/67/pdf/BlackCarbon_report.pdf	Numbers will be updated according to WGI AR5
14793	1	12		13		While non-cossil CO2 GHGs are worth a mention, it is not clear why they warrant an entire sub-section as one of the six key observations.	Noted - because the world is focused on CO2 and when you look at the other pollutants they dominate the short-lived picture, notably. No action needed
3548	1	12	39	13	11	Should mention the climate impacts of the "Montreal gases"	Taken into account - added point on the Montreal Protocol and added citation to Velders et al (2007) which is best study of this.
7811	1	12	39	13	16	The different temporal scales of different climate impacts and following implications should be mentioned.	we will discuss
11580	1	12	40	12	40	Burning of fossil fuels is the largest contibuting source of GHGs hence the concentration.That countries have been reporting on all the gases, beyond fossil fuel CO2 is an indicator that there is awareness on all gases and the matter of their GWP.	what is the point here?
18109	1	12	41	12	41	Suggest referring to the Kyoto Protocol as such rather than as the Ky0t0 Treaty here and troughout the entire document in this and other chapters.	another comment addresses this

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
12085	1	12	44	12	45	Current text "Indeed, depending on the region, mitigation of these 45 different pollutants varies enormously in cost." It is worth considering if this statement should be qualified with a statement stating something like "for many countries mitigating non-CO2 gases has been shown to be a cost effective strategy because many of these gases have long lifetimes and global warming potentials much higher than CO2." eg: An MIT study found that focusing on non-CO2 gas mitigation reduced the overall costs of action by two-thirds. Please see at Reilly, J. Jacoby, H. Prinn, R (2008) Multi-Gas Contributors to Global Climate Change: Climate Impacts and Mitigation Costs of Non-CO2 Gases. MIT. Available At http://www.pewclimate.org/global-warming-in-depth/all_reports/multi_gas_contributors	Taken into consideration - added sentence and cites "varies enormously in cost. A VARIETY OF STUDIES HAS SHOWN THAT ALLOWING FOR TRADING ACROSS THESE DIFFERENT GASES WILL REDUCE THE OVERALL COSTS OF ACTION; HOWEVER, MANY STUDIES ALSO POINT TO THE COMPLEXITY IN AGREEING ON THE CORRECT TIME HORIZONS AND STRATEGIES FOR POLICY EFFORTS THAT COVER GASES WITH SUCH DIFFERENT PROPERTIES (REILLY ET AL 2008; RAMANATHAN AND XU 2011; SHINDELL ET AL 2012)."
11581	1	12	47	13	10	There is a lot of work that has been carried out by the WHO that could be used to beef up the contribution here if these gases are to be considered.	Taken into account - agreed. Discussion on co-benefits has been beefed up but a detailed assessment of the topic is addressed elsewhere in the report.
4606	1	13				AIE is not defined in the graph	Chart has been redrawn. Comment is no longer relevant
13252	1	13				The acronym AIE is not explained	Chart has been redrawn. Comment is no longer relevant
17011	1	13				Where is Forestry?	Chart has been redrawn. Comment is no longer relevant
17012	1	13				"AIE" in the legend should be defined - Aerosol Indrect Effect (I'm assuming)	Chart has been redrawn. Comment is no longer relevant
10466	1	13				Change "Household biofuel" to Household biomass. "Biofuel" is the term used for transport fuels - need to also confirm that in Glossary. Need to cross-check with chapters 7,8,10,11 for consistency with data from this single reference. Put "AIE" in full. Is rail included in "off-road transport" or is that agriculture and construction vehicles? Needs clarifying in caption.	Chart has been redrawn.
6864	1	13				Please ensure consistency with WGI AR5 estimates of net radiative forcing -- see Chapter 8 of WGI AR5.	Chart has been redrawn. we have totally redone discussion of GWPs
10742	1	13	1	13	16	It is good that the non-CO2 forcings are presented and that the cooling effects are given some attention. But one important aspect is missing, and that is the temporal behaviour of the various mechanisms. Some agents cause strong warming effects on shorttime scales (e.g. black carbon and tropospheric ozone), while some are "medium long lived" like methane, and finally some are very long-lived. CO2 shows a special behaviour due to the very slow removal of excess CO2 (see Box 6.2 in WGI SOD). On the other hand there are some strong short-lived cooling effects. These aspects (time scales and effects of both signs) are illustrated in a recent paper by Aamaas et al. (see http://www.earth-syst-dynam-discuss.net/3/871/2012/esdd-3-871-2012.pdf. Figure 13 shows contributions by sectors and components. (see als fig 11 and 12). While figure 1.3 on page 13 uses RF as indicator the figures in Aamaas et al used temperature. See also WGI, chapter 8; figures 8.32, 8.33 and 8.34.	Taken into account - combined with other comments

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
17010	1	13	11			Shindell et al. in Science 2012, "Simultaneously Mitigating Near-Term Climate Change and Improving Human Health and Food Security" deserfves to be cited. Also, a mention/discussion of the recently launched (Feb 2012) Climate and Clean Air Coalition is warranted.	Taken into account - combined with other comments
15246	1	13	12			is this meaningful given the complexity of interactions?	Figure has been redone.
12217	1	13	13			Please explain AIE (Aerosol Indirect effects) in caption	Chart has been redrawn. Comment is no longer relevant
4886	1	13	18		19	{Add}" totality of {}existing policy efforts do not put the planet on track for meeting the objectives [of Article 2] of the United .. (UNFCCC {}Article 2) That is: " totality of existing policy efforts do not put the planet on track for meeting the objectives of the United .. (UNFCCC Article 2)	Reject - we can't say this. We can say something about 2 degrees (and we have done that, with some revisions to those statements to come).
11025	1	13	24			Suggest adding at the end of the sentence ending with 'deep cuts' the words 'that would be consistent with the precautionary approach suggested by Article 3.3 of the UNFCCC.'	Rejected - the "precautionary approach" has lots of meanings, and article 3.3 doesn't say this precisely. So we can't say this. No action needed
15247	1	13	28			"adapt naturally" is interesting vis-à-vis 'geo-engineering'	interesting indeed - no action needed
17009	1	13	3			Insert at the end of sentence on aerosols "… i.e., they cool the atmosphere LARGELY THROUGH THEIR ROLE IN CLOUD FORMATION, EXTENT, THICKNESS AND LIFETIME"	Rejected - we don't need to describe mechanisms here.
11399	1	13	30	14	2	The reference to Art. 3(3) of the UNFCCC is a truncated reference that selects only a limited part of the provision referred to. In doing so, it creates the potential for suggesting that only the precautionary principle is worthy of highlighting and stressing among the other principles that are included and referred to in Article 3 of the UNFCCC. Considering that Article 3 is a framing article in the UNFCCC in terms of identifying the principles that should guide Parties' actions in implementing the UNFCCC, it should therefore be quoted in full so as to ensure a fair and accurate reflection of the relevant framing principles as provided for in the UNFCCC.	Taken into account - this is a fair point. But if we quote all principles included in Article 3, it may be redundant and consume too much space. Instead the quote has been deleted
11024	1	13	5			The word 'purposely' should be deleted in the sentence 'Interpreting the UNFCCC goals is purposely difficult.' It is ill-judged and inappropriate.	Accepted - deleted 'purposely'
7873	1	13	5	13	5	If "optimal" is understood in terms of economic efficiency, this should be stated clearly, for in ordinary language "optimal" means "the best". This is an important difference.	Taken into account - sentence has been removed
11350	1	13	5	13	6	I would suggest that the sentense "for optimal radiative forcing reduction policies the integrated total effect should be estimated" be revised or removed because it is not clear why radiative reduction policies are brought up here and also why the integrated total effect (implying the GWP) is important.	Taken into account - sentence has been removed
11351	1	13	6	13	8	This statement can be supported by Ramanathan and Carmichael (2008, Nature Geoscience, 10.1038/ngeo156)	Accepted - added cite to Ramanathan and Carmichael (2008)
15245	1	13	7	13	11	a little speculative given the state of current research? I.e. 'could' with what degree of certainty?	Taken into account - combined with other comment
12513	1	13	7	13	8	The reference should be to "black carbon (soot)" and should not assert that this is simply a positive forcing; refer to WGI for the more mixed role soot plays	Accepted - we will put soot in brackets and add xref to WG1 per comment 664
10467	1	13	8			"soot" not a good technical term as used here and elsewhere. Suggest use black carbon (as used in Fig 1.3 and 8.2), or particulates or aerosols, as appropriate.	Taken into account - combined with other comment
4362	1	13		13		I cannot make sense of the first phrase from the legend; Numbers within brackets do not seem correct for aviation and shipping; those for biomass burning and industry are surprising (do they contribute to climate cooling?); misses definition of AIE;	Figure has been redone.
6862	1	13	2	13	3	You may want to insert reference to WGI AR5 Chapter 7 here.	Taken into account - combined with other comment

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
8225	1	13	3	13	3	Why currently? Can it change in the future? Why? How large are the negative contributions with respect to the total global warming problem?	Rejected - too much detail for this text
6863	1	13	6	13	8	Please provide a reference supporting this statement.	Taken into account - combined with other comment
3549	1	13	18	13	18	Reference to Chapter 1 in AR4, specify if this is in WG III report (which is likely)	The cite at the end of that sentence (IPCC 2007a) points to WGIII. No action needed
3550	1	13	31	14	2	Format citation	Editorial – copyedit to be completed prior to publication
3881	1	14				What does AIE means??	Figure has been redrawn
11401	1	14	13	14	15	The wording in the Bali Action Plan (decision 1/CP.13) referring to the footnote that cites the work of Working Group 3 of AR4 should be accurately reflect what is contained in the footnote - i.e. "Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, Technical Summary, pages 39 and 90, and Chapter 13, page 776." Footnote 1 of decision 1/CP.13 did NOT specifically refer to only "Table SPM5 and Box 13.7" as the current text seems to imply.	Taken into account - The sentence has been revised to point to the Bali Action Plan generally rather than specific boxes and tables, as suggested by the comment
11720	1	14	16	14	18	G8 declaretion says [suport] not [agree]. Correct word should be used.	Accepted - changed 'agreed' to 'supported a goal'
9493	1	14	16	14	18	revise this sentence to the correct fact - L' Aquila G8 Leaders Declaration says, "we reiterate our willingness to share with all countries the goal of achieving at least a 50% reduction of global emissions by 2050, recognising that this implies that global emissions need to peak as soon as possible and decline thereafter. As part of this, we also support a goal of developed countries reducing emissions of greenhouse gases in aggregate by 80% or more by 2050 compared to 1990 or more recent years." (G8 Leaders Declaration: RESPONSIBLE LEADERSHIP FOR A SUSTAINABLE FUTURE/65. in page 19)(attached on email)	Taken into account - combined with other comment
10636	1	14	16	14	18	Yamaguchi et al argued in his essay Climate Change Mitigation A Balanced Approach to Climate Change that in sipte of the inclusion of the 2 degree target, the leaders remained to recognize the broad scenetific view, and they have not agreed to the view yet. I will send it by email later.	Taken into account - combined with other comment
10677	1	14	16	14	18	If the agreement L'Aquila specifically referred to 2 degrees being a "scientific view" then this text should be placed in quotation marks, like the COP15 text. Otherwise these words should not be used, as it sounds like the IPCC authors are endorsing the idea of 2 degrees as the logical scientific interpretation of Article 2.	Accepted - Reasonable comment. Quotation marks added as suggested by the comment. The phrase was revised to say "recognized the broad scientific view that the increase in global average temperature above pre-industrial levels ought not to exceed 2°C."
17013	1	14	18			"at least 80% by 2050… BELOW WHAT BASELINE?... Any conditions (e.g., domestic legislation, etc.)?	Rejected - Exact wording is 'compared to 1990 or more recent years'. It doesn't seem necessary here to state this here.
14341	1	14	19	14	23	This omits an important addition: At COP16 in Cancun, Parties, for the first time, adopted the 2 degree goal through consensus (paragraph 4 of Decision 1/CP.16).	Accepted - Revised sentence to include mention of Decision 1/CP.16.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
11402	1	14	19	14	19	In the context of the UN's treaty and mulitlateral negotiations practice, the UN General Asssembly had decided that "the term 'takes note of' or 'notes' are neutral terms that constitute neither approval nor disapproval" (see UNGA decision 55/488 of 7 September 2011, as reproduced in UN Doc. A/56/250 and UN Doc. A/64/250). Hence, when the UNFCCC COP took note of the Copenhagen Accord, it should be read as the COP not approving or disapproving the Copenhagen Accord, but rather simply noting its existence without necessarily endorsing or unendorsing its contents. As such, the 2 degree Celsius goal recognized in the Copenhagen Accord cannot be deemed to have been adopted by the UNFCCC Parties at COP15. It was, in fact, only at COP16 in Cancun that the Parties adopted the 2 degree Celsius goal under paragraph 4 of COP decision 1/CP.16. If the intent of the referenced sentence is to indicate when the COP adopted the 2 degree Celsius goal, then the reference to the Copenhagen Accord would be legally and factually inaccurate. The reference should, instead, be to COP decision 1/CP.16	Taken into account - combined with other comments
4855	1	14	20		22	Actually, the goal of limiting warming to 1.5o has also been mentioned already in the Copenhagen Accord (see its para 23).	Taken into account - revised text to say "Ever since the 2009 Copenhagen Conference the goal of 1.5 degrees has also appeared in official UN documents..."
16063	1	14	22	14	23	The target in temperature is a political choice of Nations, in particular those most vulnerable, that want to minimize the risk of overshooting tolerable warming. IPCC can say -as righly in Victor 2011- that it is expensive o not attainable through consensus negociations, but its role is not to limit such political ambitions.	Taken into account - we are not trying to limit ambitions but just to lay out the facts. We think (with edits suggested by other comments in rows 675-681) that text is OK
13370	1	14	22	14	23	The assertion that the scientific foundations for these targets 'has remained elusive', is inaccurate. 'Dangerous' is a value -laden term. However the physical and biological sciences are able to provide reasonably accurate indications of species' and ecosystemic responses to changes in average and extreme temperatures, associated changes in weather, water availability etc. This body of research and observation is hard to summarise and varies signficantly by region. Nevertheless, it is based on a firm and growing volume of biological and physical evidence for impacts - including on ocean acidification and sea levels, glaciers, ice shelves (over time), coral reefs, and a broad range of individual species. These impacts accumulate and amplify substantially as global average temperatures rise above 1.5C. There is also good evidence about the iplications for sea-level rise and the likely fate of coastal settlemnts and biosystems. In terms of compounding effects, the scientific foundations for these targets - read in the contexty of Article 2 - are substantial and not elusive. I suggest the appropriate sentence would be: 'The scientific foundation for establishing these targets - in the light of the broad goals articulated for the UNFCCC - is substantial and compelling'.	Taken into account - We might want to have a substantial base of science, but we don't really know. Some of the sicence says 1 degree is too much. Some says that in some settings 3 degrees is too much. Variations in what different societies mean by "dangerous" and the risks they are willing to endure further amplify that observation. Sentence has been revised to reflect the variation.
13677	1	14	22	14	23	Replace "However … Victor 2011" by "Researchers disagree regarding the scientific foundations for setting temperature targets - Schneider and Lane (2006) see them as sufficiently robust, Victor (2011) does not." Source: Schneider, S.; Lane, J. (2006): An overview of dangerous climate change, in: Schellnhuber, H.-J. (ed.): Avoiding dangerous climate change, Cambridge University Press, Cambridge, p. 7-24	Taken into account - Sentence has been revised per other comment. Added citation to Schneider and Lane (2006)
17737	1	14	23			should be UNFCCC	Sentence has been replaced and word was removed. Comment no longer relevant
15534	1	14	23			Perhaps worth mentioning that the 2degC ceiling was endorsed at Cancun.	Taken into account - combined with other comment

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
4887	1	14	23			the UNFCCC—	Sentence has been replaced and word was removed. Comment no longer relevant
17014	1	14	23			This paragraph could benefit by reference to the National Academy of Sciences 2011 report, "Climate Stabilization Targets", chaired by Susan Solomon	Accepted - added reference to NAS (2011)
8476	1	14	24		30	Much of this chapter, and in fact most of AR5, is largely premised in the "deficit model" of knowledge transfer and policymaking, where it is often an a priori assumption that public policy simply needs the "right" data, knowledge or instruments in order to rectify the problem(s). This is a problematic starting point, as (while the emphasis on evidence is important) it tends to ignore or downplay the political, fiscal and path dependent realities of decisionmaking in the public domain. See for example Stone's "Policy Paradox" (1997) or Lawton 2007 (Presidential Address)Ecology, Politics and Policy	Noted - This is an interesting point but too detailed for Ch 1. You might be reading into this more than we are trying to say. We are explictly not doing this.
7874	1	14	24	14	30	Any critical literature on geoengineering is missing and should be mentioned here in order to provide a balanced view (Gardiner 2010, 2011b, Goes et al. 2011, Rickels et al. 2011, Robock 2008, Robock et al. 2010, Svoboda et al . 2011, Ott 2012, as well as the contributions in Preston 2012).	Accepted - expanded text to mention the controversy on geoengineering and added cross reference to chapter 6.9 and citation to Rickels et al (2011) and Gardiner (2010) as suggested. More discussion on geoengineering is found in ch 3,6, and 13
7347	1	14	24	14	30	This paragraph is very clumsy and has poor English usage and grammar ("facing with"; "number of literatures" "from various footings"). It also conflates possible extreme effects and appropriate policy responses - better to break these two ideas apart. Then it would be better not to elevate "geoengineering", as currently it is the only appropriate policy response measure discussed.	Taken into account - paragraph has been revised and the mention of geoengineering expanded to be more balanced
4856	1	14	25			"reference could also be made to the relevant/recent IPCC SP on extremes	Rejected - IPCC SR on extremes does not cover catastrophic losses such as collapse of THC or antarctic ice sheet. Text is ok. No action needed
7875	1	14	25	14	25	The observation that emissions are not on track for stabilization let alone deep cuts is correct. But it would substantially improve the analysis of what has happend so far and in identifying current challenges to say something about how "this reality" came about and who created it. One reason that is not mentioned throughout the first chapter is that one of the largest emitter in terms of absolute and per-capita emissions, the US, has refused to implement any meaningful climate policy on a national level until today. See also comment 26.	Rejected - assigning cause is not helpful here.
14794	1	14	26			"Weitzman (2009) raised the concern that standard policy decision tools such as cost-benefit analysis and expected utility theory are not able to deal with climate change decisions, owing to the uncertain probability of high or catastrophic impacts."	Accepted - adopted suggested sentence to replace existing one
13678	1	14	27	14	30	Replace "Facing …Society 2009" by "Partly driven by these concerns, the literature on geo-engineering options to remove CO2 from the atmosphere or manage solar radiation has been increasing exponentially (see Chapter 6.9)".	Accepted - adopted suggested sentence
15248	1	14	28	14	30	contradicting Article 2	Noted - insufficient information. No action needed

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
14331	1	14	28	14	30	The brackets in line 28 suggest that their content is a definition of geoengieering. Yet finding a definition, e.g. for scientific or governance purposes, is still a major challenge. On definitions see e.g. Williamson, P., Watson, R.T., Mace, G., Artaxo, P., Bodle, R., Galaz, V., Parker, A., Santillo, D., Vivian, C., Cooper, D., Webbe, J., Cung, A. and E. Woods (2012). Impacts of Climate-Related Geoengineering on Biological Diversity. Part I of: Geoengineering in Relation to the Convention on Biological Diversity: Technical and Regulatory Matters. Secretariat of the Convention on Biological Diversity. Montreal, Technical Series No. 66.	Sentence has been replaced per other comment. Comment no longer relevant
14332	1	14	28	14	30	The literature cited does not cover current key aspects of geoengineering governance and ist interrelation with mitigation policy. More recent literature such aspects includes e.g.: - Bodle, R., with Homan, G., Schiele, S., and E. Tedsen (2012). Regulatory Framework for Climate-Related Geoengineering Relevant to the Convention on Biological Diversity. Part II of: Geoengineering in Relation to the Convention on Biological Diversity: Technical and Regulatory Matters. Secretariat of the Convention on Biological Diversity. Montreal, Technical Series No. 66; - Bodle, Ralph, "International governance of geoengineering: Rationale, functions and forum", in: William C.G. Burns and A. Strauss, (eds.), Climate Change Geoengineering: Legal, Political and Philosophical Perspectives, Cambridge: Cambridge University Press (submitted February 2011; in press); - Lin A.C., International Legal Regimes & Principles Relevant to Geoengineering (in press). In: W.C.G. Burns and A. Strauss, (eds.), Climate Change Geoengineering: Legal, Political and Philosophical Perspectives Cambridge: Cambridge University Press, Cambridge (submitted 2011, in press); - Rickels, W.; Klepper, G.; Dovern, J.; Betz, G.; Brachatzek, N.; Cacean, S.; G ssow, K.; Heintzenberg J.; Hiller, S.; Hoose, C.; Leisner, T.; Oschlies, A.; Platt, U.; Proelß, A.; Renn, O.; Sch fer, S.; Z rn M. (2011): Large-Scale Intentional Interventions into the Climate System? Assessing the Climate Engineering Debate. Scoping report conducted on behalf of the German Federal Ministry of Education and Research (BMBF), Kiel Earth Institute, Kiel, available at http://www.fona.de/mediathek/pdf/Climate_Engineering_engl.pdf	Taken into account - We don't' have a lot of space here on this topic, added the Rickels et al cite.
9786	1	14	28			When political decision makers read such paragraphs, they might tend to draw the conclusion that geo-engineering might save it all.	Taken into account - sentence has been replaced per other comments
14795	1	14	28			Add: "...literature on risks and potential of geo-engineering..."	Taken into account - sentence has been replaced and discussion expanded per other comments
5459	1	14	3			this paragraph describes different summits and their respective goals- they all seem well intentioned but it is not clear what the point of the paragraph is. It seems that the point is integrating the scientific basis and knowledge on climate change into political goals- but a sentence or two to direct the reader would be helpful	Noted - The purpose is to show how ultimate objective or 2 degree target has been treated. The idea of this paragraph is to convey the role of these parallel processes. Paragraph has been revised per other comments. No futher action needed

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
7346	1	14	3	14	23	It does not seem appropriate to cite political declarations of the G8 as evidence for a global interpretation of Article 2 of the Convention. If political statements are to be referred to then the range of submission by country groupings to the UNFCCC (usually consisting of more than eight members) could be referred to here. As the African Group, the Least Developed Countries gorup, the Alliance of Small Island States and the Bolivarian Alliance of the Americas (ALBA), representing over 100 countries collectively, have suggested a 1.5C target. The material as presented suggests the G8 declarations are more relevant to determining what constitutes "safe" or "dangerous" interference than submissions from more sizeable and more representative groups of countries. It would be preferable to perhaps remove the discussion of political considerations if the conclusion that no scientific foundation for establishing the targets is to be maintained. Otherwise reference to the Cancun Agreements, with reference to below 2C with the intention to review and consider a 1.5C target, may be more appropriate.	Taken into account - Cancun has been added though it was touched upon in more general way. The reasons why G8 declaration is included here are 1) leaders have first agreed to explore halving global emissions by 2050 (in 2007 at Heiligendam), and 2) they supported to cut their emissions at least 80% by 2050. There are many G8 Summit statements, but only important two among them from the standpoint of mitigation target are cited here. The paragraph has been revised per other comments
3311	1	14	30	14	30	I would add a reference to an ethical skeptic: Gardiner (2010). "Is 'arming the future' with geoengineering really the lesser evil? Some doubts about the ethics of intentionally manipulating the climate system" in Gardiner, Caney, Jamieson, and Shue (2010). Climate Ethics: Essential Readings. New York: Oxford University Press	Taken into account - combined with other comments
3062	1	14	30			Also cite the Novim report http://www.arxiv.org/abs/0907.5140 (2009)	Rejected - several citations already added per other comments. I think we have the right balance now
8506	1	14	30	14	30	It would be appropriate to mention that in the framework of the G8+5 summit (Tokyo, 2008) the meeting of leading academies of science stated in its resolution that “there is also an opportunity to promote research on approaches which may contribute towards maintaining a stable climate (including so-called geo-engineering technologies and reforestation), which would complement our greenhouse gas reduction strategy”.	Rejected - too much detail for this chapter
9787	1	14	31	14	47	Multidimensional optimization will gain importance, time issues as later on stressed in chapter 2 as well. I would add a sentence that both decision dimensions and the time-frame are specific and thus different for different decision makers and must be dealt with accordingly. There is no "one size fits all"	Taken into account - other edits to the text will emphasize this point--about article 2, about time horizons for radiative impacts, etc.
3312	1	14	32	14	36	I don't understand, precisely, what this sentence is referring to. Why are the costs harder to make precise?	Taken into account - sentence has been revised for clarity.
7876	1	14	32	14	43	This view is based on a portfolio perspective as it is adopted in the Royal Society report on climate engineering (Shepherd et al. 2009). However, such a perspective seems implausible to assess the triangular affair of mitigation, adaptation and geoengineering. It supposes that one can choose between any combination of the measures and thereby ignores possible trade-offs. For instances, if employment of measure A undermines measure B it does not make much sense to speak of a portfolio. In addition, the portfolio perspective obscures conflicts of interests and, hence, justice for a different mix of measures will affect different people (differently). For further criticism of the portfolio pespective see Gardiner (2011).	Taken into account - text has been revised
15249	1	14	37	14	38	see point 7	Noted - insufficient information. No action needed
12218	1	14	40	14	40	Please use consistent language. Here soot is used, earlier balck carbon is used e.g. on page 12, line 49. The term Black Carbon is preferred.	Accepted - changed "soot" to "black carbon"

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
14796	1	14	41			It is not the case the because the world is not on track for 2C that analysts have had to look at higher temp goals; the higher temperature goals (3C, 4C, 5C, etc.) have always been among the scenario runs. What would be correct would be to state... "And the evidence that the world is not on track to stop warming at 2 degrees Celsius means that analysist have had to explore solutoins that compensate for this slow progress, through more rapid emission declines later and/or negative emission options."	Taken into account - sentence has been revised. The term "slow progress" suggested is too emotive. And I think when you look at the history the number of STABILIZATION runs at these higher temperatures HAS increase.
7348	1	14	41	14	43	Firstly this sentence accepts or suggests that 2C is an accepted global goal, which should be stated in the context of the review of that goal, as that is how many countries agreed to it. Secondly, it is unclear why a failure to reach a goal determined to be "safe", should then result in the need for "another goal." Surely 1C, 1.5C or 2C can all continue to serve as goals and the science can continue to inform policy-makers how far they are from those goals.	Taken into account - combined with other comments. There is extensive discussion elswehere in the text about the origins of 1, 1.5 and 2 degrees. No further action needed
11026	1	14	42			The phrase 'analysts have had to devise a larger number of alternative goals' is poorly expressed and should be amended to 'analysts have had to consider a number of alternative goals, and the costs of inaction relative to the costs of accelerated policy action.'	Accepted - phrase has been adopted to replace the original, as suggested
13679	1	14	42	14	43	Replace "… have had to devise… goals" by "have to assess new policy instruments that could achieve substantial mitigation or assess the costs and benefits of alternative goals". Reason: The fact of not being on track could mobilize higher political will to get back on track.	Taken into account - combined with other comment
2244	1	14	44	14	47	We need scientific evidence. Scentific "understanding" is insufficient	Rejected - Science is a combination of evidence and understanding. This is off topic for this chapter. No action needed
13368	1	14	5			It is unclear what 'purposely difficult' is intended to mean. Written to be obscure? I suggest it is clearer to write simply 'Interpreting the UNFCCC's goals is sometimes difficult'.	Taken into account - combined with other comment. We are removing "purposely"
11400	1	14	5	14	5	The sentence "Interpretiing the UNFCCC goals is purposely difficult" injects a subjective opinion as a scientific truth, implying that the treaty framers intended to make the UNFCCC's provisions to be unclear and ambiguous. The word "purposely" should be deleted.	Taken into account - combined with other comment. We are removing "purposely"
13369	1	14	7	14	9	'The second part of Article 2...etc.' This sentence's assertion about the second part of Article 2 is inaccurate. It is scientifically possible to indicate when species and ecosystems are/were adapting naturally rather at a point when such adaptation is breaking down or impossible, in relation to climate-driven pressures (temperatures, patterns of species reproduction, water avaialbility, and so on). Similarly it is possible to indicate when human-engendered and climate-related threats are affecting food systems and sustainable economic development.	Rejected - This isn't really the point we are making--we are making a point about the ability to nail down precisely what is "dangerous". Other edits (suggesting a variety of points of view, see comment 686) address this
4607	1	14	9	14	9	Do you mean "natural science analysis"?	No--we mean the totality of scientific assessment. No action needed.
6507	1	14	18			Replace "agreed to cut their emissions" with e.g. "supported a goal of developed countries reducing emission of greenhouse gases in aggregate" according to the text of L'Aquila G8 Summit.	Taken into account - combined with other comments. Text has been revised
3552	1	14	27	14	27	"Facing with the increasing…", delete "with"	This sentence has been removed per an previous comment. Comment no longer relevant
6865	1	14	27	14	28	Suggest to refer to both WGI and WGII AR5 as the basis for such statements.	This sentence has been removed per an previous comment. Comment no longer relevant

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
3551	1	14	7	14	7	Reference to Chapter 1 in AR4, specify if this is in WG III report (which is likely)	Taken into account - text has been revised to specify report
6866	1	14	41	14	42	Supporting evidence for this statement needed. Suggest to add reference to relevant sections of WGI AR5, Chapter 12.	Taken into account - addressed through responses to other comments such as 714-715. No action needed
4018	1	15	10			after "Shindell et al., 2012" add "Anenberg et al., 2012". The full reference: Anenberg, S.C., J. Schwartz, D. Shindell, M. Amann, G. Faluvegi, Z. Klimont, G. Janssens-Maenhout, L. Pozzoli, R. Van Dingenen, E. Vignati, L. Emberson, N.Z. Muller, J. Jason West, M. Williams, V. Demkine, K. Hicks, J.C.I. Kuylenstierna, F. Raes, and V. Ramanathan. Global Air Quality and Health Co-Benefits of Mitigating Near-Term Climate Change through Methane and Black Carbon Emission Controls. Environ Health Perspect 120:831–839 (2012). http://dx.doi.org/10.1289/ehp.1104301.	Rejected - we are already overloaded with refs.
2245	1	15	11	22	35	Your theory seems to believe that the climate is influenced by CONCENTRATIONS of greenhouse gases in the atmosphere. Why do you place so much attention on EMISSIONS?. What evidence is there that they have any effect on atmospheric concentrations?	Noted - Emissions lead to concentrations. See WG1. No action needed
10823	1	15	11	15	18	Given the use of Figure 1.3, and the previous reference to Shindell et al 2012 and UNEP 2011, you seem to be expanded GHGs to be more than just the long-lived (wel-mixed) GHGs as in the Kyoto Protocol. I think this is good and overdue. Yet, in section 1.3.1 you focus on the long-lived greenhouse gases. I think you should justify why you focus on these.	Taken into account - The first two paragraphs have been revised to explain.
14359	1	15	12			Try to say something about likely emissions after 2008. There was a temporary slowdown (decline?) because of global recession, but I believe there was an especially large increase in 2010. The point could usefully be made that despite the recession the medium-term path is still about what was expected before.	Accepted - data will be updated as they become available
10837	1	15	12	15	12	Footnote 1. If it fine to use EDGAR. Why did you stop at 2008? When I believe EDGAR has numbers to 2011 now? And it is probably worth referencing what you write, e.g., http://www.biogeosciences-discuss.net/9/1299/2012/bgd-9-1299-2012.html	Accepted - data will be updated as they become available. Cite added to WGIII Annex II
10679	1	15	12	15	12	Given the importance of global GHG emissions data, it would be helpful if the authors provided pointers to some of the other sources out there (e.g. WRI CAIT, UNFCCC). There could even be a box listing these sources and comparing their different characteristics (sectoral coverage, temporal coverage, estimated uncertainties, etc.)	Taken into account - cross reference added here.
9922	1	15	12			A url should be given in the footnoot to the EDGAR dataset.	footnote has been removed. Full citation to the database in the reference list includes url
12219	1	15	17	15	18	Does the explanation in paranthesis mean that the EDGAR database does not include BC, or is it another explanation to exclude BC?	Taken into account - text has been revised

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
10743	1	15	19	15	21	It should be specified that it is the IPCC reports FAR to AR4 that presented GWPs for transforming emissions of different components to a common scale. And I think it is important to mention here that the GWP concept has been subject to critisism and that several alternatives have been presented. (See AR5 WG1 SOD as well as Report from IPCC Expert meeting on Metrics (Plattner et al., 2009)).	Taken into account - Revise sentence to say: "Starting with the first assessment report, the IPCC has calculated global warming potentials (GWPs) to convert these gases with different properties into common units over 20, 100 and 500 year time horizons (chapter 2, IPCC First Assessment Report, 1990). In the Kyoto Treaty diplomats chose the middle value--100 years--despite any published conclusive basis for that choice (Shine, 2009). The GWP concept has been subject to criticism, including as more experts focus on the potentials for mitigation of pollutants with short atmospheric lifetimes whose radiative impacts are relatively under-counted when a long time horizon is used for calculating GWPs (Plattner et al 2009; Fuglestvedt et al., 2010, Atmospheric Environment, 10.1016/j.atmosenv.2009.04.044; Victor, Kennel and Ramanathan, 2012)."
10744	1	15	19	15	21	Regarding footnote 2: Very good.	Noted
10745	1	15	19	15	30	Somewhere in this para (or in a footnote) it should be made clear that IPCC did not choose 100 years time horizon, but presented GWPs for 20, 100 and 500 years. And that it was for the Kyoto Protocol that 100 years was chosen (without any published conclusive basis for this; see e.g. editorial by Keith Shine in Climatic Change, 2009).	Taken into account - combined with other comment
18017	1	15	19	15	30	could more reason be given on why to select 1970 to 2008 as the timeframe for reviewing historical GHG emission?	Accepted, data will be updated as they become available
10824	1	15	19	15	21	I release the "footnote 2" keeps a door open, but as the WGI text clearly explains is that the use of GWP100 is a value based choice that has no real justification. I know it is used broadly, but I think a stronger link to the actuall WGI text. For example, the use of "the IPCC has long used" implies that there is broad agreement on using the GWP100, which is not the case. Perhaps word something like "we use the GWP100 as in the Kyoto Protocol, but we recognise that other equally valid choices exist (ref WGI)".	Taken into account - combined with other comment
11352	1	15	19	15	21	Although the GWP100 is the most commonly used metric for research and policy purposes, emission conversions using the GWP100 have drawn various criticisms (Fuglestvedt et al., 2003, Climatic Change, 10.1023/a:1023905326842; Fuglestvedt et al., 2010, Atmospheric Environment, 10.1016/j.atmosenv.2009.04.044). To avoid promoting the use of GWP100, it can be stated that the GWP100 is used only to illustrate the change in greenhouse gas emissions on a common scale and to faciliate comparison. Issues related to the GWP and other metrics are summarized in Tanaka et al. (2010, Carbon Management, doi:10.4155/cmt.10.28).	Taken into account - combined with other comment

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
11403	1	15	19	15	30	There should be an explanation of why the timeframe 1970 to 2008 was used for purposes of reviewing historical GHG emissions. Why should not the historical range be extended back to at least 1900 or 1850? Starting from 1970 would essentially discount pre-1970 historical emissions as a factor in calculating future emissions responsibility.	Accepted, we will be adding a figure on cumulative emissions.
4019	1	15	26	30		Please check the percentage. As all non-CO2 GHG have GWP higher then CO2 total emissions of all greenhouse gases- weighted by their global warming potential (GWP) with 100 year time horizon should have increased by more than 80% since 1970, even though some of them have shorter life times compared to CO2	Rejected - non-CO2 weigh only 1/4 altogether and they increased less than 80%. No action needed
16064	1	15	28	15	18	The "collection" of flunorinated gas is probably inaccurate. "Net emissions" or "production" may be correct.	Rejected - collection is OK. No action needed
18412	1	15	3		4	Such country or group of countries related statements do not need to be repeated within the chapter. That's a bad policy.	Rejected - this shift is correct and important for the assessment. No action needed
10825	1	15	31	15	31	"warming gases" would be better to be "GHG", as Figure 1.3 shows some are cooling	Accepted - changed "warming gases" to greenhouse gases
10826	1	15	31	15	32	This could be confusing to some people. State more clearly, that "by weighting the GHG with a GWP100, CO2 contributes…".	Accepted - Changed sentence to "Looking at the total source of warming gases AND WEIGHTING WITH 100-YEAR GWPS (Figure 1.4, right panel), AT PRESENT CO2 contributes…"
10827	1	15	31	15	32	Do the percentages refer to a single year, and average of all years, etc? State.	Taken into account - combined with other comment
7349	1	15	31	15	36	Why is some detail of the country of origin provided for some of these statistics (e.g. China's contribution to CO2 from cement) but not others? Particularly as no such information is present in the figure referred to it may be better to remove the references.	Rejected - we are just illustrating so that people get a sense of how the activities are allocated
17016	1	15	31			Are these %'s for a 100-yr time-span, as well?	Taken into account - combined with other comment
17017	1	15	33			Does "agriculture" here include all aspects of LULUCF / AFOLU? What about forests? Are these numbers consistent with those coming out of WG1? It is critical that numbers like these are cross-referenced for consistency.	Taken into account - All categories of emissions are listed in Annex II. See Annex II for emissions included in "agriculture". See also Chapter text. We will cross check for consistency.
9778	1	15	36	15	36	Emphasizing "originated in China" is not fit. Suggest to delete "of which half originated in China"	Rejected - we are just illustrating so that people get a sense of how the activities are allocated
17015	1	15	5			Insert , "… to encourage shifts TO LOWER GHG EMISSIONS in the energy system, …"	Accepted - adopted wording as suggested
17406	1	15	6			Here or somewhere else that biofuels are referenced, it is important to discuss the potential negative effects of large-scale deployment of biofuel approaches for land use (eg, under growing conditions of inadequate global food supply, diverting existing cropland to biofuel production risks exacerbating conversion of natural systems to agriculture with large resulting release of C to the atmosphere).	Rejected - other edits create this balance; there is a whole chapter on these issues too. No action needed

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
10678	1	15	7	15	10	Little evidence is given here or in the rest of the chapter to support the claim that there has been substantially more effort to mitigate soot and methane (the Shindell Science paper does not discuss past trends, only future mitigation; the full UNEP report has a brief discussion of trends but only ozone precursors show much decline in the charts there).	Accepted: edited sentence to say: "...there ARE SUBSTANTIALLY STRONGER INENCITVES TO LIMIT SHORT-LIVED POLLUTANTS LIKE BLACK CARBON (SOOT) and methane—in part because these other pollutants are also linked to many local environmental ills AND THUS THE LOCAL BENEFITS FROM MITIGATION ARE MORE IMMEDIATE AND APPARENT (UNEP, 2011; Shindell et al., 2012)."
4017	1	15	9			suggested wording: "many local environmental ills and human respiratory diseases"	Taken into account - combined with other comment
18428	1	15				historical and future trends When the report presents the trend (pag 15 paragraph 1) it should say that emissions are growing horribly, and not only “shifting”.	Rejected - but they are shifting, and using the word "horribly" is sure to earn ire from others. No action needed
17018	1	15				It's unfortunate that the data used only goes through 2008 - just at the height of the recession. Some very interesting trends have emerged in the 4 years since the deepest part of the recession and it may come across as tone-deaf for a report that is to be published in 2014 to be based on 2008 data, esp when databases such as IEA, NEAA and EIA have more up-to-date emissions data. AR4 came out in 2007 and used 2004-05 emissions data, so it should follow that AR5 which comes out in 2013-14 should use 2011 data, FF CO2 data of which will be available by IEA later this year. Does the TaskForce on National Greenhouse Gas Inventories have anything to add to this data?	Accepted, data will be updated as they become available
11892	1	15	11	17	34	This section is too long and not easy to catch the point. Suggest to add a table to summarize the changes in GHG (in %) and the major driven factors for these changes.	Taken into account - section has been revised
18113	1	15	19	15	30	There is reference to 2008 emissions in this paragraph. However Fig 1.4 shows data only till 2006. This paragraph also discusses % rise in emissions between 1970 - 2008. Either the text or the figure (1.4) needs to be changed.	Accepted, data will be updated as they become available
6867	1	15	20	15	21	Please add reference to WGI AR5 Chapter 8.	Taken into account - combined with other comment
3553	1	15	31	15	36	Mention contribution from transport in thsi paragraph.	Rejected - the paragraph is just illustration. Each sector does not need to be mentioned. No action needed
6508	1	15	31		36	Quote the year, for which contributions of gases are calculated.	Taken into account - combined with other comment

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
18111	1	15	31	15	36	The sector categorisation in this paragraph does not match that shown in Figure 1.4 (right). Suggest harmonising them for ease of understanding.	Accepted - edited line 34 to say: "Other sources of greenhouse gases INCLUDE CO2 from biomass burning (11%, mostly forest and peat fires and post?burn decay in non?Annex I countries), and INDUSTRIAL SOURCES SUCH AS CO2 from cement production (3%, of which half originated in China).
6868	1	15	31	15	36	Please ensure consistency in numbers with WGI AR5, Chapters 2, 6, 8, ...; this also applies to the quantitative results provided in the subsequent sections.	Accepted - will double check for consistency
17694	1	15	9	15	10	Must be better explained why countries create policies to limit the emission of some pollutants. Their budget is limited and they can obtain more percibable results in the reduction of these contaminants with less money.	Taken into account - combined with other comments
9249	1	16		16		Are biofuels incorporated here under Energy? Too small a component to split out?	Figure has been redrawn. Modern biofuels production are in the energy sector, consumption in transport sector (only non-CO2). Traditional biofuels and woodwaste are in all 1A sectors.
14797	1	16				"2% in Ax1 and 87% in non-Ax1" < 100% ?	it is a percentage of a percentage (first derivative), not absolute. No action needed
3063	1	16				Figures show that IPCC is essentially wasting its advocacy effort---emissions have steadily increased WGI and II are performing a useful function in collecting and summarizing the science, but the discussions of “mitigation” of emissions (that is not proper English usage; effects may be mitigated, but emissions are reduced, or not) are wishful thinking. It hasn't happened, and there is nothing to indicate it will.	Noted - no action needed
11891	1	16				The legends and captions are too small.	Figures will be re-designed for print and on-screen for final draft.
7447	1	16				The GHG emissions for ALFOU seem high. Most biomass used for energy is from sustainable sources. It seems that some is assumed to be non-sustainable. I have discussed this in detail in chapters 7 & 11.	Taken into account - Added cross-reference to chapters and beefed up the ALFOU discussion in caption and text.
7308	1	16	1			Waste sector is missing from sectoral estimates in this figure.	Taken into account - waste sector will be added
7307	1	16	10			"landfills and wastewater (together an increase of 90%, with 20% since 1990)" No citation given.	The figure has been redrawn and corresponding text removed. Comment no longer relevant
14360	1	16	11			Explain why rice emissions declining	The figure has been redrawn and corresponding text removed. Comment no longer relevant
14361	1	16	11			Lumping livestock and other agriculture emissions together with land use is a problem. Should separate out deforestation. Is agriculture (including livestock) a large source of emissions once deforestation is removed? (I think not.)	The figure has been redrawn and corresponding text removed. Comment no longer relevant

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
10468	1	16	17			Delete "gases"	The figure has been redrawn and corresponding text removed. Comment no longer relevant
15535	1	16	19		29	How are the regions defined?	Taken into account - this paragraph has been removed but descriptions of the categorization of countries can be found elsewhere in the chapter (e.g. LDC in Box 1.1)
9094	1	16	19	16	29	The reducing the emissions of the greenhouse gases (GHG) requires the inclusion in the analysis of real quantities of emissions originated in developed countries, because their historical and actual emissions are very very high in comparison with the developing countries emissions.	Taken into account - we are adding a cumulative emissions charts and the whole purpose of the discussion here is to disentangle that discussion
18413	1	16	19		35	From an ethical and policy perspective the use of the basis year 1990 is controversial and misleading. Is the purpose of the text to focus on the “bad guys” again? Assessing long term changes in trends is more reasonable.	Noted - 1990 was chosen by UNFCCC and Kyoto so we are following that. No action needed
11582	1	16	19	16	29	There is need to interrogate these figures and references be provided.	Noted - The paragraph discusses figure 1.4. No action needed
4888	1	16	20			[Del] generally used terminology w/o "highly":: ["highly] industrialized	Taken into account - "highly" has been deleted
3555	1	16	21	26	24	References to Annex I, Annex II and Annex B countries mixed up. If retained, each should be defined clearly.	Taken into account - edited sentence to sy "Since 1990 CO2 emissions from electricity and heat production increased by 27% for the group of OECD countries; the rest of the world has risen 64%. Over the same period, CO2 emissions from road transport increased by 29% in OECD countries..."
17019	1	16	21, 35			In l21, it cites that 87% of the rise in FF CO2 emissions sicne 1990 is from NA1 nations. In l35, it states that the rise in CO2 emissions from energy from non-A2 nations since 1990 is 64%. How can these nubemrs be reconciled? This is a significant difference for seemingly similar metrics with similar baselines.	Taken into account - combined with other comments, edits (see 781) remove the annex II distinction and simplify.
17020	1	16	23			"newly industrialized countries"; again, these nations should be listed so a complete snapshot of the current situation in the world is given, while also allowing posterity to read this report and assess what each nation has done, what impact it has had, etc.	this paragraph has been revised. The discussion on newly industrialized countries has been removed. Comment is no longer relevant.
7151	1	16	24			The word 'in' should be struck. Otherwise the sentence does not make sense.	this paragraph has been revised. The sentence has been removed. Comment is no longer relevant.
17021	1	16	24			"other developing countries"; again, these nations should be listed so a complete snapshot of the current situation in the world is given, while also allowing posterity to read this report and assess what each nation has done, what impact it has had, etc. - does this refer to Least Devleoped Nations (LDCs)?	this paragraph has been revised. The sentence has been removed. Comment is no longer relevant.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
4889	1	16	26		27	many readers may not know these abbreviations (esp. the case of Mexico and S-Korea): "OECD North America .. OECD Europe .. OECD Pacific	this paragraph has been revised. The sentence has been removed. Comment is no longer relevant.
12220	1	16	27	16	28	The description explaning EIT in page 17, line 31-33, could better be introduced here where it is mentioned the first time. It should also be in the Glossary naming the countries that are included in the EIT group.	this paragraph has been revised. The sentence has been removed. Comment is no longer relevant.
17022	1	16	27			"Economies-in-transition" ; again, these nations should be listed so a complete snapshot of the current situation in the world is given, while also allowing posterity to read this report and assess what each nation has done, what impact it has had, etc.	this paragraph has been revised. The sentence has been removed. Comment is no longer relevant.
17023	1	16	28			Emissions from EIT declined in the 1990s and have since levelled… IN LARGE PART BECAUSE OF THE BEAK UP OF THE SOVIET UNION (and wahtever inefficient centralized industrial policies may have contributed, etc.)	this paragraph has been revised. The sentence has been removed. Comment is no longer relevant.
10470	1	16	28	16	33	Sentence "Emissions …… to 1970." is out of place. Move to line 33 after "doubled."	Accepted - sentence moved
10469	1	16	30			Think this should be "Fig 1.5" not 1.6	Figures have been changed and renumbered. Text is updated accordingly.
10680	1	16	30	16	30	There is a reference to a Figure 1.6 here that is not the actual Figure 1.6 in the draft (properly referenced on p17 line 8). I suspect there is a missing chart...	Figures have been changed and renumbered. Text is updated accordingly.
17024	1	16	32			"CO2 EMISSIONS FROM the energy ssytem have nearly tripled…" (The ernegy system itself has not tripled since 1970, ahs it? If so, fine, but it sounds like the intent of this statement is in regard to emissions, not the energy system itself.	Accepted - edited to say "EMISSIONS FROM THE energy system…"
17025	1	16	33			Simialr to previous comment - Has transport doubled since 1970? Or have CO2 emissions from transportation doubled?	Taken into account - text has been revised for clarity
4890	1	16	34		35	[Del and Cor] "[highly] industrialized (so-called “Annex II” countries) .. in Annex II (I guess: Annex I)	Taken into account - combined with other comments
16199	1	16	7		18	Using %s to describe change within a gas limits ability to compare across gases--perhaps add actual values in parentheses (drawn from the charts--and/or refer reader to charts)	Rejected - chapter 1 is just an overview. For more detail you can go to sectoral chapters or to WG1 where there is a lot of detail
11404	1	16	7	17	26	The effect of choosing 1970 as the starting year for looking at historical emissions becomes clear in these paragraphs - these highlight the point that emissions growth in the post-1970 period come from developing countries rather than developed countries, which could create the implication that future responsibility for emissions will then lie largely with developing countries and that, therefore, the focus for mitigation actions will have to be on developing countries rather than on developed countries. Choosing 1970 as the starting year allows the analysis to disregard the fact that the vast majority of anthropogenic GHGs currently in the atmosphere was contributed by developed countries if historical emissions between 1850 or 1900 up to the present were taken into account.	Accepted, we will be adding a figure on cumulative emissions.
10828	1	16	8	16	8	"higher emissions from livestock". Is this a per unit increase or do you really mean "increase in the number of livestock"	this paragraph has been revised. The sentence has been removed. Comment is no longer relevant.
3882	1	16	9	16	9	"oil and gas production and transmission"". What does it means transmission in this context?	this paragraph has been revised. The sentence has been removed. Comment is no longer relevant.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
14798	1	16				Format for reporting emission rises is inconsistent. Generally, if the Ax1 and nonAx1 breakdown is probably more informative if given as "X% of the rise has been in Ax1 and Y% has been in nonAx1" rather than "Ax1 has risen by X% and nonAx1 has risen by Y%" since the latter requires the reader to know the relative proportions of Ax1 and nonAx1 base year emissions in order to understand the implications of the reported rises in emissions.	Taken into account - these are really broad trends and the point is just to illustrate them generally. Text is revised and added a pie chart for further illustration
18110	1	16		16		The caption states that the figures show the long term trend from 1970-2009, however the figure only contains data till 2006. Caption needs to be amended to 2006. Also, is "buildings" an economic sector? Does this refer to the construction industry or something else (direct energy use in buildings?) This may need further explanation. Finally, under which category would methane emissions from landfills be captured?	the sectors reflect the breakdown in the rest of WG3. figures will be updated later
4363	1	16		16		time period (1970-2009) does not matches that of fig 5.2.3, although it is the same graph	Accepted - figures to be updated
13656	1	16	19	16	27	Comparison of the contribution to emissions increase by Annex-I and non-Annex-I countries has been done from 1990 even though it has been mentioned earlier that data is available in almost all databases from 1850 onwards. It is unclear why the comparison is only for the period after 1990 then. It should begin from an earlier period.(CAIT, EDGAR)	the comparisons are illustrative; we are adding a cumulative emissions chart which will help address this.
18114	1	16	19	16	29	a) For consistency, the increase in CO2 from 1970 should be mentioned again here as it was in lines 7-18 for the other GHGs (which reinterated the information in pg 15, lines 26 and 27). b) The text write-up cannot be easily matched with the information presented in Fig 1.6. For example t is not apparent which are the "newly industrialised countries", "other developing countries", "OECD NOrth America", "OECD Europe", OECD Pacific", "Economies in Transition". c) Where is the information about international transport reflected in Fig 1.6? The transport sector should arguably include domestic transport emissions as well. Also, why is international transport as a sector suddenly singled out in a paragrapgh discussing emissions from regions? More explanation on this is required in this paragraph. Is it linking it to embodied emissions, in which case this is not very clear. d) Caption under Fig 1.6 should explain what OECD, REF, LAM, MAF and ASIA stand for.	Taken into account - text is revised, figure redrawn and caption expanded
6509	1	16	30		31	Modify the description , as "Figure 1.6" dose not "look at global emission by sector".	Figures have been changed and renumbered. Text is updated accordingly.
18115	1	16	30	16	33	This part does not appear to be related to Fig 1.6 which it refers to and seems to be more relevant as an introduction to Fig 1.4.	Figures have been changed and renumbered. Text is updated accordingly.
4364	1	16	30	16	17	I assume link is to fig 1.5, not 1.6	Figures have been changed and renumbered. Text is updated accordingly.
18116	1	16	33	17	1	This needs supporting data/figures or reference.	Rejected - the reference is in the figture. The text has been revised and the sentence was removed
18112	1	16	7	16	18	This paragraph discusses the source of increase of all GHGs except CO2, It can therefore be enhanced by including a discussion of the source of increase of CO2.	Rejected - the next two paragraphs discuss CO2 in detail
3554	1	16	8	16	8	"mainly to higher", insert "due", i.e. "mainly due to higher"	Sentence has been removed. Comment no longer relevant
10746	1	17				Since"CO2 equivalents" is the unit used, it should be explained in the figure caption how these are calualted; e.g. emissions weighted by GWP-100. (And whether the GWPs are from AR4 or those used by the Kyoto Protocol (i.e. SAR). This applies also to figure 1.4	Taken into account - other edits address this point in detail, which is a good point
11893	1	17				The legends and captions are too small.	Figures will be re-designed for print and on-screen display for final draft.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
3883	1	17				Difficult to read both figures.	Figures will be re-designed for print and on-screen display for final draft.
17407	1	17				Figure too small to read easily.	Figures will be re-designed for print and on-screen display for final draft.
17027	1	17				The regions at the tope of each panel need to be defined on the plots themelves or in the caption	Taken into account - combined with other comments
5756	1	17				These figures are too small. Regions need to be explained prior to using the abbreviations, too.	Figures will be re-designed for print and on-screen display for final draft.
10471	1	17				Text (P 16, l 35) talks of only "road transport". Is that the case for Fig 1.5? Change legend accordingly if so. Both figures mention "Energy" in their legends BUT I suspect right hand figure " CO2 energy" includes transport emissions whereas "Energy" in left figure excludes transport. Needs clarifying by changing legend terms.	Taken into account - figure covers all transport; text focuses on road transport. Text has been modified and a note added
16007	1	17				text of figure not readabel	Figures will be re-designed for print and on-screen display for final draft.
17026	1	17	1	17	2	Should "from fuel combustion" be deleted from this last sentence? Otherwise it implies that 60% of CO2 emissions are from fuel combustion from electricity production and transportation - this sems to low to leave 40% of CO2 emissions from fuel combustion to other non-electricity and non-transportation sectors??	Accepted - sentence revised and phrase deleted. Text added on the largest sectors comprising this share.
6511	1	17	10			Replace "The sum" with e.g. "the function" to make it correct.	Accepted, changed "sum" to "product.
4608	1	17	12	17	12	E is not defined	Accepted - replace C/E with C/TPES
18117	1	17	12			C/E should be C/TPES.	Accepted - replace C/E with C/TPES
15250	1	17	15			it is worth pointing out that reduced growth (the "credit crunch") is proportional to lower emissions - see point 5	Rejected - suggested change is not needed
17028	1	17	15	17	16	The recession was due to more than "the credit crunch", so it is suggested that "due to the credit crunch" be deleted.	Accepted - edited to "when the global recession BEGAN TO HAVE ITS LARGEST EFFECTS ON THE WORLD ECONOMY.
14362	1	17	18	17	22	See Cline (2011, pp. 10-11) for decomposition analysis for 1990-2006 by major country. William R. Cline, Carbon Abatement Costs and Climate Change Finance (Washington: Peterson Institute for International Economics, 2011)	Accepted - cite to Cline added and text revised
17738	1	17	19			While discussing CO2/TPES - the rate of CO2 growth actually slowing, see recent IEA reports on CO2 emission.	Taken into account - the section was rewritten
7877	1	17	22	17	24	We highly agree with this analysis ("most important driver of emissions is economic growth"). This is an important point. However, throughout the first chapter traditional DGP-growth is (more or less implicitly) affirmed by a value-laden language (growth is "sluggish" or "robust", "slow performance" in terms of growth etc.) and by statements in which GDP-growth is deemed "necessary" or investment in exploitation of fossil fuels is deemd "insufficient". If so, Working Group III affirms the main driver of emissions. Then, reaching the 2° goal is indeed not viable anymore and other options such as Solar Radiation Management become more attractive. Unfortunately, the chapter does neither mention the many well-known problems associated with and critiques of economic growth in terms of GDP (instead of many: Jänicke 2012a) nor does it mention proposals to generate/maintain prosperity without relying on tradinional growth patterns (WBGU 2011, 2012, SRU 2011).	Taken into account - this section has been revised and added cross reference to ch 5 which discusses the kaya identity more in depth
15251	1	17	23	17	24	see point 13	Noted - insufficient information. No action needed
17029	1	17	25	17	26	Reword after the semicolon to be more clear: "while in the last few years, emissions in emerging economies have grown much more rapidly."	Accepted - text edited

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
14363	1	17	27			Edit for clarity (“decreased” … “twice as much” - ??)	Taken into account - text has been rewritten for clarity
16201	1	17	27		34	when describing a decrease that is 'good' (e.g. from negative=uptake of 1.4 to a negative=uptake of 2.7), might want to describe it as 'improving' even though the trend is increasingly negative. Readers will think negative means bad when in some cases, it represents an improvement.	Taken into account - text has been rewritten for clarity
7309	1	17	3			Waste sector is missing from sectoral estimates in this figure.	Rejected - waste is not a sector in the WG3 macro sector scheme
4891	1	17	31		32	{Cor} in generally used terminology those are EiTs to a market economy: "underwent transition from [Soviet-style] central planning {to a market economy} [(the so-called economies in transition, or] “EIT” countries) and That is: "underwent transition from central planning to a market economy (“EIT” countries)	Taken into account - text has been rewritten for clarity
15252	1	17	32			not quite seeing the point here - does central planning result in fewer emissions or vice versa?	Taken into account - text has been rewritten for clarity
15536	1	17	33		34	Why 'ultimately to the same level'? I would expect differing natural endowments to mean that there are always likely to be differences.	Taken into account - text has been rewritten for clarity
14799	1	17	33			"Slowly the … same level." This may be a premature or simplistic extrapolation, since the ultimate carbon intensity is certainly a function of domestic energy resource endowment, not merely technological "catch-up".	Taken into account - text has been rewritten for clarity
12221	1	17	4			Region names should be explained in the caption. Colour codes for different sectors and pollutants should be kept the same throughout the chapter.	Figure will be revised.
9788	1	17	7	17	11	Here you should make a reference to COMMONER, B. (1972): The Environmental Cost of Economic Growth. In: Ridker, R. G. (Hrsg.): Population, Resources and the Environment. Washington, DC 1972, S. 339-363, who published on this topic earlier.	Rejected - suggested change is not needed for our purposes here
17408	1	17	8	17	26	This analysis seems too narrowly focused for this section which addresses more than just energy systems (see categories in Fig 1.5).	Taken into account - text has been rewritten for clarity
3556	1	17	10	17	10	"Total emissions are the sum of…" should be "Total emissions are the product of…"	Accepted, changed "sum" to "product.
13657	1	17	10	17	12	Kaya identity is used for factor analysis which privileges population over all other indicators. If numbers are compared between 1850 or 1970 and 2000 however, it is seen that a high share of emissions is from countries which have had small very small shares in the total global population increase (Sattherwaite et al.)	Taken into account - text has been rewritten for clarity
18118	1	17	10	17	11	The Kaya Identity is Impact (CO2) = Population X income per capita X energy intensity of GDP x carbon intensity of energy OR Population x GDP/capita x Energy/GDP x CO2/energy. (Kaya 1990, Raupach 2007) The statement that total emissions is the sum of the individual forces (population, GDP and TPES) needs to be improved.	Taken into account - combined with other comment
13253	1	17	12	17	12	What is "E" in the ratio C/E? not explained	Taken into account - combined with other comment
18119	1	17	16	17	26	a) Figure 1.6 does not support the information provided here which further decomposes the drivers of global emissions between industrialised and emerging countries. b) Standardise reference of carbon intensity of energy throughout the document. In lines 19 and 34 for example, it is referred to as CO2/TPES while on line 10, carbon intensity is C and in line 12, it is C/E.	Taken into account - both points are combined with other edits. Text has been rewritten
3557	1	17	27	17	28	"…decreased to about 2%, about twice as much.." Missing minus sign, and unclear language.	Taken into account - combined with other comment

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
18120	1	17	27	17	34	a) It is not clear how the percentage figures mentioned in this paragraph are derived from Fig 1.6 (which is indexed to 1970). b) EIT has already been defined earlier. C) Reference for the last sentence is required.	Taken into account - combined with other comment
6510	1	17	8		34	Make the abbreviated symbols (e.g. (P), (G), etc.) consistent, including those used in Figure 1.6.	Figure will be revised.
10831	1	18				A regional breakdown, like in Raupach et al (2007) would be good, particularly considering you discuss it in the text.	Rejected - I don't think we have the space for this, but added references to others who have done regional breakdowns (Raupach et al.)
5757	1	18				What does "cap" mean (in "GDP/cap")?	Accepted, cap stands for capita, figure will be revised.
4020	1	18	11	18	18	facts and figures provided in this paragraph need to be referred to relevant sources	Taken into account - will update to IEA, 2012 and provide clarification on the different PE accounting approaches
6816	1	18	11		14	These unreferenced share data are misleading and false, since they are not comparing comparable quantities (example: the primary energy of nuclear is the uranium potential, while that of renewables is - the sun? These comparisons typically look at the primary energy of nuclear power and compare it with the end-energy of renewables. Such methods / figures are used to falsely inflate nuclear and statistically lower the share of renewable energy. Using the substitution method of primary/end energy content place nuclear energy closer to 2.5 % of global supply, whole renewables as a whole stand at 18%. For a much better and comparable final-energy consumption comparison for 2009 see page 17 of REN21's Global Status Report: http://germanwatch.org/klima/gsr2011.pdf. See also http://www.europeanvoice.com/article/2012/march/blowing-away-nuclear-power/73977.aspx and http://www.eia.gov/todayinenergy/detail.cfm?id=5750	Taken into account - text has been revised for clarity and cite added to IEA 2012
10472	1	18	11			Assume this is global "primary" energy supply.	Accepted - edited to say global PRIMARY energy supply.
10473	1	18	12			Change 'biofuels" to "biomass"	Rejected - suggested change is not needed
4984	1	18	16	18	18	Sentence: decline in overall share of fossil fuels from 88 % in 1990 to about 86 % . the lowest in decades. Indicate which year decline was 86 % ?	Taken into account - combined with other comments
13514	1	18	16	18	18	Sentence: decline in overall share of fossil fuels from 88 % in 1990 to about 86 % . the lowest in decades. Indicate which year decline was 86 % ?	Taken into account - combined with other comments
5758	1	18	16	18	18	Neither "renewables" nor nuclear power are zero emission electricity sources! There is no such thing as a "zero emission energy source", just the timing of the emissions is different (see LCAs of energy sources).	Accepted - edit to say "…two largest sources of ESSENTIALLY zero GREENHOUSE GAS emission SOURCES OF…"
10475	1	18	16			For nuclear reduction by 0.5% need to state what accounting method used. Also lack of references in this whole section to supprt data quoted.	Taken into account - combined with other comments
12515	1	18	17			Change “zero emission” to “low emission.” “Zero emission” is a misnomer; as discussed extensively later in the draft, all generating sources have some life cycle emissions.	Taken into account - combined with other comments
10832	1	18	17	18	17	"zero emission electricity" does not, as far as I know, exist. You probably mean zero emissions at the power plant, but there are plenty of emissions elsewhere in mining, construction, etc. I would reword and refer to the WGIII chapter that deals with this	Taken into account - combined with other comments

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
7879	1	18	19	18	20	Please be more explicit about the relation of costs and benefits. In economic terms, if an activity is highly beneficial, the costs are outghweiged by the benefits. Then, an activity cannot be both, beneficial and costly, at the same time. Or are you referring to upfront investments? Or are you suggesting that renewable energies are more expensive than conventional energy sources? This is not correct (see comment 18).	Taken into account - edited to say "(and OVER THE LONG TERM, IF IMPLEMENTED WELL, highly beneficiaL)".
7350	1	18	19	18	24	It is not clear that it is the potential cost of transformation that causes "many different perspectives"- where and how is this established? It would seem that diverse concepts of responsiblity and justice are large drivers of differing perspectives. Also it is not clear what it means to say that something is "costly (and highly beneficial)" - is that referring to the "benefit" of mitigating climate change or of some co-benefit? This should be elaborated further.	Rejected - this is a very controversial topic because there are many ways to view the underlying facts and options. Text is properly balanced. No action needed
17031	1	18	19	18	24	This paragraph gets into very murky "science" and is no longer an objective presentation of scientific findings, but rather an introduction of value judgements - which IPCC should probably stay away from.	Rejected - we disagree. See 861
10681	1	18	19	18	20	Something being both costly and highly beneficial needs a bit more explaining!	Taken into account - combined with other comment
12222	1	18	2			Consider to use colours that makes it easier to distinguish between the different indicators. Please consider to indicate the purpose of this figure in the caption (driving forces). Further PPP, TPES, cap should be explained or written out in legend.	Figure will be revised.
7152	1	18	20			Rather than use 'costly (and hightly beneficial)', maybe use 'costly, but nevertheless highly beneficial,' would be better. Nonetheless, even if the cost is high, it could also prove to be cost-effective in the long term. If so, it is a point worth making in the text I think.	Taken into account - combined with other comment
15277	1	18	20	18	20	"peoples" to be "people"?	Rejected - plural was intentional. No action needed
7878	1	18	3			Of course, the energy system is slow to change. Rather than mentioning this well-known fact, the report should address that already there have been two decades of inaction and eventually discuss the reasons why this is so (lack of political will, successful lobbying of powerful stakeholders (Oreskes/Conway 2011), etc.).	Rejected - the report addresses the consequences of inaction in more detail elsewhere. No action needed
9250	1	18	5	18	6	But there has been rapid fuel switching in the USA - coal to gas - thus reducing emissions at some point sources? Not necessarily slow to change. And China seems to be making changes rather quickly. I think the paradigm is changing slightly; we should not be wholy pessimistic, as there is some cause for hope, even though overall emssions are rising.	Rejected - the overall system is in fact quite slow to change. Look at the data on the US which is the only place on the planet where this gas revolution is happening. IN the last 13 months we have seen a big shift in the switchable power supply (coal to gas, from 42% coal to about 32%). but it could easily switch back. And the rest of the system is largely unchanged. No action needed
16243	1	18	5	18	6	The challenge of slow change is not limited to the energy system, but includes also long-living buildings and infrastructures that create energy demand and often create lock-ins.	Rejected - that is why we use the term "energy system" rather than energy sector. No action needed
17409	1	18	5			Again, it's unclear why focus is given only to energy systems -- this seems at odds with data presented in the chapter and also with one of the six core arguments that multiple mitigation approaches will need to be pursued simultaneously. Also, later in the page, it seems that "world emissions" are being conflated with emissions from energy systems. Greater precision seems important.	Taken into account - the paragraph has been revised for clarity

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
10830	1	18	5	18	6	A good reference here is http://www.sciencemag.org/content/329/5997/1330	Accepted - added this cite to the end of the sentence referred to here; also, added cite to World Economic Forum Global Agenda Council White paper on Energy security and decarbonization.
10474	1	18	5	18	18	This paragraph confuses "energy" with "electricity".Suggest start new para at line 13 and change "renewable energy"in line 16 to "renewable electricity".	Taken into account - The paragraph has been edited for clarity.
18121	1	18				PPP (Purchasing Power Parity) should be defined in the caption. Source of data for GDP and Population should be added.	Figure will be revised
8226	1	18		18		In this section 4 perspectives (mitigation obligation, trade, per capita emissions and efficiency of the economy) are discussed. Another perspective may be added is the resource endowments or country circumstances. For example, countries in early stage of development and those are rich in natural resources tend to have more per capita emissions. Also other factors such as location (arctic vs. temperate) have significant influence on emissions.	Rejected - there are lots of perspectives. We don't have space for this. No action needed
17030	1	18				These are NOT perspectives on mitigation, but rather perspectives on emissions trends and they are entirely arbitrary. Why not look at emissions per km^2 or emissions per capita per kim^2 or plots of wealth transfers / trade deficits assocaited with emissions? Like earlier, this is an interesting academic exercise, but this section adds little value to the objective, policy-relevant discussion due to its arbitrary, selective frmaing. Its deletion is suggested.	Rejected - we disagree completely with this comment and have documented extensively that these different perspecitves DRIVE the starting point for diplomacy on mitigation and on policy strategy.
18122	1	18	11	18	18	Reference required for the information on the changes in renewable, nuclear and fossil fuel energy in total energy mix over time.	Taken into account - combined with other comments
3558	1	18	16	18	16	"by half a per cent." should be "by half a percentage point."	Accepted - text changed as suggested
6786	1	18	16	18	18	New data / evidence available: "Taken together nuclear and renewable energy sources-the two largest sources of zero emission electricity-have led to a decline in overall share from 88% to about 83.3%". Reference: REN21. 2012. Renewables 2012, Global Status Report, Page 21, Figure 1 Delete text from the above sentence: "of fossil fuels"	Rejected - cited IEA 2012. Sentence has been revised
3446	1	18	17			The assertion: nuclear and renewable energy are the two largest sources of zero emission electricity, could be relative if it is consider the CH4 emitted from dams constructed in Amazonas. See Brazil experience in accounting these emissions.	Rejected - there's a couple dams for this we know this is true (e.g., Balbina). Generalizing this globally is much tougher. This is too much detail for this introductory chapter.
13254	1	18	17	18	17	Strictly speaking, nuclear and renewable are note zero emission (taking in account the whole life cycle or direct emissions, example, nuclear installation and decomission, solar PV panel making, some amount in geothermal), so it would be better to say "the two largest sources of near zero emission electricity"	Taken into account - combined with other comment
13255	1	18	18	18	18	It is not clear for the context, if the percentages of 88% and 86% are referred to primary energy or only electricity.	Taken into account - combined with other comment
3559	1	18	24	18	24	"-illustrated on four…" should be "-illustrated in four…"	Rejected - we have added a fifth and will fix grammar when we insert that extra perspective. No action needed

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
15450	1	18	4			Although all the four perspectives described here are useful, the rationale for the selection is not really clear. For example, the first case (AI and NAI under the Kyoto Protocol) deals with emission reduction of the whole economy in absolute terms based on country groupings (and production-based in contrast to the second case). Technically, there could be other country groupings other than the Kyoto-way and there are some other proposals (e.g. South-North Dialogue). But there is no mentioning of that. The first category seems to be about "country-, production- and historical responsibility-based emission and mitigation"; the second is "emobodied, consumption-based" emission; the third is "per capita (population-based)"; the forth is "intensity-based." It might be better categorize them by either "what emissions" or "based on what".	Rejected - the perspectives are perspectives on the strategy of mitigation, not groupings. no action needed
17695	1	18	12	18	23	Why not use the data for 2011 on Renewables? Also in line 23 Scientific analysis not only can help frame but must be taken into acount.	Accepted - data will be updated as it becomes available
16065	1	19				Complex, too small prints, and mysterious. Even in the large IPCC report, this is not very useful.	Figures will be re-designed for print and on-screen display for final draft.
8911	1	19		19		In Figure 1.7, panel (b) the direction is not clear; i.e., what is the source (producing) region and what is the receiving region (to which commodities are exported).	All figures have been redrawn and captions revised
13371	1	19				This figure is extremely hard to follow. It should be broken into its components, with each presented and discussed separately.	All figures have been redrawn and captions revised
4021	1	19				this figure might require a thorough review: for example how come that all non-Annex B oil&gas exporting countries transfer less emissions than Russia?	All figures have been redrawn and captions revised
11894	1	19				The legends and captions are too small.	Figures will be re-designed for print and on-screen display for final draft.
17410	1	19				Figures too small to read.	Figures will be re-designed for print and on-screen display for final draft.
17649	1	19				Figure - in particular country names - is hardly legible.	Figures will be re-designed for print and on-screen display for final draft.
7351	1	19				The heading "perspectives on mitigation" is misleading - this figure merely shows emission levels using a variety of metrics, it does not suggest any mitigation levels or indication of mitigation "burden sharing." If the authors intend for this to be a presentation of ways in which to determine who should have greater mitigation responsiblity, they should also include a representation of a historical emissions, and of historical emissions per capita, and of contribution to current warming/or atmospheric concentrations.	All figures have been redrawn and captions revised
17034	1	19				This data is outdated. Data throguh 2011 exists from the recent (2012) report from PBL-NEAA :Trends in Global CO2 Emissions". As stated in an earlier comment, It's unfortunate that the data used only goes through 2008 - just at the height of the recession. Some very interesting trends have emerged in the 4 years since the deepest part of the recession and it may come across as tone-deaf for a report that is to be published in 2014 to be based on 2008 data, esp when databases such as IEA, NEAA and EIA have more up-to-date emissions data. AR4 came out in 2007 and used 2004-05 emissions data, so it should follow that AR5 which comes out in 2013-14 should use 2011 data, FF CO2 data of which will be available by IEA later this year. Does the TaskForce on National Greenhouse Gas Inventories have anything to add to this data?	Accepted, data will be updated as they become available
17032	1	19				Showing emissions reductions from former Soviet nations (e.g., Ukraine and Russia) from 1990 levels is misleading as broader pattersn caused the decline. If you were to start from say 1992 or 1994, you would see starkly different results that more accurately reflect the current world reality.	All figures have been redrawn and captions revised

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
5759	1	19				I suggest to split the panels appart and divert this figure into 3 or 4. Panels a and b are too small and have no stringent, inherent connection to panels c and d.	Rejected - We are mindful that figure 1.7 is hard to read, and other comments have led us to need to create still more panels for figure 1.7. Thus we have redrawn all the figures to make them easier to read and will consider splitting figure 1.7 into two pages if the problem of legibility persists after the government review.
11108	1	19		19		The sub-figures are too small to read. This applies to many other figures in the draft, too.	Figures will be re-designed for print and on-screen display for final draft.
16008	1	19				text of figure not readabel	Figures will be re-designed for print and on-screen display for final draft.
15469	1	19	1			Having four graphs on one figure makes it too busy. The impt points made with this figure may get lost. Suggest breaking it into 2 or 3 figures, esp as there is a long discussion of the graphs in the section.	Rejected - We are mindful that figure 1.7 is hard to read, and other comments have led us to need to create still more panels for figure 1.7. Thus we have redrawn all the figures to make them easier to read and will consider splitting figure 1.7 into two pages if the problem of legibility persists after the government review.
7352	1	19	16	19	20	Needs to clarify that "Annex I" is a list under the Convention, and the Kyoto Protocol provided for parties included in Annex I to join its Annex B with a QELRO. Currently reads as if Annex I is a category of the Kyoto Protocol alone.	Taken into consideration - edits earlier in the chapter make it clear where Annex I came from. Text here is accurate and helpful for nonexpert reader who will get confused if we add Annex b.
10834	1	19	17	19	18	Well, not all Annex I countries have targets, so this sentence is factually incorrect.	Rejected - text says "…Annex I countries that agreed to targets.." where "that" is a qualifier. No action needed
12223	1	19	2			The caption is very long. Please consider to give seperate captions for the different Panels. Caption for Panel A) page 19, line 6-7. The description of the 4 colours in the caption do not match the 3 colours in the figure. Panel B is a very omportant figure, but should have been describes better, e.g. to indicate in the figure what is increase in "import"/"export". Panel C and D, region names are not fully visible. Also: please consider to give each panel a heading indicating its purpose, such as "Panel A) Trends in GHG emission" etc.	Rejected - a long caption here is needed to explain the figure. We are mindful that figure 1.7 is hard to read, and other comments have led us to need to create still more panels for figure 1.7. Thus we have redrawn all the figures to make them easier to read and will consider splitting figure 1.7 into two pages if the problem of legibility persists after the government review.
3560	1	19	6	19	6	"Kyoto" should be "Kyoto protocol"	Accepted - text will be changed

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
17033	1	19	6	19	7	There are no blue bars in this panel (a), so this statement should be deleted, "Blue bars show non-Annex I countries."	Accepted - figures to be updated
3561	1	19	7	19	7	"non-Annex I" should be "non-Annex B". Ref. Comment no 11 above.	Taken into consideration - text has been revised
4365	1	19		19		fig has too many components that are printed too small, I recommend spliting	Rejected - We are mindful that figure 1.7 is hard to read, and other comments have led us to need to create still more panels for figure 1.7. Thus we have redrawn all the figures to make them easier to read and will consider splitting figure 1.7 into two pages if the problem of legibility persists after the government review.
6513	1	19	16		17	Modify the description, as "mitigation obligations under Kyoto Protocol" do not appear on the panel.	Rejected - we think the sentence is correct. By dividing countries into color-coded groups based on whether they are members of Annex B under the Kyoto Protocol, we show whether they have mitigation obligations under the Protocol and their emission levels for the given time period. No action needed
3562	1	19	17	19	17	"Annex I" should be "Annex B". Ref. Comment no 11 above.	Taken into account - combined with other text.
18125	1	19	17	19	20	Fig 1.7a shows Annex B and non-Annex B as per the Kyoto Protocol listing of countries with and without obligations. While the characterisation in terms of Annex 1 and non-Annex 1 is not incorrect (as per the UNFCCC), to avoid confusion for the reader, it may be best to refer to these groups of countries consistent with how it appears in the figure.	Figure will be revised.
6512	1	19	6		7	Modify the description, as "Blue bars" do not "show non-Annex I countries".	Taken into consideration - text has been revised
18123	1	19	6	19	7	a) Reference to Blue bar showing non-Annex 1 countries to be deleted as line 5 says non-Ammex B countries are shown in red. b)The names of the countries in Figures 1.7c and d are not clear - they can either be presented at an angle to fit the entire name, or a key should be provided with the full names.	Accepted, figure and caption will be revised.
18418	1	2				It is right when it says that climate mitigation is bigger than climate policies. I have two objections though (pag 2 paragraph 5): first, sustainable development (SD) and green economy (GE) are clearly convergent with mitigation, but energy security it is not: that difference is not clear. Second, how many national governments are actually investing in green economy and SD? I think the tone of the summary is excessively optimistic, and does not accurately acknowledge the gap between science and policy. □	Taken into account - portions of the text has been rewritten for more balance

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
18407	1	2	12		12	The concept of sustainable development arose 1980/ 81 , not with the Bruntland Report. See AR4 WGIII, Chapter 12 Sustainable Development and Mitigation	Taken into consideration - there were LOTS of ideas related to this for decades prior, but Brundtland crystallized it. The text has been rewritten to reflect deeper roots of the concept
17794	1	2	13	15		And possibly have multiple benefits simultaneously (economy, social, environmental, health, ect)	Taken into account - combined with other comments. No further action needed
7153	1	20	1			Replace 'an' by 'a'.	Accepted - text changed
3605	1	20	1	20	1	Please add in brackets "(including Canada and the US, the total emission reduction target was 5.2%)."	Rejected - this is too much detail for here
10835	1	20	1	20	1	Where did the 4.2% come from? Article 3 of the KP states "with a view to reducing their overall emissions of such gases by at least 5 per cent below 1990 levels in the commitment period 2008 to 2012"	Taken into account - If we exclude USA, Canada and Turkey (Turkey has no numerical target under the Kyoto Procotol), base year emissions are 12,055,187 tCO2e and target emissions are 11,549,665 tCO2e, which corresponds to 4.193% reduction. Citation will be provided
17035	1	20	1	20	5	It might be worth discussing how the EU cut their emissions between 1990-2005 (and have since stabilized), whereas others - like the U.S. - have cut their emissions post-2005.	Rejected - this is too much detail here
4022	1	20	11	20	13	suggested wording: "The big decline in Ukraine's and Russia's emissions, for example, reflect the collapse of their economies in the early 1990s in the aftermath of the desintegration of the Soviet Union in 1991." (Reason for correction: In fact, there has been no major "restructiring" since then. Unless the authors imply almost total elimination of some high-tech industries with marginal emissions.)	Rejected - Getting into this level of detail may create problems about getting the exact details of which sectors changed when and we don't have space for that level of detail here. Also, getting into those details takes the topic away from the purpose of our chapter. There is no doubt that some of this is economic collapse, but a lot is restructuring--there have been big shifts in economic activity; changes in pricing regimes; etc. No action needed
14801	1	20	12			"Russia, Ukraine, EU+12, and part of EU15 (former East Germany)."	Taken into consideration - text edited to say " The big decline in Ukraine, Russia, the 12 new members of the EU (EU+12) and one of the original EU members (Germany, which now includes East Germany) reflect…"

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
7880	1	20	13	20	16	These lines seem to be based on the stage model of economic development from W.W. Rostow (1960). If such a model is presumed here, it should be stated explicitly.	Rejected - they aren't fully based on the model, so adding a Rostow cite here would not be fully appropriate for what we are saying. No action needed
4470	1	20	17	20	28	This paragraph is incoherent and internally inconsistent. Many of the countries that have ratified Kyoto are not meeting their Kyoto obligations, and others have not ratified Kyoto. Countries can't both be "selective" and compliant at the same time.	Noted - in fact, that is exactly the point. Countries select which obligations to join and then they "comply." That's the key insight of Downs et al (which we cite) and which Victor (2011) applies directly to the climate issue. No action needed
4857	1	20	17		28	The purpose of the lamentation on various interpretations is unclear; it would be better to avoid ..	Noted - suggested action by commentor is not clear. We simply offer that there are many ways to interpret the trends in the chart. No action needed
7353	1	20	17	20	28	It is not clear that this is "the message" of that panel. Nor is the importance of CBDR an "intepretation" in the same sense that "countries have complied with their targets" is an observation, and it is not clear why they are described as "alternate" interpretations, when they could easliy be complementary.	Taken into account - when we add a cummulative perspective then CBDR will be beefed up. No further action is needed
14802	1	20	18			eliminate "big"	Accepted - changed "big" to "some"
11896	1	20	18	20	18	Harmonize the use of "Kyoto treaty", "Kyoto" as "Kyoto Protocol".	Accepted - text changed as suggested
11895	1	20	2	20	4	Move this statement to the caption of Figure 1.7.	Rejected - our view is that this point is so important to accurate understanding of what kyoto does (see for example the Peters comment about where the 4.2% number comes from) that it belongs in main text
14804	1	20	20		24	It is not clear how this is a fitting illustration of common but differentiated responsibilities ("and respective capabilities"). This inference would require comparing the magnitude of the action required of a Party to its responsibility and capability, which is not reflected in this chart. This inference is further blurred by the fact that other effects played large roles: UK dash to gas, soviet collapse, and recession/financial crisis in particular.	Taken into account - We think the allocation of QELROs to developed countries is a fitting illustration to that point. Also, we are adding a fifth perspective on historical emissions. No further action needed
14803	1	20	25			eliminate "strict"	Accepted - removed "strict"
17036	1	20	25	20	28	This statement may cause offense to some nations whose domestic circumstances preclude comprehensive actions desired by certain branches / entities wiithin their governments. Everything after the semicolon on l25 should be deleted as it is not a constructive addition to the text.	Rejected - we are mindful that this statement may cause offense but it is correct and scientific. Other topics may cause offense to other countries but we are here to report on the science.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
15253	1	20	26	20	28	this seems most obvious?	Noted - lots of other comments point in the oppposite direction. Insufficient information for action. No action needed
16066	1	20	29	20	37	True, linking trade and emissions is key. Maybe link this paragraph with parts of the report relevant to (1) indirect and sectoral emissions (2) international negociations	Noted - insufficient information. No action needed
12224	1	20	29	20	31	Is it always the case that are allocated to the country where they occur, one example is international transport.	Taken into account - text in the paragraph has been revised. Also, revised second sentence to say "nearly all of the statistics presented in this chapter" rather than "all" to indicate that there are exceptions.
9463	1	20	29		37	Indeed! Chapter Eleven would benefit from explicit discussion of this priority. It mentions the challenge, but does little to examine frameworks that seek to internalize emissions from trade (i.e. the California LCFS and the US RFS).	Noted
17038	1	20	29	20	37	Unusual weight is given to a single study throughout this section (the Peters et al 2011 study). It is merely one framing and one that has not gaiend traction in the practical world of international negotiations. As a result, it's unusual influence, persistence and recurrence throughout this Chapter is inappropriate. For example, there is also the Chakravarty article in PNAS (2009) on sharing glboal CO2 emission reductions among 1B highest emitters. Neither paper deserves to be the source of a single framing	Taken into account - The Peters et al study is about trade. The Chakravarty et al study is about per-capita assignments (largely ignoring trade but indexing on economic prosperity and explicitly avoiding national accounting). But adding the other per-capita perspective is important. Two points here: First, on trade, we are illustrating this with one study because we can only use one figure. Second, on per-capita we add a sentence at end of paragraph: "Other studies have examined per-capita emissions in a more fundamental shift that would assign responsibilty for emissions to individuals rather than nations (Chakravart et al 2009)
4858	1	20	32		33	Avoid one-sided evaluation. There is another side of the coin, too: the fundamental demand by China to maintain econ. growth (for higher living standards for its people) and the partially export-oriented national steel industry is part of meeting that demand. So: common (coupled) but differentiated demands ..	Taken into account - cross reference to section 1.2.1.2 on macroeconomic situation discussion on embedded emissions on traded goods and services added here
17037	1	20	32			While the emissions are "embodied" in products that are exported, the economic benefit of those emissions go to the producing nation. This very important aspect cannot and should not be overlooked/glossed over. In theory, producing nations *could* increase prices to produce consumer goods via clean energy.	Noted - This is true to some degree, but so do the local externalities. Our point is not to get into those weeds here.
7155	1	20	34			Remove unnecessary paranthesis.	Accepted - deleted parenthesis

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
17039	1	20	35	20	37	This final statement of the paragraph is a total value judgement and IPCC should NOT be in the business of making value judgements. This is a pervasive problem in this Chapter. Calling for the incorporation of trade into a process that is already gridlocked (as stated earlier in the Chapter) would NOT be a productive policy-relevant recommendation.	Noted - it is not total value judgment, but is a direct logical extension of the argument. This sentence has since been deleted in editing.
14805	1	20	37			"… trade rules, and the consideration of embedded carbon when assessing possible meanings of "common but differentiated responsibilities and respective capabilities".	Rejected - too much detail that obscures the main point here
4859	1	20	38		47	Besides consideration of per capita emissions another essential factor is the consideration of the "historical emissions" – which is not illustrated on the panels, however, these are also of key importance for scientific and political assessments of the mitigation.	Taken into account - we are adding this perspective.
7882	1	20	38	20	47	The paragraph fails to mention the significant differences in per-capita emissions within the group of developed countries. This difference should not go unmentioned because it highlights at least to important points: first, a high level of prosperity can be reached with substantially lower per-capita emissions than in countries such as Australia or the US; second, it points to different responsibilities for the impacts of climate change (see chapter 3.3).	Rejected - there are LOTS of things this paragraph doesn't mention. But the data are in the figure so we don't need to do this. We need to be careful in adding more text, for example, on per capita emissions as this might overly endorse one particular burden sharing scheme over another one.
7354	1	20	38	20	47	It is noted with "interest" the diversity within categories (i.e. between countries in A1 or NA1) but the difference between Annex I and Non-Annex I is not commented on; it appears remarkable that the highest per capita emissions by country of non-Annex I are not much more than the highest per capita emissions of Annex I. Further, the highest per capita emissions come from Korea, a country that is particularly unique within the Annex distinction, due to its membership of the OECD.	Noted - no clear action suggested
7881	1	20	39	20	40	Again, the stage model seems to be presumed.	Taken into account - combined with other comment
3884	1	20	4	20	6	I understand a few words about the EU economic crises should be mentioned here, as a driver for CO2 mitigation success	Rejected - It is hard to comment on that right now it is still playing out. Solid literature on this is still missing so we cannot discuss this.
4471	1	20	41	20	42	This sentence is unwarranted. Quantitative information by itself cannot provide a justification for any particular scheme for allocating emissions reduction obligations or emissions rights. Any such allocation has to be the result of negotiations, and may take account of various criteria such as historical emissions, capacity, the possibility for "leapfrogging" over carbon-intensive technologies in the course of rapid development, and most importantly, national interests. Allocation along lines of population (does this mean per capita allocation?) is one possibility, but can hardly be considered either a scientific or consensus position.	Rejected - this is not what we are saying. We are saying if you take this perspective THEN that's the logical implication. -- the text has been revised for clarity
7883	1	20	41	20	41	Here might be a minor mistake. Do you mean "emission reduction obligations" instead of "emission obligations"?	Taken into account - edited to say: "emission CONTROL obligations"
17040	1	20	41	20	42	This third perspective does NOT suggest that emissions obligations be allocated along lines of population! It's tone deaf to the reality ofg moving people and goods within sovereign border of vastly differing sizes and across vastly different landscapes. Again, these perspectives - this section - is nota constructive contribution to the report and should be deleted.	Rejected - See 945. We disagree. The literature and concepts need to be reviewed.
17650	1	20	43	20	44	In Figure 1.7, there is explicit example of one of the least developed countries, thus the figure also does not show differences among them.	Accepted. Figure and discussion will be revised.
14806	1	20	44			replace "state of the economy" with "income per capita"	Rejected - text is ok as is. No action needed

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
14364	1	20	48			Need to clarify whether using purchasing power parity GDP or market exchange rate.	Taken into account - clarified text in the caption to figture 1.7, panel D.
14807	1	20	48			"efficiency" is an inappropriate term here. It is clearly more than simply efficiency, as subsequently stated in the same para. It is also a measure of resource endowment, economic structure (agri/industry/service), state of development (which determines rate of investmentin infrastructure), etc.	Rejected - it is a measure of lots of things, including prices. The overall crude indicator, though, is efficiency--and we explain what we mean in the text. No action needed
14800	1	20	5			The phrase "exceed their target" is ambiguous. (Emissions exceed their targeted emissions, or reductions exceed their targetted reductions?)	Taken into account - edited sentence to say: "FOR 2008-2012, THE COUNTRIES THAT JOINED THE KYOTO PROTOCOL AND ADOPTED NATIONAL EMISSION TARGETS ARE certain to COMPLY WITH their COLLECTIVE target"
7154	1	20	5			The antecedent of 'they' is unclear. Do you mean 'Canada and the US' or the 'other Annex I countries'?	Taken into account - combined with other comment
13372	1	20	7	20	8	The comment is made that countries will be unable to meet their emissions targets without also engaging in a degree of emissions trading and purchasing credits internationally. Given the faith in these markets and mechanisms, it is hard to see this as problematic without a further explanation why this might be so.	Noted - The point is really just about collective effort and dealing with shortfalls. See edits per 952
11721	1	20	9	20	11	Everyone can understand the meaning without this sentence and all anex I countries are making efforts to meet their target by using Kyoto mechanism. So,there is no need to pick-up the indivisual country's case.	Accepted - deleted the sentence. But it is important to note that power companies that cannot comply with their own target do not have extra money to purchase CDM after Fukushima but the situation will become clearer in the future.
9494	1	20	9	20	11	delete this sentence - Japan is making effort to meet 6% cut and CDM credits is acceptable system by Uns	Taken into account - combined with other comment
9357	1	20	9	20	11	The example of Japan should be deleted because Japan contributes to the reduction of CO2 through the CDM project, from which Japan get the credit.	Taken into account - combined with other comment
18429	1	20				perspectives on mitigation The interpretation done regarding KP is far too optimistic (pag 20 paragraph 2)	Rejected - other comments say the opposite. I think balance is ok here
18126	1	20	40			The perspective on how per capita emissions depicts differences in stages of development requires elaboration. Alternatively, this perspective can be limited to the difference in sizes of populations in countries.	Rejected - this is an overview chapter--we don't have space for this. But, sentence is edited for clarity: "fundamental differences in the PATTERNS of development"
6514	1	20	42		44	Modify the description, as "the least developed countries" do not appear on the panel.	All figures have been redrawn and descriptions and captions revised
18127	1	20	43	20	44	There is no LDC grouping in figure 1.7. How is this comparison made?	All figures have been redrawn and descriptions and captions revised

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
18128	1	20	47			a) Which countries are Indonesia's economic peers as shown in Fig 1.7c? Elaboraton required. Also land use change (deforestation) is arguably a depiction of the state of the economy - one that relies on natural resources? The distinction drawn in this regard is not clear. Also, how would this be related to population which is the main focus of this perspective? b) The point that could be made here is the argument for the right to atmospheric space to develop based on population base which this perspective shows. Hence China and India for example could justify greater total emissions on this basis as their per cap is still far lower than that of industrialised countries.	Rejected - Our statement about land use in Indonesia is correct. For clarity, edited the sentence at line 46 to say "…when compared with OTHER COUNTRIES AT THE SAME LEVEL OF PER-CAPITA INCOME."
14809	1	20				These claims about whether a given target is acheivable or "impossible" based on these studies must be stated with much more clarity about what can actually be substantiated by such modeling exercises. They are based on assumptoins about technological progress on a 50 (or greater) year timeframe, they rely on assumptions about policy effectiveness, maximum penetration rates, acceptable reductoins in GDP growth (or absolute GDP). These assumptoins might simply not apply under conditions significantly different from today under societies are acting in earnest to fend off climate change. Such caveats should be stated.	Rejected - Page 20 is about very near-term issues--not 50 years. We think the comment refers to pages 21-22. For the first part, we will take these into consideration. However, relationship between the first half and the second half is unclear. Even today, asumptions mentioned here (for example policy effectiveness) may not be the case. Section 1.3.3 has been revised
3564	1	21				Label on vertical axis should read "GtCO2/yr"	Figure will be redrawn
17644	1	21				Please put proper names of model on footnote or another spaces, so that it would be easy to understand for readers who is not expert in economic research fields	Figure will be redrawn

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
17044	1	21				This plot should NOT be replaced with a chart showing mitigation gaps. Such a plot cannot capture the ineherent, vast uncertainties of such an analysis. A detailed explanation of why such a presentation is unwarranted follow: • Even before you look at scientific uncertainties, the political uncertainties leave a range of 18 Gt CO2e (i.e., 3 Gt gap in case 4 vs. 21 Gt gap in BAU). Note, these numbers were updated in the Bridging the Emissions Gap report to be 4-16 Gt, showing how fluid our knowledge is of this science • Even if the political realities could be confined to a single “case”, you’re left with a range of close to 5 Gt – or more than 10% of current global emissions. • But let’s accept that we could confine the pledges to a single case. Where would the science leave us? • 2°C is a very nebulous goal given the propagation of uncertainties that occurs when going from emissions to atmospheric concentrations to transient / equilibrium temperature change. • Many studies have made informed predictions, but it remains an awfully challenging parameter to quantify accurately. As a result, the level of emissions reductions called for under a “2°C scenario” may actually only limit warming to 3°C… or – there’s an equal possibility that that same amount of emission reduction would limit warming to only 1°C. • In general there are three critical scientific / objective / analytical aspects to the 2°C goal and the idea of an “emissions gap” that really make it unworkable from an operational standpoint. Uncertainties in quantifying emissions. Uncertainties in the carbon cycle (i.e., translating emissions to concentrations) Uncertainties in Earth’s climate sensitivity (i.e., translating atmospheric concentrations to a temperature change) • As a recent study by Chinese scientists published in Nature Climate Change demonstrates, we are still woefully inaccurate in our ability to consistently and accurately report emissions. • The Guan et al. study found that in China alone, an emissions gap of 1.4 Gt existed in 2010 between the nationally-reported emissions and the aggregation of provincial level data – an uncertainty of 1.4 billion tons of CO2 – roughly equivalent to half the 3 Gt gap in case 4. • In other words, more accurate reporting from one nation could close the emissions gap by 50%(!). • Along these lines, estimates for cumulative carbon emitted to date, globally, range from about 400 to 700 Gt.	Figure will be redrawn. -- we are going to defer to IPCC WG3 chapter on modeling and look at gaps related to many different goals.
14365	1	21	1	21	5	What about the question of whether energy subsidies are causing excessive use of energy per unit of GDP that cannot be justified by high ratio of goods (and manufacturing) to services sector associated with lower per capita income?	Taken into account - a good point. Sentence at line 1 edited to say: "primary processing using energy intensive methods OFTEN REINFORCED WITH SUBSIDIES THAT ENCOURAGE EXCESSIVE CONSUMPTION OF ENERGY." Also, at line 4 edit "…should reflect the PATTERN of economic development…"

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
15537	1	21	10		22	An important issue that should be mentioned here is that national planning aspirations often envisage more rapid growth than do the BAU modelling assumptions. If the planners are right, then the outlook is more difficult still. As the Blanford et al piece in EMF22 suggests, it is not clear that BAU projections have taken on board the rapid growth of Asia since the 1990s.	Rejected - The Blanford et al (2009) paper is clear. However the paper was published in 2009 and global economy, including China and India, are still struggling. If we adopt this comment, that may invite many comments arguing the paper was writen more than 3 years ago. If there is a more recent paper, we will gladly incorporate that into the text. No further action needed
17043	1	21	13	21	15	The EMF22 is NOT the most recent study. IEA's World Energy Outlook 2012 (due out in Nov) has 3 scenarios and will be the most recent effort. Even last year's WEO2011 is more recent than the EMF22 effort.	Rejected - IEA is a single model study. EMF's strength is multimodel comparison. Edited the sentence to say: "...most recent MULTI-MODEL study…"
12910	1	21	13	21	21	the results of EMF22 are the latest published right now. However, EMF27 is about to be published and some of the draft numbers even are used in this FOD in other chapters. EMF27 gives a much more optimistic picture with repect to achievability of low emission targets. Chpter 1 should reflect this saying that EM22 shows that is difficult , meanwhile we are more optimistic (albeit the task still being a difficult one). If emf27 is not mentioned in chapter 1 we run into inconsistencies because it will be used in other chapters!	Accepted, data will be updated as they become available
7156	1	21	14			Remove unnecessary paranthesis.	Editorial – copyedit to be completed prior to publication
2154	1	21	16	21	18	This is the sentence which will become the press headline (linked to my comment above on the central question is "can we achieve 2°C?"). The press will state "IPCC says 2°C is not achievable". If the IPCC really comes to this harsh conclusion, you need to triple think about it. I do not think so. Yes, the chances are small, but not impossible - in my view a neutral picture should be drawn which shows hope, as well as the need to act. Specifically, my suggestion is to consider a picture with a RANGE of BAU trajectories on the top, and a RANGE of maximum possible mitigation pathways at the bottom. In a separate exhibit you can then compare the "mitigation range with the 1.5 / 2.0./ 2.5 etc RANGES of temperature stabilization	Taken into consideration - the whole section has been rewritten to be more clear about our intentions that achieving the goal will be challenging but not impossible
17046	1	21	18	footnote		The footnote should specify that this is "above pre-industrial levels".	Taken into account - This paragraph has been rewritten for clarity and the footnote removed.
16067	1	21	2	21	8	Not very helpful. Is it something that will be precised by research ? By improved international accounting and data collection? Or just not knowable?	Noted - There are various perspectives and we simply offer a few. Here we discuss the typical stages of development and offer the logical extension based from this perspective. No action needed

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
7885	1	21	21	21	22	The statement "a Herculean task" is value-laden and misleading. With the technologies available today Germany can genrate 100% of its electricity with renewable energy sources by 2050 (SRU 2011). Thus, the taks is not so much Herculean in any technical meaning although it might be so in terms of political feasibility (see comment s19 and 26). This, however, is an important difference. This difference is brought out well in chapter 6. A reference to and eventually some key messages of chapter 6 should be included.	Taken into account - a good point. Section has been rewritten to more accurately reflect our message
12909	1	21	21	21	21	value judgement: "Herculean" should be avoided!	Taken into account - combined with other comment
12225	1	21	24			Y-axix should read Gt CO2/yr not Gt/CO2. It should be included in the caption that this figure picture the BAU emissions, and is without further measures.	figure will be replaced
4860	1	21	29	22	22	Some clarity would be needed since the EMF scenarios are on fossil and ind. CO2 while references to the pledges (gaps) and to the ppm-ranges (for 2C) are for CO2e	EMF 22 is based on CO2e. Fig. 1.8 focuses on Energy related CO2 only to make it consistent to Table TS2 cited in Bali Action Plan. Figure will be redrawn. No further action needed
7355	1	21	29	21	30	This says "at least in half" when above it says "most of those scenarios were based on emission controls that envisioned a 60% reduction" these are quite different and it does not seem appropriate to "downplay" the depth of cuts necessary later in the section.	Rejected - This comment is incorrect. Here we are talking about what IPCC AR4 showed. The previous paragraph describes about EMF 22. The figure will be redrawn. No further action needed
17045	1	21	29			There's a more recent body of literature than AR4 on this topic. See the work of Rogelj, Meinshausen, etc.	Rejected - Of course--but one of the purposes of AR5 is to comment on what was said in AR4 and what has changed; so this statement MUST STAY so that we can put the findings into context
15452	1	21	29	22	12	For the purpose of being comprehensive, it would be better to have a reference to UNEP study on the "gap" (UNEP (2011) Bridging the Emissions Gap. UNEP) because the study is a synthesis report of existing studies.	Taken into account - combined with other comment
15254	1	21	3	21	5	this too seems good policy!	Noted - no action needed
17041	1	21	3	21	5	Allocation Emissions obligations is not the business of the IPCC. Making value judgement statements like this may have a detrimental effect on the integrity of the IPCC. These concluding statements in each of these paragraphs ought to be deleted, if the entire section is not deleteed altogether.	Taken into account - combined with other comment
11897	1	21	4	21	4	Avoid to use "should".	Rejected - "should" is ok because the beginning of the sentence says "From this perspecitve…"
7884	1	21	5			We do in not oppose improvements in energy intensity. Still, what matters with repsect to mitigating climate change are absolute and per capita emissions. Low intensity goals alone will not lead to any meaningful reduction in emissions as is well demonstrated by figure 1.6.	Noted -- no specified action suggested

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
8912	1	21	6	21	7	There is something wrong with this sentence, too many "interpretations".	Accepted - edited sentence to say: "well, WITH VARIED IMPLICATIONS FOR POLICY STRATEGIES AND THE ALLOCATION OF BURDENS AND BENEFITS AMONG PEOPLES AND NATIONS."
3885	1	21	6	21	7	"Still other interpretations are possible as well, and the exact interpretation of what explains these interpretations has large implications for policy".. Please improve wordings to express your view.	Taken into account - combined with other comment
17042	1	21	6	21	8	This statement more or less implies that this entire section is all relative, subjective and attempting to be prescriptive. As a result, this section should be deleted.	Rejected - this comment is incorrect. Sentence has been revised per previous comment
9216	1	21	9	22	35	It should be notd that the "concentration stabilization" is not a likely future and this has implication on the scale of emission reductions. In (T. Matsuno, K. Maruyama and J. Tsutsui “Stabilization of atmospheric carbon dioxide via zero emissions-----An alternative way to stable global environment”. Part 1 and 2 In Proceedings of Japan Academy Ser. B, Vol. 88, No.7 (July, 2012),p 368-395.), the authors critically examine the traditional “stabilization” concept in which the atmospheric CO2 concentration and corresponding temperature are held constant for many centuries to a millennium. They claim that such long-term constancy of concentration and temperature is not a likely future state. Instead they propose “zero-emissions stabilization” in which emissions wi be diminished close to zero, and after that the concentration will decrease approaching the final equilibrium state for which the temperature rise can be made much lower to avoid the risk of sea level rise. Another advantage of the zero-emissions stabilization strategy is that emissions in the near future can be made larger compared with ordinary stabilization pathways under the same temperature rise constraint. This would be beneficial to respond to current socio-economic needs. These points are shown by simple model calculations for illustrative cases.	Rejected - This comment should be addressed to WG1or to WG3/Ch. 6. This paper raises the important issue whether the world can tolerate to delay the timing of stabilization, for example at 450 ppmCO2e level, for another century br centuries in comparison to generally anticipated. This is beyond chapter one's mandate.
3447	1	21	1	21	2	An additional argument justifying that emissions of greenhouse gases are higher in emerging economies, is due to the relocation of highly polluting firms from developed countries into developing countries. Maybe a comment on this issue should be mentioned in the document.	Rejected - this is exactly why we added the "embodied emissions" perspective. No action needed
4366	1	21	2	21	8	Pannel B of Fig 1.7 suggest that «mature» economies have seen part of their industry related emmissions transfered to developping economies, so how much more carbon efficient economies really become as they mature when emission transfers are accounted for. What is the contribution of those emission transfers to meeting the Kyoto objectives, compared to “real” emission reductions ?	Rejected - the piece we cite (Peters et al) deals with this in detail, and one implication is that OECD countries haven't made much progress. UK emissions are down 20% but embodied emissions pretty much offset that cmopletely. That's the implication. If we go too far down the road of spelling this out in the text then some reviewers (as they already have) will freak out. hence our balance here without more detail
6515	1	21	4		5	Modify the description after "and", taking into consideration that a rapid transition of a developed country to low emissions can lead to importing more GHG emissions embedded in trades from developing countries and promote GHG leakage to such developing countries, as suggested in section 5.5.4.	Rejected - this edit not needed because exactly this general point (if not the details) is in our treatment of embodied emissions on the previous page

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
3563	1	21	6	21	7	"…exact interpretation of what explains these interpretations…" unclear and bad language.	Taken into account - combined with other comments
18130	1	21	6	21	7	Needs rewording. For example, the word interpretation appears thrice in this sentence.	Taken into account - combined with other comments
14808	1	21				This section is quite difficult to follow. The text seems to confound BAUs with mitigation scenarios. It does not make sense to show a set of 11 BAUs shown and state "BAU projections such as in Figure 1.8 are wildly at odds with those ambitions and global emissions continue to ncrease" ... is this not true simply by virtue of the fact that these are BAUs, not mitigation scenarios?	The commentator misunderstood the text and the figure. The text and figure has been revised
14810	1	21				This section is focused on making the case that meeting the 2C target would be exceedingly challenging, which is undoubtedly true as has been evident for quite some time. However, as presented, this section appears to be presenting a case for relaxing this exceedingly challenging target. What is not discussed, but is equally relevant to such a decision, is whether it would also be exceedingly challenging to MISS the 2C target? That is, what demands and pressures would be put on societies to bear the impacts of a higher level or warming? Not only is there no basis provided in this section to suggest that meeting the 2C target would be less challenging than missing the 2C target, but the text does not even raise this as the relevant comparison to make.	Noted - WG3 is about mitigation centrally, and the exact role for adaptation (and bearing impacts) is unclear to us. Thus we have added a discussion of adaptation near the end of the chapter. Talking about the cost of 2 degrees on societies is more of a WG2 topic but we have added a sentence highlighting the challenges of missing the two degree target.
4367	1	21		21		A figure model outputs showing that targets are not achievable would be more interesting	Noted - that is exactly what we are doing. Figures will be redone.
13658	1	21	10	22	12	The entire section draws from projection of emission trajectories for the future, which are based on business as usual scenarios. This is a high uncertainty methodology as the nature of the the BAU trajectories is counter-factual and mitigation efforts are highly sensitive to the assumption of a BAU trajectory. Why have other approaches (budget approach – Meinshausen et al) not been used to measure the scale of the mitigation effort required, as it provides a more concrete basis to gauge total available carbon for the future. □	Taken into account - The budget approach isn't any more helpful--there is no way to escape the need to look at BAU-like projections and the "gap" between likely and desired trajectories. This section has been revised for clarity.
8227	1	21	16	21	18	It is not clear if the targets are not achievable even with mitigation actions? Please clarify.	This section has been rewritten for clarity
6869	1	21	16	21	18	Please check definition of Climate Sensitivity in the Glossary. We suggest to stick very closely to this Glossary definition. E.g., here the equilibrium component of the formal defintion is missing. The Glossary definiton reads: "In IPCC reports, equilibrium climate sensitivity refers to the equilibrium change in the annual mean global surface temperature following a doubling of the atmospheric equivalent carbon dioxide concentration."	This section has been rewritten for clarity. No further action needed
13256	1	21	19	21	20	the expression "small majority" is contradictory. What it is intended to be said? That a small portion of scenarios will find the target achievable, or that a majority of scenarios will find the target achievable?	Taken into account - This section has been rewritten for clarity. we will add text '8 among 14 scenarios', and also add 'in case of delayed participation, 2 out of 14 scenarios', if we use EMF 22 as a base of our discussion.
17728	1	21	21			replace the phrase "a Herculean task" by "an increasingly difficult task as actions are delayed"	Taken into account - this section has been rewritten

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
6870	1	21	29	21	29	Which part of AR4? Need to provide specific references to previous IPCC reports.	Taken into account - figure and discussion on the figure has been rewritten with cross reference to chapters
15451	1	21	9			It would be useful to view the challenge from the perspective of cumulative emissions up to 2050, too, as described in Meinshausen et al. (2009) Greenhouse-gas emission targets for limiting global warming to 2 ºC. Nature. 458: 1158-1163 (doi:10.1038/nature08017). For example, the paper says having emissions by 2050 results in 12-45% probablity of exceeding 2 ºC (assuming 1990 level as the base year, though). To keep the probability below 25%, the cummulative emissions must be less than 1,000 Gt CO2. This way of thinking would add another useful insight to the discussion and it is worth mentioning.	Taken into account - Here discussions are based on the best estimate of climate sensitivity of 3 degree C. Meinshausen's paper deals with the broad range of climate sensitivity (2-4.5 degree) and this point has been dealt with separately in our text. See page 22, lines 13-17. This description will be modified based on the description of AR5/WG1/Ch.12. Also refer to comment 1040. This section has been rewritten
10779	1	21	9	22	12	This statement is so strong that it should be part of the summary of the report. It says, in simple English, that warming control is nearly hopeless. The author, though, softens the writing with the weak word "challenging..."	Noted - section has been rewritten
4861	1	22				1.4.1 It could also be mentioned, that many of these priorities, goals (MDGs and climate change mitigation and adaptation related goals), and the means to achieve those are interrelated to some extent.(Such interrelations should be taken into account with reconciling the priorities.)	Noted - This is what we wrote in this section. Also for interaction between mitigation and adaptation, refer to 1.4.5. This section has been rewritten
14366	1	22	10			Cline (2011) sees mitigation capable of staying within the 2 degree limit as cutting per capita emissions to 1.4 GtC02 b 2050, not 1.1.	Taken into account - Section has been rewritten. Added cite to Cline and Yamaguchi et al (see comment 1008) and others (such as comment 1011); Cline (2011)
11722	1	22	11	22	12	Yamaguchi et al says [the feasibility of the 2 degree target is too slim, if not possible]. So [1 degree or 1.5 degrees would be extremely challenging] is more apropriate expression. 1.Yamaguchi et al.:[Climate change mitigation,P23], send attachment by another e-mail.	Taken into account - combined with other comment
10637	1	22	11	22	12	Yamaguchi et al says that "the feasibility of the 2 degree target is too slim, if not possible". So it is better to express that "1 degree or 1.5 degrees would be extremely challenging". Yamaguchi et al Climate change mitigation will be sent be email later.	Taken into account - combined with other comment
17048	1	22	11	22	12	Reword this setence to be more clear: "By logical extension, limiting warming to 1 degree or 1.5 degrees is even more challenging [and prehaps even impossible given emissions lock-in, etc.]"	Accepted - text changed as suggested
9971	1	22	11	22	12	This part should be revised into "is extremely challenging". The 1.5℃ target is not realistic and even 2℃ target is extremely difficult to attain, as described in (Höhne, 2011, conclusion) and (Rogelj, 2011, abstract). These literatures are listed in the No10 line of this table.	Taken into account - Rogeli et al. discussed the gap (see 981). Added after 'target' in line 4, p. 22, '(den Elsen et al. 2011, Rogeli et al 2011)' . The section has been rewritten
16068	1	22	12	22	12	Noun missing	Taken into account - combined with other comment

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
16202	1	22	13		17	uncertainty bit is not clear. What is the point? Point is not made; be more direct.	Taken into account - text has been revised for clarity but basic concept remain unchanged. Meaning is quite clear. We added another Meinshausen et al. (2009) here. Ref. #1040.
9926	1	22	14		18	The Unit for concentration is inconsistent in the context. Ppm and Ppm CO2e are all used, but the difference is not stated.	Rejected - We use the unit accurately. Only when we indicate concentration of CO2 only, we use ppmCO2. When it indicates GHG, we use ppmCO2e.
16069	1	22	18	22	22	"Exceptionally difficult if nor impossible" is not acceptable without a qualification such as "in the present state of play" or "with the policy instruments presently on the table". If the political goal of Nations is indeed 2°C, then other instruments should come in play such as banning most plane transport or limiting drastically the use of individual cars. Thus the construction of this paragraph is misleading. In particular, even consensual policy (e.g. universal pricing of carbon) is presently not given serious consideration. Also, no technological barrier exist to implement technology based changes (see other chapters). Only political proposals, instruments and consensus are lacking. You should say so, for example "technology and economic policy proposals, sufficient to limit GHG emissions, do exist but are presently excluded from serious policy consideration, making the 2°C goal nearly impossible".	Taken into account - The text has been rewritten. Though we soften the language, this comment is a political statement. Our role is to provide policymakers policy relevant information based on scientific literatures.
14367	1	22	18	22	22	This comes close to throwing in the towel. In general it seems to me there is a risk that the chapter essentially implies it will be extremely costly and almost impossible to stay within the 2 degree limit. Cline (2012, p. 4; p. 81) calculates that by 2030 the path needed would only impose economic costs of about 2/3 of one percent of GDP or less annually on both industrial and emerging market economies, with the cost reaching 1 to 2 percent by 2050. It would be unfortunate to imply instead that the 450 ppm target is simply impossible, thereby discouraging efforts to meet it.	Taken into account - That is what we are saying, to some degree. But we will qualify this. In this particular point, we need to know the condition that enable achieving 450ppm (CO2e?) target at the cost of 1-2% of global GDP. We are looking forward to see several modeling studies (EMF 27, RoSE, AMPERE, LIMITS). If there are new findings, we will add those.
9251	1	22	18	22	18	350 ppm is an old figure - was it that low at the AR5 cut-off date? Now locally 400 ppm.	Accepted - change 350 to 390
7886	1	22	18	22	22	You write that to stop warming at 2° will be exceptionally difficult if not impossible. It is not clear though in what sense it is deemd impossible: scientifically/technologically or economoically or politically (in terms of political will)? If you have the first or second meaning in mind, you should critically discuss those studies and politcal plans that suggest otherwise. See also comment 33.	Taken into account - Good suggestion. Our discussions are based on literatures that are based on analysis of technology, cost, speed of energy system transformation etc. and not on political will. Political will stems from policymakers after they read this report. This section has been rewritten for clarity.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
17049	1	22	18	22	22	There is a body of literature that would be very informative to this discussion: Many studies have addressed the question of feasibility from different angles, but with remarkably concordant conclusions: for normative climate sensitivity, limiting warming to 1.5 deg C is no longer possible because the mitigation rates required (c. 20% per annum – Raupach, Tellus, 2011) are not technically feasible. Large-scale energy technologies require 50 years for full-scale penetration (Smil, V., Energy. Myths and Realities, American Enterprise Institute, 2010; Victor, D., Global Warming Gridlock, Cambridge Press, 2011); for the penetration of zero-emission technology, this timescale is equivalent to a mitigation rate of ~5% per year. Limiting warming to 2 deg C is still feasible in principle, but would require an immediate start to mitigation at rates exceeding 5% per annum. Alternatively, one can use estimates of the emission gap for year 2020, which are 3 to 9 Gt CO2-eq per year, compared to the required level to meet the 2 deg C target of 44-46 Gt CO2-eq per year (UNEP, Emissions Gap Report, 2010, and IEA, World Energy Outlook, 2010). The prognosis for limiting warming to 3 deg C is more optimistic. Raupach (Tellus, 2011) demonstrate that a 3 deg C limit could be achieved for mitigation start times from 2011 to 2030 with decarbonization rates of 2 to 3.5% per year, respectively. These rates fall within realistic energy technology turnover rates and have been met by some nations in the last decade; e.g., Denmark, Germany and Spain decarbonized by 1.9, 2.2 and 3.6% per year, respectively, from 2005-2010, although some of these declines likely reflect recessionary effects.	Taken into account - Thanks for useful information. On this point, our idea is to mainly rely on large model comparison projects now on-going. But we will cite some of those in our text.
11405	1	22	2	22	12	The reference to "pledges" should be with respect to the Cancun outcome under decision 1/CP.16 rather than to the Copenhagen Accord, as only the former is the multilaterally agreed instrument under the UNFCCC for such pledges.	Rejected - Legally speaking this comment is correct. However the pledge is generally known as the Copenhagen Pledge and exactly this language is used in chapter 6 (ref. to Fig. 6.34). What we do is to add the following after 'Copenhagen Conference' in p. 22, line 2, i.e. ', officially approved at COP16 in Cancun the next year,'. No action needed
14811	1	22	20			eliminate "…if not impossible…" This is is presented as if it is an analytical scientific result. It is not. It is a conclusoin based on a set of assumptions regarding whether society is capable of rallying the political will to achieve a appropriately ambitious mitigation pathway.	Taken into consideration - the text has been rewritten
16071	1	22	23	22	27	Scenario consideration is too complicated in the paragraph. Why not a graph?	Rejected - other chapters will address this in depth
16070	1	22	23	22	35	Same remark on the paragraph. Only fairly "mild" conditions are tested in the scenario, and not rather more radical options such as ban in some coal trade, drastic limitation of plane travel, quotas in the use of cement… So the implausibility of the 2°C scenario should be qualified e.g. "with policy already on the table".	Rejected - this comment is much too extreme and not linked to the scientific research. No action needed

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
14812	1	22	23		35	Again, this is reporting modeling results as scientific results, without acknowledging the sensitivity to assumptoins. Most importantly, the claim that emissions must peak around 2020 is based on optimal path assuming earnest reductions started today. That does not mean that meeting the 2c target *requires* emissions to peak by 2020 and is impossible otherwise. If earnest reductions do not start in the next few years, then the peaking year of the optimal path would be pushed out later than 2020, (with subsequent reductions greater than 4% and/or negative emissions to compensate for the delay). Please see section 6.2.3 "Interpretation of model infeasibility"	Taken into account - All figures will be redone. The new approach to figure 1.8 will focus exactly on the conditions. We will cite cumulative emissions from WG1/SPM as follows; 'The 2°C temperature target implies cumulative carbon emissions by 2100 to be below about 1000–1300 PgC in the set of scenarios considered, of which about 545 [460 to 630] PgC were already emitted by 2011 (AR5/WG1/SPM)'. If SPM will not be ready we can cite similar wordings from WG1/Ch.12/12.5.4.3 that describes as 'most likely value for the cumulative budget compatible with stabilization at 2°C of about 1000–1300 GtC, of which about 520 GtC have been emitted by 2011.
7887	1	22	23	22	35	The message seems to be that the 2° goal is (almost) out of reach. If this is the case, will (should?) mitigation still have priority? Please be more explicit about this point.	Rejected - we can't make that statement
17050	1	22	29	22	30	"… reduction of annual emissions by 4% per year THROUGH WHAT YEAR?"	Taken into account - Exact wordings are 'around 4% of 2000 emissions annually over a period of decades' p. 111. Change the text exactly as written in the literature.
6817	1	22	31			Drop 'nuclear' from this line. It is not possible to power up nuclear in time to meet these timeframes - see above. Furthermore, any signicant investment in nuclear acts as a wasteed financial resource sink lowering the potential for faster methods, ie renewables.	Rejected - The idea is to expand all near-zero sources, including nuclear
11898	1	22	31	22	32	For "nuclear power", consider to mention the Fukushima accident may affect the policy of the use of nuclear power; as it has been mentioned in page 10, line 50.	Rejected - not needed here--too much detail. We discuss that earlier
12614	1	22	32	22	32	Bioenergy and CCS is a very valid technology but may be constrained by the availability of sustainable biomass. This must be taken into account when estimating the infultration of bio CCS into any overshoot scenario.	Taken into account - The comment is correct. What the literature and the text shows, however, is that without all technologies including BECS, 2.6W/m2 can not be achieved. No action needed
12657	1	22	32	22	32	Bioenergy and CCS is a very valid technology but may be constrained by the availability of sustainable biomass. This must be taken into account when estimating the infultration of bio CCS into any overshoot scenario.	Taken into account - combined with other comment. No action needed

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
11027	1	22	32			'It is uncertain at this stage whether all those conditions could be met. For example, in view of the Decision at COP 17 that "a protocol, a legal instrument or agreed outcome with legal force" applicable to all parties to take effect from 2020—the very year that global emissions would need to peak.' This is an understatement, i.e. the words should be strengthened to state: 'it is almost impossible at this stage that those conditions would be met, in view of the Decision that ….parties is to take effect from 2020—the very year that global emissions would need to peak. An assessment of risks and the need for policy strengthening will need to take into account likely implementation lags and the likely shortfall from full global participation, and the possibility that stronger top-down policy pressure may discourage participation.'	Taken into account - We have other comments (notably from USG) arguing that we strip out all interesting content related to such points. The text in this section has been rewritten
17051	1	22	34			It might be worth explainging why the year 2020 was chosen - some 8-9 yers after the agreement in Durban.	Rejected - we can offer no scientific explanation for this, only political ones, which is beyond the scope of this chapter.
11899	1	22	37	22	40	Consider to make this paragraph more simple and clear.	Noted - paragraph seems simple enough. No specific action suggested
18414	1	22	39		39	Please which ones?	Noted - insufficient information. No action needed
17047	1	22	4	22	7	See detailed comment on emissions gap presented in comment 84	Taken into account - combined with other comment
3888	1	22	42	22	42	Can the authority for the assertion that this is 'one of the most serious challenges' be cited and the reasons given for rejecting differing expert assessments (eg Lomborg's Copenhagen Consenus http://en.wikipedia.org/wiki/Copenhagen_Consensus)? Otherwise this looks like a statement of personal bias by the authors.	Rejected - this is the authors' assessment of a vast literautre, which is exactly what the authors were asked by ipcc to do
3891	1	22	44	22	47	This sentence confuses the humanitarian MDG goals with the urgent priorities of actual governments. The urgent priority for the Syrian government right now is to retain power. Once again the problem here is the absence in the chapter of a positive theory of the incentives that governments actually face. Where there is an inadequate understanding of the reasons for government failure, otherwise unjustified disappointment with political outcomes can lead to unreasonable disillusionment with democracy itself.	Accepted - line 43 edited to say: "only challenge. FOR EXAMPLE, a survey…"
18430	1	22				mitigation challenge Here the report is more realistic since considers almost impossible to avoid a 2C raise in global temperature. However, when it leaves hard data and enters in international politics it says that the adoption of measures consistent with a 2C scenario is uncertain (pag 22), when is clear that is also almost impossible. This happens in the same page: 22 paragraphs 3 and 4.	Rejected - We have lots of comments urging us to do the opposite--to talk about the feasiblity of 2 degrees. And some models (albeit with wacky assumptions) can reach 2 degrees
3565	1	22	12	22	12	Substitute "require" with "be"	This sentence was reworded in 1010. Comment no longer relevant

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
6871	1	22	13	22	17	Suggest to base this statement on (and refer to) the assessment provided by WGI Chapter 12, which is based on a number of peer-reviewed studies and different line of evidence, rather than relying on a single study only.	Taken into account - In WG1/CH.12, Climate Sensitivity remain unchanged, though pdf of CS shown in Box 12.1, Fig.1 shown in Ch. 12 of WG1 may be different from that in AR4. Also, at this moment no such study like Meinshause's has been published based on new pdf. Therefore we keep this as is. In addition, we add after the end of line 17, p. 22 the following; 'Meinshausen (2009) also calculated limiting cumulative CO2 emissions over 2000-2050 to 1000 GtCO2 (1440 GtCO2) yields a 25% (50%) probability of warming exceeding 2 degree since pre-industrialization'.
3566	1	22	14	22	14	Insert "the" before "probability"	Accepted - adopted suggested text
6872	1	22	18	22	18	Add reference to the relevant Chapters in WGI AR5 showing the past, present, and future projected evolution of GHG/aerosol concentrations: e.g., Chapters 2, 6, 11, 12.	Accepted - it should be noted that IPCC WG1 has no real insight into future evolution of concentrations, which is mainly a social science issue. Added to end of sentence at line 20 xrefs to IPCC WG1 chapters 2, 6, 11 and 12.
18131	1	22	2	22	6	Reference is made to the "Copenhagen conference" in line 2 and COP 15 in line 6. For ease of reading suggest changing the reference in line 2 to COP 15 in Copenhagen (2009).	Taken into account - combined with other comment. Sentence has been revised to reflect comment 1020
6516	1	22	21		22	Add a conditional clause, e.g.. ", if governments want to limit warming to about 2 degrees." to make it clear.	Accepted: edited line 22: "...must be AGGRESSIVELY EXPANDED if DIFFICULT GOALS SUCH AS STOPPING WARMING AT 2 DEGREES ARE TO BE ACHIEVED."
6873	1	22	24	22	24	This should probably say "Integrated Assessment Modelling Community" rather than "Climate Modelling Community".	Accepted: edited to say "integrated assessment and energy and emissions modeling communities"
6874	1	22	26	22	28	Need to base this statement regarding the 2°C climate target on WGI AR5, see Chapter 12 WGI AR5.	Rejected - The statement will be based on what the IAM work, which we review, will say. No action needed

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
3890	1	22	37	23	21	This section ends with a paragraph that suggests that the Mitigation challenges and strategies problem is to use CBA to assess trade-offs, difficult though this is. This means that the section omits consideration of the problem of political processes and incentives. For example, what arrangements would incentivise a governing elite to put mitigation ahead of retaining power? To help readers understand why it is so hard to get politicians to 'do the right thing' in the light of the best available CBA the chapter needs needs to undertake a positive analysis of the actual incentives of bureaucrats and politicians. Arelated need is to explain how the efficacy of government actio is limited by inadequate information.	Rejected - politics, where it is assessed scientificially, is suffused throughout the chapter--to the degree that lots of other comments urge us to pull back. We can't do a full blown positive political economy of policy choices here.
15453	1	22	41			The descrption here is not fair because it fails to mention there could also be interaction between climate change and those sustianble development issues and they are not limited to "tradoffs." Climate change can worsen some of the SD issues mentioned here by making conditions hard. For example, extreme poverty can be worsened by droughts and some other extreme weather events due to climate change. It is generally agreed that climate change can have negative impacts on efforts to prevent malaria. Hence, only stressing "trade offs" would miss an important point. This point should be mentioned even if the section is mainly about "challenges" and the authors want to focus on the aspect of challgenges.	Rejected - there's a LOT of discussion of interaction of priorities. No more needed. Text around co-benefits redone and text revised
18132	1	22	44	22	47	It would be good to list all 8 MDGs or say that those given are examples.	Rejected - beyond the scope of our chapter. No action needed
11028	1	23				The text states: 'MDGs are unquestionably the urgent issues human beings should cope with immediately and globally. Achieving such goals along with an even broader array of human aspirations is what many governments mean by "sustainable development"…'. The first part of this is a value judgment, and could be better phrased as: 'MDGs represent an important and widely supported crystallisation of the priorities for human welfare, immediately and globally.' The second part needs to acknowledge that SD encompasses environmental goals. The following is preferred: 'Achieving such goals along with an even broader array of human aspirations including protection of the environment is what many governments mean by "sustainable development"…'	Rejected - I think our text is ok. No action needed.
15255	1	23	11			compare with 'growth'	Noted - insufficient information. No action needed
8408	1	23	14	23	14	I suggest to avoid defining such kind of exercises "essential". Maybe they could be of some methodological interest, but it's hard to believe that could really be of some interest for policymakers. Different problems have different temporal and spatial scales, and it does not make much sense to assume that it is possible to address only one problem at the time, and that there is just one actor. Furthermore, one of the references quoted (Lomborg 2004) is not peer reviewed and a lot of analysis made by the author and used in such exercises have been identified as very weak, if not completely biased (i.e., Realclimate 11/8/2009: A biased economic analysis of geoengineering). The major part of the work of the Copenhagen Consensus doesn't involve much science and it is not peer reviewed. I suggest you delete this reference that only generates confusion.	Taken into account - deleted this phrase and the two cites: "...worthy—such endeavors are both essential and highly controversial (e.g., Lomborg (2004); Sachs (2004)."
14813	1	23	14			It is probably not advisable to cite authors whose writings have been roundly discredited by climate scientists.	Taken into account - combined with other comment
10064	1	23	14	23	21	Are there any more recent references to cite?	Taken into account - combined with other comment
7157	1	23	14, 21, 44			Remove all unnecessary parantheses.	Accepted – copyedit to be completed prior to publication

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
15538	1	23	15		17	The difficulties are well illustrated in the discussion of US CBA guidelines in Dietz, S (2012). 'The Treatment of Risk and Uncertainty in the US Social Cost of Carbon for Regulatory Impact Analysis' Economics The Open-Access Open-Assessment E Journal Vol. 6, 2012-18. http://dx.doi.org/10.5018/economics-ejournal.ja.2012-18	Rejected - text is fine--it already makes these points. No action needed
14814	1	23	16		17	CBA is not a good example here, given its problems when applied to issues such as climate with intergenerational considerations, value-laden tradeoffs, and profound uncertainties of possibly catastrophic magnitude (a la Weitzman).	Accepted - deleted citation to "Azar" cited at line 21 and added citation also to Weitzman (2009) and to Nussbaum (see comment 1062)
17052	1	23	16	23	17	Explain why applying such techniques for making tradeoffs is extremely difficult difficult in such settings - due to unknwon discount rates, etc.?	Rejected - we already provide several examples (e.g. monetization), low probabilities, extreme impacts. We deal with this satisfactorily
17053	1	23	18			Inserting "such as equity" is unncesary. "Equity" is a laoded term in the UNFCCC context - and as previous AR's have shown, it has over a dozen definitions. Therefore, it should be avoided, unless it is made crystal clear what it refers to. Here, the conversation is about the Millenium Development Goalds and one ough to check to see if "equity" is one of them.	Rejected - the MDG is an illustration of the kinds of tradeoffs involved. And so is equity--a term we choose because it has many definitions-- an illustration. Other comments like 1060 urge us to do opposite. Text is fine
11406	1	23	18	23	19	The reference to "important goals such as equity" should be further expanded with a more substantial and balanced discussion of the concept and the application of equity in the context of climate change policy and actions (see e.g. Martin Khor, The Equitable Sharing of Atmospheric and Development Space: Some Critical Aspects (Research Paper 33, South Centre, November 2010)	Rejected - other comments (1059) urge us to do opposite. I think we are fine here
15256	1	23	19			why is 'equity' difficult?	Taken into account - combined with other comments
3313	1	23	19	23	19	After "monetized," I'd add two citations to theoretical sources challenging the coherence of CBA for climate change equity: Gardiner (2011) (cited above) and Martha Nussbaum (2000) “The Costs of Tragedy: Some Moral Limits of Cost-Benefit Analysis.” Journal of Legal Studies, 29: 1005-36	Taken into account - combined with other comments
17054	1	23	21			This last sentence could stand to have this addition, " market damages, TO SAY NOTHING OF COUNTING EMISSIONS ACCURATELY TO BEGIN WITH."	Rejected - there are LOTS of embellishments possible. Text is fine
8781	1	23	22	24	34	Little consideration of the implications for (mitigation) policy of the uncertainties and difficulties of prediction of the consequences of climate change. Charlesworth M & Okereke C (2010, Policy responses to rapid climate change: An epistemological critique of dominant approaches, Global Environ. Change, 20:121-129, doi:10.1016/j.gloenvcha.2009.09.001) provides some pointers, the most obvious being precaution.	Rejected - we don't' have space to cover everything here. This is a very short paragraph and points to chapter 2.
15257	1	23	23			please highlight "risk management under uncertainty" (its crucial)	Rejected - that's why we have a whole section on it -- no action needed
3892	1	23	23	23	23	Can the authors cite an authority for asserting that the policy challenge is one of risk management under uncertainty? Perhaps it is the policy elite's key challenge, but is it decision-makers's key challenge? Is it not a greater problem that politicians want to get re-elected and that they fear that if they go very far down the mitigation path they will get thrown out of office?	Rejected - our task is the decision-maker's challenge related to mitigation - no action needed

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
8409	1	23	24	23	24	The control of emissions will impose costs on national economies, but the exact amount is uncertain. I would add that the control of emissions will impose also benefits on national economies, and also their exact amount is uncertain. So I suggest to write: “The control of emissions will impose either costs or benefits on national economies, but the exact amount is uncertain.	Taken into account - we have an edit much earlier in the chapter that makes that point; no need to make it again.
17055	1	23	25	23	26	This sentence could stand to have this addition, "to allow for flexibility, OR IF EARTH'S CLIMATE SENSITIVITY IS NOT WHAT WE THINK IT IS."	Rejected - this sentence is an illustration that is brief for clarity. Adding lots of other illustrations will junk up the text
11353	1	23	25	23	26	This statement can be supported by literature (for example, Stavins (1995, Journal of Environmental Economics and Management, doi:10.1006/jeem.1995.1036)?).	Rejected - there's a LOT of literature on this topic; point here is just an illustration and then to set up this topic being addressed in more detail in chapter 2
8478	1	23	27		29	Policy design has a specific meaning an context in policy analysis that is not apparent here. See the 1987 text by Bobrow and Dryzek (Policy Analysis by Design) which speaks to the importance of values and critical theory to policy.	Rejected - Our intention for the word "design' is basic and we don't think we need a citation here to make this point.
13682	1	23	27	23	27	Insert after "... energy systems.": "or policy instruments are more efficient than predicted. In this context, market mechanisms have shown in the last decade that they can mobilize cheap reductions (see Michaelowa 2012)." Reference: Michaelowa, A. (2012): Manoeuvring climate finance around the pitfalls, in: Michaelowa, A. (ed.): Carbon markets or climate finance?, Routledge, Abingdon, p. 255-265	Taken into account - added a sentence at line 27: " "... energy systems.": "or policy instruments are more efficient than predicted. In this context, the experience with market mechanisms reveals that they can mobilize inexpensive reductions in some settings (see Michaelowa 2012)."
11900	1	23	29			Is this "Metcalf, 2009" an available peer-review reference?	Noted - yes--see reference list. No action needed
14815	1	23	30			delete "Perhaps". The potential consequences are unquestionably more uncertain.	Rejected - actually I don't think anyone really knows this--hence we are more cautious in our language. No action needed
15258	1	23	31			essential to factor in understanding of feedbacks in forecasts!	Noted - yes. No action needed
17056	1	23	31	23	34	if there is not yet a source for this proclamation, do NOT include the statement as fact.	Rejected - this is in fact exactly where the science is headed. But when we wrote the draft we didn't have WG2 report. Now we do
4023	1	23	33	24	2	the authors might wish to base the discussion on UNEP 2011, where the most recent scientific knowledge on black carbon has been assessed in a comprehensive manner. The level of uncertainty is now much lower. Clearly, mitigating black carbon emissions would very likely reduce the anthropogenic radiative forcing in spite of side effects, which have been rightly pointed out by Chen and other researhers.	Rejected - we cite this elswhere and extensively. No action needed
11354	1	23	33	23	34	Sea level rise and ecosystem impact mentioned after "for example" are not exactly examples of climate feedbacks	Rejected - that's why we have the phrase "along with…" on line 32

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
14816	1	23	35			"…and may also lessen uncertainty". It is not clear what this refers to.	Taken into account - edited sentence to say: "may also lessen uncertainty IN THE ASSESSMENT OF POSSIBLE AND PROBABLE IMPACTS World Bank…"
14817	1	23	36			Not clear that the para starting "Risk management…" is useful here.	Rejected - it is very useful because it is added the temporal dimension. No action needed
17411	1	23	38			This would be a good place to refer to the potential of AFOLU mitigation strategies.	Taken into account - afolu added in several places
10476	1	23	38			Maybe a footnote to define short-lived and long-lived for the reader.	Taken into account - From revisions, there is now a more careful discussion of GWPs and time horizons earlier in the chapter. That should be sufficient. Also, readers can find the definition in glossary.
17740	1	23	39			give reference to the chapters when you write "elsewhere"	Accepted - at line 39: added cite to "IPCC WG1, chapter 8"
16339	1	23	4	23	7	This section mentions the MDGs and refers to the recent Rio+20 agreement. My comment is that it was agreed at Rio+20 (paragraphs 245-251) that a set of "Sustainable Development Goals" will be developed. I think that this should be mentioned in WGIII report, as I think this will be an important way that nations will be delivering truly sustainable development and so mitigation strategies post 2015. The document says that the SDG's should be "action oriented, concise and easy to communicate, limited in number, aspirational, global in nature and universally applicable to all countries while taking into account different national realities, capacities and levels of development and respecting national policies and priorities. (...) Governments should drive implementation with the active involvement of all relevant stakeholders (.....) progress towards the achievement of the goals needs to be assessed and accompanied by targets and indicators (....) The document states that a working group will be set up of experts to report to the 68th session of the UN. There is a process where stakeholders will be able to input to this expert panel and to the UN. IPCC and readers of the IPCC report should be making sure that they have the right science to base the goals on. The UN will be looking for this. The SDG's are expected to be the mainstay of the post 2015 development agenda	Rejected - At this stage I don't think we need to do this. There remains lots of uncertainty about whether/how the SDGs will actually be developed and whether they will be useful. If we are writing for the year 2014 and beyond who knows if this will be consquential. But the MDGs (which we use here JUST as an illustration for tradeoffs (see comment 1059) have proven to be relevant
11355	1	23	41	23	45	Here the could state explicitly the importance to strike a balance between the abatement of short-lived climate forcers (e.g. black carbon) and that of long-lived climate forcers (e.g. CO2) (Berntsen, 2010, Climatic Change Letters, 10.1007/s10584-010-9941-3).	Rejected - our cites here (e.g. Ramanthan and Xu and the UNEP report) make exactly that point. No action needed
4473	1	23	44	23	45	The other side of the coin is that any of the large nations or blocs (e.g., the U.S., China, the EU) can by itself cause dangerous interference with the climate if its emissions grow unchecked. Thus, each of the largest nations has some individual incentive to reduce emissions and to press for coordinated action.	Rejected - we agree and we make that point elsewhere (citing to Victor et al 2012 in Foreign Affairs). no action needed.
17057	1	23	44			The Shindell et al. paper in Sciecne (2012) ought to be cited here.	Rejected - we cite that a lot elswhere. We don't need to cite it every time we mention slcps

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
12226	1	23	45	23	47	The finding from Chen et al deserves an explanation. Also, a judgement of what the majority of studies find should be included. As this sentence stands now, I read that it is as likely as not that BC warms the atmosphere. Also, the snow and ice effect of BC should be mentioned to give the reader an idea of the total climate effect of mitigating BC.	Taken into account - this text is an illustration and is getting already too long and off point. Text shortened -- delete p.23 line 45 ("It should be noted…") through p.24, line 2. Replaced with: "A climate change mitigation strategy that places emphasis on short-lived climate pollutants also has implicaitons for the choice of GWPs and could favor GWPs with time horizons shorter than the 100 year values that essentially all policy makers have adopted to date."
17058	1	23	45	23	47	This statement regardign BC effect on clouds is not necessarily a scientific consensus by any means and therefore it is misleading to include it. What is a scientific consensus is that sulfate aerosol is a far superior cloud condensation nucleus than BC aerosol.	Rejected - see 1087. Just because eveyone doesn't agree 100% doesn't mean we shouldn't mention this--espeically if lots of governments adopt SLCP strategies. No action needed
11356	1	23	45	23	47	One could add the point here that removing sulfate aerosols may result in a short-term warming (e.g. Andreae et al., 2005, Nature, 10.1038/nature03671; Armour and Roe, 2011, Geophysical Research Letters, 10.1029/2010gl045850; Tanaka and Raddatz, 2012, Climatic Change Letters, 10.1007/s10584-011-0323-2).	Rejected - this point is addressed in WG1 and not essential for us here. No action needed
10477	1	23	48			For short-lived, cross reference Section 8.2	Sentence has been removed. Comment no longer relevant
8477	1	23	8		11	This presents sustainable development as an outcome, rather than as a process. SD may never be attainable.	Rejected - language throughout is very process and balancing and evaluation. That is process, not just outcome. No action needed
17651	1	23	8	23	21	This paragraph could list some more and more recent references, e.g. more recent literature concerning low probability but high risk events.	Taken into account - combined with other comment. We have referred risk management and fat tail issues to chapter 2. Our chapter has space only for general issues
7888	1	23	8	23	21	Lomborg's work is genreally regarded as poor science and contains many obvious flaws (e.g. see the many critical comments in Nature and Science on his book "The Skeptical Environmentalist"). It comes at a great surpise that Lomborgs ill-founded "message" resurfaces in this report. In addition, we doubt that CBA is of much use in identifying justifiable climate policies. All CBAs provided so far (most notably those of Nordhaus, Tol, Weitzmann) are vulnerable to serious challenges raised in the literature (e.g. Hampicke 2011, Betz 2006, Randal 2002, Broome 1992, Ott/Baatz 2012, Baum 2009). The many problems of using CBA to clalculate "optimal" policies were already discussed in the 90s (at least in Germany, see for example Rohner/Edenhofer 1996). Rather than pointing out the importance of CBA you should refer to chapter 3 where some of its merits and drawbacks are discussed. See also comment 44.	Taken into account - combined with other comment. At end of this paragraph in addition to new cites suggested above also add crossref to IPCC WG3 chapter 3.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
10264	1	23	8			Fresh reference:Routa, J., Kellomäki, S., Kilpeläinen, A., Peltola, H. and Strandman, H. 2011. Effects of forest management on the CO2 emissions of wood energy in integrated production of timber and energy biomass. GCB Bioenergy 3: 483–497. Citation from the article: "In general, forest bioenergy supply chains seem to be effective; i.e. the energy consumption was 2–3% of produced energy and the CO2 emissions are 4–7 kgCO2 eqMWhpa 1 (Wihersaari & Palosuo, 2000). This held also for this study, with the energy consumption varying in the range 2.2–2.8% of that produced in the energy supply chain."	Rejected - thank you for the cite, but it doesn't fit here at all. This is about mitigation potential of forestry programs, which belongs in the chapter that deals with that. No action needed
3889	1	23	8	23	8	The statement that "all" countries seek sustainable development flies in the face of the sober reality of oppressive authoritarian regimes that demonstrate, when the need arises, their willingness to kill as many of 'their' people as is necessary in order to retain power. Again there is a need to distinguish between pious statements of good intent, and the real priorities of despotic (and other) regimes.	Rejected - hence we have the phrase "in different ways" on that very same line. It depends on the objective function. This comment takes us far from our team's task. No action needed
18431	1	23				Reconciling priorities and SD There is again a remarkable optimism regarding the adoption of SD path by “all countries” (pag 23, paragraph 2). This is inaccurate; most societies live within short-term scenarios. Most of them have economic growth concerns, fewer might have equality concerns, but this does not mean that they are acting considering the long-run or future generations. Those are exceptions, not the rule.	Rejected - it depends on the relative weight that countries give to such varied factors. This comment relates to 1095. No action needed
4251	1	23	1	23	2	The threshold of $1 per day has been revised by the World Bank to $1.25 per day for the definition of absolute poverty	Accepted - Although the MDG refers to USD 1 per day as the threshold all statistics reported after 2005 considers USD 1.25 as the threshold. Text updated to reflect $1.25
3568	1	23	21	23	21	Strange with only one reference to a really huge literature.	Taken into account - combined with other comments. see comment 1057 and 1093 and other edits that addresses this
3567	1	23	8	23	8	Replace "places" with "puts"	Accepted - text revised
16072	1	23	23	24	18	This section describes chapter 2, why not insist on the new body of knowledge in this chapter compared with AR4?	Rejected - because this is an introduction to WG3 and our purpose is to introduce other chapters, issues and themes. No action needed
6875	1	23	31	23	34	Suggest to refer here to the relevant Chapters of WGI AR5, e.g., Chapters 11, 12, 13, 14, Annex I: Atlas of Global and Regional Climate Projections.	Accepted - at lines 33-34 cite: "(later add citation to relevant parts of IPCC WG2; SEE ALSO IPCC WG1, CHAPTERS 11-14 AND ANNEX I).
11583	1	23	36	24	2	There is a considerable body of work on short lived climate pollutants. Its also clear what technologies are required to deal with them. This work should not be confused with the requirements and the commitments to bring down the GHG concentrations in the atmosphere.	Rejected - text is fine and accurate as is. Other edits will shorten and focus, for example see comment 1087. no action needed

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
6876	1	23	39	23	39	Please refer to WGI AR5 Chapters, e.g., 2, 6, and/or 8.	Taken into account - another edit above adds xref to chapter 8--thanks. No further action needed
6877	1	23	45	23	47	Please refer to WGI AR5 Chapter 7.	Sentence has been removed. Comment no longer relevant
6878	1	23	47	24	2	It seems crucial here to refer to WGI AR5 when discussing an assessment of atmospheric perturbation life time etc.. The atmospheric lifetimes of perturbations of different GHGs and aerosols are discussed in detail in WGI AR5 Chapters: Chapters 2, 6, and/or 8.	we have deleted this text and added other xrefs to WG1. Comment no longer relevant
17696	1	23	8	24	18	Why is the Precautionary principle not mentioned?	Rejected - because there are lots of things that could be mentioned; our purpose is to illustrate the tradeoffs. No action needed
17059	1	24	1	24	2	this statement demands expansion and quantification. See, for example, the Guan et al study in Nature Climate Change (2012) on China's Gigaton emissions gap	text is deleted. Comment no longer relevant
17061	1	24	10	24	14	These examples are not "extremes" in the common understanding like cyclones, droughts, floods. Rather, these are abrupt climate changes and/or tipping points/thresholds. This is a very important difference to make. Refer to WG1 colleagues for further clarification.	Rejected - this comment is incorrect. These are "extreme climate impacts" which is our phrasing, and the pieces we cite here do the same.
14333	1	24	14	24	16	This sentence suggests that geoengineering may be a "risk managment approach" that could reduce uncertainties or crudely offset impacts of climate change. Yet all recent studies emphaisze (i) the uncertainties around the potential impacts of geoengineering and (ii) the time it would take to makes geoengineering techniques work, cf for instance Williamson, P., Watson, R.T., Mace, G., Artaxo, P., Bodle, R., Galaz, V., Parker, A., Santillo, D., Vivian, C., Cooper, D., Webbe, J., Cung, A. and E. Woods (2012). Impacts of Climate-Related Geoengineering on Biological Diversity. Part I of: Geoengineering in Relation to the Convention on Biological Diversity: Technical and Regulatory Matters. Secretariat of the Convention on Biological Diversity. Montreal, Technical Series No. 66	Rejected - this is a massive mis-statement of the literature. Almost all recent studies have, in fact, looked at risks and benefits and tried to develop some frameworks. And it is that balance that we are telegraphing here. No action needed
16075	1	24	14	24	15	"radical innovation" suggests that we invent from scratch new processes. In most cases, the scientific base does exist. Isn't our problem is more "development and implementation of best technology"?	Rejected - this comment doesn't apply to text cited. No action needed
16073	1	24	14	24	18	On Geoengineering, "a growing number of studies" is misleading. Many of these studies emphasis extra risk, and anything resembling a real life experiments is forbiddent (e.g. recent UK episodes) or at least very controversial. The paragraph should mention that risk is unknown, and that all notion of geo-engineering is (still) controversial.	Rejected - the text says exactly that and so do the pieces we cite. No further action needed
7158	1	24	14			Remove unnecessary paranthesis.	Editorial – copyedit to be completed prior to publication
7889	1	24	14	24	18	Again, crititcal literature on geoengineering is missing (see comment 22).	Taken into account - combined with other comments
15420	1	24	14		16	It is dangerous and misleading to suggest geongineering is a “risk management approach” when geoengineering technologies are largely speculative, with unknown short- and long-term impacts on climate, environment and biodiversity. Reference to geoengineering as an element of a risk management approach should be DELETED.	Rejected - This is not what we say and we disagree that the effects are "unkonwn". They may be uncertain and involve balancing of risks--which is exactly what we say. Geoengineering is a topic that must be discussed. No further action needed

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
16076	1	24	15	24	15	The sentence implies that change is mainly technology. In many cases, especially in the industrialized world, there is now a dimension of limiting uses ("la sobriété") that should be also proposed.	Rejected - this point is not relevant here--we are talking about risk management and geoegineering, not "limiting uses". No action needed
14368	1	24	15			Unfortunate to give a boost to geoengineering, given the risks.	Rejected - we are not giving a boost. We are adding it to the discussion. No action needed
14818	1	24	15			add "…. may be able crudely to offset the impacts of some climate change while imposing other risks."	Taken into account - I like this edit, but it makes for a complicated sentence. Let's add the idea in the next sentence. line 17 to say "…technology, possible IMPACTS AND RISKS OF TESTING AND DEPLOYING GEOENGINEERING, AND STRATEGIES that might be needed…"
15259	1	24	16	24	18	fools gold?	Noted - insufficient information. No action needed
14334	1	24	16	24	18	see comment to p. 14 line 28-30: The literature cited does not cover current key aspects of geoengineering governance and ist interrelation with mitigation policy More recent literature such aspects includes e.g.: - Bodle, R., with Homan, G., Schiele, S., and E. Tedsen (2012). Regulatory Framework for ClimateRelated Geoengineering Relevant to the Convention on Biological Diversity Part II of: Geoengineering in Relation to the Convention on Biological Diversity Technical and Regulatory Matters Secretariat of the Convention on Biological Diversity. Montreal, Technical Series No. 66; - Bodle, Ralph, "International governance of geoengineering Rationale, functions and forum", in: William C.G. Burns and A. Strauss, (eds.), Climate Change Geoengineering Legal, Political and Philosophical Perspectives, Cambridge: Cambridge University Press (submitted February 2011; in press); - Lin A.C., International Legal Regimes & Principles Relevant to Geoengineering (in press). In: W.C.G. Burns and A. Strauss, (eds.), Climate Change Geoengineering Legal, Political and Philosophical Perspectives Cambridge: Cambridge University Press, Cambridge (submitted 2011, in press); - Rickels, W.; Klepper, G.; Dovern, J.; Betz, G.; Brachatzek, N.; Cacean, S.; G ssow, K.; Heintzenberg J.; Hiller, S.; Hoose, C.; Leisner, T.; Oschlies, A.; Platt, U.; Proelß, A.; Renn, O.; Sch fer, S.; Z rn M. (2011): Large-Scale Intentional Interventions into the Climate System? Assessing the Climate Engineering Debate Scoping report conducted on behalf of the German Federal Ministry of Education and Research (BMBF), Kiel Earth Institute, Kiel, available at http://www.fona.de/mediathek/pdf/Climate_Engineering_engl.pd	we cover the landscape, including with a new cross ref to chapter 6.9.
11029	1	24	16			Geoengineering needs to be represented in a balanced way if it is to be introduced here at all. Its perverse effects should be noted. For example, after Cicerone 2006, insert the words: 'The perverse effects of geoengineering will need to be considered in policy analysis – in particular, the likelihood that 'successful' application of a geoengineering solution to reduce temperatures may induce complacency about emission control, and that apparent 'success' may distract from failure in areas such as ocean acidification.'	our text says pretty much exactly that. And so do the things we cite. No further action needed
8969	1	24	16		18	These studies indicate there really is no coherent "pland B" so that geoengineering is not a real option and its governance is quite speculative.	Rejected - text is balanced about risks and context -- no action needed

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
13680	1	24	16	24	18	Replace "Cicerone , 2006). Since AR 4 … Society 2009" by "(see Chapter 6.9)".	Accepted - added a cross reference to IPCC WG3, section 6.9.
15421	1	24	16			DELETE: "growing"	Rejected - bilbiometric analysis shows they are growing exponentially
12227	1	24	18	24	18	It might be worth to include the IPCC meeting report from the Workshop on geoengineering here.	we leave that to chapter 6. we have added xref to chapter 6.9
3064	1	24	18			For geoengineering, also cite the Novim report http://www.arxiv.org/abs/0907.5140 (2009)	Taken into account - combined with other comments
10478	1	24	18			Cross-reference to geoengineering section in main report.	we have done that now
15422	1	24	18			INSERT A NEW SENTENCE: However, geoengineering remains highly controversial, largely due to unknown and unintended impacts and the inability to contain effects within boundaries (i.e., geoengineering's effects will be transboundary) or to reverse unintended, negative effects of geoengineering; a global de facto moratorium on geoengineering techniques was agreed at the United Nations Convention on Biological Diversity (CBD) in 2010, preceded by a moratorium on ocean fertilization (one geoengineering technique) in 2008. (CBD decisions IX/16 C and X/33 paragraph 8w; see ETC Group, "The Geoengineering Moratorium under the UN Convention on Biological Diversity," 10 November 2010 [online] http://www.etcgroup.org/es/content/what-does-un-moratorium-geoengineering-mean)	Rejected - way too much detail. We have written 4 balanced lines and your edit proposes to more than double that text with a highly selective set of references. There is a lot of literature out there, we can't cite them all.
16074	1	24	21	24	21	Black carbon (soot) has recently been in the spotlight as important GHG without a global presence.	Noted - agreed, but no action needed
14819	1	24	25			Finl sentence: "As this is a global commons problem, an effective solution is possible only with international collective action."	Rejected - The suggested sentence says pretty much same thing as our sentence but with twice as many words. No action needed
17062	1	24	26			Rather than "unavoidable", perhaps use "essential if dangerous anthropogenic interfernece in the Earth system is to be avoided."	Rejected - I don't think we can say "essential" since there is a small chance that self-interest, low costs of abatement or tacit cooperation (a la Shelling and Downs/Rocke) could do this. Essential will come across as prescriptive
4862	1	24	28		29	{Add} Techn. development is discussed in the next section, but it should also be mentioned here: "coordination is also needed to share information about best practices {and technologies} in many areas	Rejected - we are severely space constrained. It is mentioned in next section and that is fine

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
8782	1	24	29	25	15	Logical tension between discussion of 'promising options for reducing emissions involve changes in behaviour' and 'without radical technology innovation deep reductions are not possible by 2050' should be clear; however, to illustrate - if changes in behaviour mean radical reduction in consumption of fossil fuels are achieved without technological change then innovation, though potentially welcome, is not essential. The history of technological innovations such as CFCs suggests that relying on technology is not a robust policy assumption. The second statement suggests a trenchant ideological position and a distinct lack of imagination.	Rejected - The CFC example in fact shows EXACTLY what we say--that changes in technology allowed (and accelerated) deep cuts in emissions. Changes in behavior may play a role; maybe not. But absent massive changes in behavior (which has not really been witnessed in most of international economic or environmental law--except perhaps some aspects of trade in endangered species) it is really tech change that matters
11148	1	24	3		8	States that scientific uncertainties involve investments across many intellectual disciplines and activities, such as engineering and the many fields of climate science (related to understanding the risks of climate change). But apart from understanding, what about the acceptability of those risks? Risks can never be quantified and explained with 100% rationality. there's always an emotional/ethical component involved, e.g. in assumptions underlying risk assessment models. I would therefore recommend that references are included to the scientific fields that study acceptability of risk as an ethical issue.	Taken into account - combined with other comments. We talk about risk management; we are adding a cite to Nussbaum's related work; and we point to chapters 2 and 3 that deal with these issues in depth. No further action needed
17060	1	24	3	24	18	this paragraph could benefit by reference to the National Academy of Sciences 2011 report, "Informing an Effective Response to Climate Change" in which iterative risk management and adapative governance were stressed as being critical to successful response to climate change.	Taken into account - combined with other comment. in response to another comment we have added an NAS citation
16077	1	24	37	24	40	The two mentions of geoengineering are too much. One could be enough mentioning "as an insurance". This is an introduction, not an editorial.	Rejected - the text is balanced and ok and brief. No action needed
7890	1	24	38	24	39	Even modest objectives such as delinking emissions from growth (which has already occurred in some countries) are portrayed as highly difficult to reach. Under this non-neutral and perhaps even prescriptive point of view more ambitious goals are to be regarded as utopian.	Rejected - but this is difficult and that's what most of the modeling shows. And some of the countries that supposedly are delinked have, in fact, not delinked because they have outsourced emissions through trade. And that's exactly what we say. No further action needed
17063	1	24	38	24	39	One could point to the results in the U.S. from 2011: Emissions declined by 2.4% while GDP grew by 1.8%. See http://www.eia.gov/todayinenergy/detail.cfm?id=7890&src=email	Rejected - this would be a dangerous fact to use since single year estimates are notorously unreliable signals of long term trends. Our figures will be updated.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
11030	1	24	39			The text states: 'Delinking GHG emissions from GDP growth will probably require massive changes in technology.' The emphasis on technology should be balanced by reference to changes in patterns of human behaviour, either here or elsewhere. I suggest 'Delinking GHG emissions from GDP growth will probably require large changes in technology and significant changes in human behaviour [see, for example, ….]''.	Rejected - In the most simple matter delinking emissions from GDP will require different technologies and also different ways how we use technologies. Having a statement to emphasize this hardware-software dichotomy would be quite useful in ch.1 especially in view of its otherwhise heavy tech-fix (nuclear, geoengineering, CCS) focus. No further action needed
17412	1	24	40			Discussion of technology innovation would be more appropriate if complemented by discussion of innovation in practices / behavior (eg, household energy use, transport choices, land use management alternatives, etc).	Taken into account - combined with other comments
4305	1	24	14	24	18	change „may“ to „might“; add „and to some degree systems that might be needed to govern geoengineering“ because none of the mentioned authors has provided a suitable, practical and much quoted model of governance	Taken into account - combined with other comments
6880	1	24	16	24	18	Ensure consistency with and reference to WGI Chapters 6 and 7 which do thoroughly assess the physical science basis of proposed geoengineering methods covered by CDR and SRM. Avoid reassessing the physical science basis component in WGIII. We suggest to also consider the cross-WG IPCC Expert Meeting Report on Geoengineering held in June 2011 (IPCC, 2012: Meeting Report of the Intergovernmental Panel on Climate Change Expert Meeting on Geoengineering [O. Edenhofer, R. Pichs-Madruga, Y. Sokona, C. Field, V. Barros, T.F. Stocker, Q. Dahe, J. Minx, K. Mach, G.-K. Plattner, S. Schlömer, G. Hansen, M. Mastrandrea (eds.)]. IPCC Working Group III Technical Support Unit, Potsdam Institute for Climate Impact Research, Potsdam, Germany, pp. 99.).	Rejected - we are not reassessing the physical science basis. What we are doing is pointing to the physcial science issues that relate to risk management--and here WG3 needs to address the topic. Added cross-reference after Cicerone citation to IPCC WG1, chapter 6
3569	1	24	2	24	2	"…that are particularly not well understood." replace with "…that are not always well understood."	Sentence was removed from previous edits. Comment no longer relevant
3570	1	24	5	24	5	"In climate these…" Replace with "In relation to climate change these…"	Accepted - adopted suggested changes
6879	1	24	7	24	7	Reference to WGI AR5 needed.	Taken into account - cross ref already added per previous comments. No further action needed
5387	1	24	20	24	20	climate issue --- should be --- climate change issue	Taken into account - combined with other comments
15715	1	24	20	24	34	This section contains language that could easily be perceived as being 'Policy Prescriptive', something the IPCC should stay away from, for instance: 'Collective action is needed at many fronts', or: 'Coordination is also essential on matters of finance since many international goals seek action by countries that are unwilling or unable to pay the cost fully themselves'. Better to phrase statements where some action is 'needed' in a conditional "if.. then" manner: "if certain objectives A and B are to be met, then actions X and Y are needed'). In addition, I suggest not to use expressions like "countries that are unwilling or unable to pay...", better to more neutral wording "countries that are not in a position to pay…'.	Rejected - we don't think our text is how is policy prescriptive. While we don't phrase this as IF, THEN when you read the paragraph in totality that is exactly what it says. No action needed

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
8410	1	24		25		I suggest to add in this section the importance of reshaping energy subsidies. Many analysis highlights that the price signal from subsidy phaseout would provide an incentive to use energy more efficiently, and trigger switching from fossil fuels to other fuels that emit less GHGs. Eliminating environmentally harmful subsidies must play a central role in national efforts to achieve a long-term transition to a truly sustainable and secure energy system.	Taken into account - combined with other comments. Subsidies are discussed earlier in the report and other edits add a phrase to underscore impact of subsidies (in response to a comment from William Cline). Text now ok
12086	1	24	38	24	39	The text states that "Delinking GHG emissions from GDP growth will probably require massive changes in technology." This incorrectly implies that Delinking GDP from GHG emissions has not been achieved yet anywhere with existing low carbon technologies. This text could be read by some "nontechnical" decision makers as implying that "delinking" is not technically possible yet until we have "new technical innovations". Yet "relative" Delinking of GDP from GHG emissions has been achieved in many counties including China from 1980-2000 (Please see Comment #3 above) and Absolute delinking of GDP from GHG emissions has been achieved by a few countries. These countries have achieved this using currently available technologies. Please see OECD (2011) Towards Green Growth: Monitoring Progress. OECD - the subsection on Decoupling GDP from greenhouse gas emission indicators.	Taken into account - combined with other comments
6301	1	24	38	24	39	"Delinking GHG emissions from GDP growth will probably require massive changes in technology." Consider adding "as well as changes in behavior." The report deals with this issue in an important way, so acknowledge it here.	Taken into account - combined with other comments
3571	1	24	40	24	40	"…vary in any ways…" should be "…vary in many ways…"	Accepted - text changed as suggested
3572	1	24	41	24	41	Replace ";" with "	Accepted - text changed as suggested
18248	1	24	45	24	47	To stimulate investment in appropriate technologies at the right time and place, The term “appropriate technologies” could be substituted by “opportunity technologies”. This because appropriate technology can be confused with the already coined term in the sense to be appropriate with the factors´ endowment. So I propose: To stimulate investment in opportunity technologies, that is at the right time and place, and to the right people,	Rejected - it could be confused, but "opportunity" is even worse--it has no obvious plain English meaning
15716	1	24	45	24	47	Again, policy prescriptive language: suggest to replace by "To stimulate investment in appropriate technologies at the right time and place, it will help if countries would consider the full life cycle…	Accepted - text changed as suggested
17697	1	24	20	24	34	Mitigating CC is providing a public good, some government will freeride	Noted - that's why we are talking about int'l cooperation
4863	1	25				1.4.5 In some areas the mitigation and the adaptation measures are closely interlinked (e.g. urban planning, construction, certain agricultural activities, forest management)..	Noted
17064	1	25	1	25	2	A discussion of David et al in Science (2010): "Future CO2 Emissions and Cliamte Change from Existing Energy Infrasutrcture" is warranted here.	Taken into account - per another comment we have added the Davis et al cite earlier in the chapter.
15260	1	25	13	25	15	current Intellectual Property system is a deterrent.	Noted - actually folks tend to over-state this. The mantra against IP is mostly political rhetoric (see GEA chapter 24 for a detailed assessment).

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
11031	1	25	15			The text states: 'They also agree that without radical technology innovation deep reductions are not possible by 2050' - this is again a judgment. It may be that extremely rapid and wide deployment of currently emerging technologies such as solar PV and electric vehicles, combined with behaviour change, would generate deep emission reductions – the case is not proven. I suggest 'A combination of wide deployment of emerging technologies, and radical technology innovation will increase the likelihood of deep emission reductions by 2050 being achieved.'	Taken into account - sentence has been removed
17065	1	25	15			Insert, "radical technology innovation, SUCH AS COST-EFFECTIVE CCS, deep reductions…"	Rejected - given all the complaints about CCS by other reviewers calling out CCS here--when we already have discussion of CCS in more detail elswhere in the chapter--seems unwise
15539	1	25	16		30	Should also mention changes in consumption patterns. That is a potentially important margin of adjustment.	Taken into account - discussion now mentions behavior and consumption
5318	1	25	16	25	19	"decreasing vulnerability to energy price volatility": If volatility of energy prices around a mean price are significantly lower than the cost of providing energy by renewable energy sources, it will still be better for consumers than to cope with some volatility than accept high costs for sure. Volatility is not per se bad!	Rejected - that is true in some settings but not others; and when you read the sentence in totality we are pointing to a wide array of factors that people cite as reasons for pursuing efficiency. Text is balanced
3036	1	25	16		30	This paragraph seems to imply adherence to the common misconception that rebound effects apply only or mostly to final consumers. Globally, only one-third of energy is consumed by households and for personal transportation, while two-thirds is consumed in the productive part of the economy ("embedded" energy), which provides goods and services [ref: ExxonMobil, The outlook for energy: a view to 2030, (2009) available at http://www.exxonmobil.com/Corporate/energy_o_view.aspx.]. Rebound effects may be quite large in the productive part of the economy (including industrial plus commercial plus commercial transportation sectors) [ref: H.D. Saunders, "Historical evidence for rebound in 30 US sectors, and a toolkit for rebound analysts," (2011, under review) available at http://works.bepress.com/harry_saunders/9/, showing historical magnitudes of direct effects alone at around 50% in the US productive economy]. Energy use responses to efficiency gains in this productive realm are driven by producers maximizing profits, not end-use consumer behavior that is susceptible to "education."	Taken into account - this paragraph is about efficiency, with just a passing mention of rebound effects. It is about the big picture. But we'll edit to clarify that. This sentence at line 28 replaced with : "While many policy efforts focus on end-use efficiency, improvements in efficiency are relevant across the entire value chain from primary energy supplies to final users."
17066	1	25	21			Perhaps cite California rolling brown-outs from several years ago and recent blackouts in India that left something like 10% of the world' population without power.	Rejected - too much detail for here
12228	1	25	22	25	22	It would be useful if some examples of barriers are given.	Taken into account - edit lines 22-23: "However, energy efficiency faces barriers when it comes to implementation—FOR EXAMPLE, THE DIFFICULTY IN OBTAINING RELIABLY INFORMATION ABOUT THE COST AND PERFORMANCE OF INSTALLING MORE EFFICIENT TECHNOLOGIES--THAT POLICY REFORMS CAN HELP TO ADDRESS."

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
15261	1	25	23			see point 23	Noted - insufficient information. No action needed
12229	1	25	24	25	26	It would be useful if some examples of rebound effect are given.	Taken into account - in light of comment 1162 I think we will just keep it simple and xref to the chapter in the main report
4094	1	25	25	25	26	why not reference Jevons to the rebound effect?	Rejected - The relevant chapter in the main body of the report addresses this. Jevons and company are prone to massive over- (and sometimes under-) statement
6435	1	25	25	25	26	Additional references for the rebound effect: Gifford, R., 2011. The dragons of inaction: psychological barriers that limit climate change mitigation and adaptation. American Psychologist 66 (4), 290-302; Druckman, A., Chitnis, M., Sorrell, S. and Jackson, T., Missing carbon reductions? Exploring rebound and backfire effects in UK households. Energy Policy 39 (6), 3572-3581; Freire-Gonzalez, J., Methods to empirically estimate direct and indirect rebound effect of energy-saving technological changes in households. Ecological Modelling 223 (1), 32-40; Ouyang, J.L., Long, E.S. and Hokao, K., Rebound effect in Chinese household energy efficiency and solution for mitigating it. Energy 35 (12), 5269-5276.	Rejected - this level of detail is too much for the introduction chapter. Rebound effects are discussed in Chapter 5. Comment has been redirected to ch 5 and ch 9 accordingly.
11149	1	25	26		30	States that there is a need to educate consumers about the financial and environmental benefits of rational energy use and the rebound effect, which will support effective consumer decisions. However throughout the document this statement is defied directly (on p 389 lines 8-9) as well as indirectly by explaining that consumers are not rational decision-makers and/or not primarily driven by environmental benefits, e.g. P38 lines 5-8; p45 lines 37-44; paragraph 2.3.1; p73 lines 21-24; p169 lines 4-13; 3.11.1.2. I suggest that not only cross-references to these sections are added but that the statement itself is adjusted or removed.	Rejected - This level of detail is too for one paragraph here. Edits (such as in response to 1164) will address this
17645	1	25	26	25	28	"Socail benefit" is also neseccisty of education for consumers in order to decide effective choices.	Rejected - in light of edits (see 1164) this sentence was deleted
4830	1	25	26	25	28	The notion that consumers need to be educated about financial and environmental benefits to induce behavioural change is much too simplified. Psychological research has shown (see also the following chapters) that education alone is not sufficient to induce change. Knowledge is a necessary but not sufficient to make people change their behaviour. See for example the literature review in Abrahamse, W., Steg, L., Vlek, C., & Rothengatter, T., (2005). A review of intervention studies aimed at household energy conservation. Journal of Environmental Psychology, 25, 273-291.	see comment 1170--Sentence will be deleted. But the point here is REALLY important and will be passed along to the chapter that addresses energy efficiency
17413	1	25	27			"educate consumers" is a fairly unsophisticated representation of the opportunity for mitigation through behavior changes -- this is an area of only emerging understanding, but it has become clear that simply "educating" members of the public is not sufficient and that economic, policy and social incentives often need adjustment if large-scale behavior change is to result. This comment applies to Ch 5, p 71, ln 22-26.	Taken into account - combined with other comments
15262	1	25	29			see point 23	Noted
17067	1	25	29			As stated, it is a weird and abrupt way to end the paragraph - and section. It would be improved if this section stated the barriers and examples of how those barriers have been overcome.	Rejected - this is implicit in all that is said earlier in the paragraph; see also response to 1164

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
7891	1	25	31	40		It is correct that climate policies are a triangular affair between mitigation, adaptation, and geoengineering. According to you, how the priorities are set depends on expectations ("if it is to be expected"). To make priorities dependent on the behavior of others, rather than on normative reasoning, is an ethical claim that should be debated in chapter 3.	Rejected - dependence on the behavior of others is the essence of strategic interaction. And it is core to essentially ALL research in international relations (and broadly now in cooperative theory in economics, going back to game theory). So raising these issues in this chapter is relevant, even if chapter 3 deals with them too
15278	1	25	31	25	31	"adaption" to be "adaptation"?	Accepted - spelling fixed
11901	1	25	33	25	34	"More countries…" please give examples; If possible, provide a reference.	Taken into account - edited: "…there has been a shift in emphasis to ADAPTATION.' DELETE the next sentence.
10682	1	25	33	25	34	"More countries are rightly focussing on adaptation" sounds policy prescriptive	Taken into account - combined with other comments
15263	1	25	34			but there is a danger that adaptation is at the cost of mitigation - is this a message we wish to be communicating think of the implications!	Noted - maybe or maybe not. But if adaptation is reality shouldn't we be talking about it? No action needed
15423	1	25	34		38	DELETE: "rightly" SENTENCE SHOULD READ: "More countries have been forced to focus on adaptation." (Countries affected by climate change must focus on adaptation, but it is not a choice.)	Taken into account - combined with other comments
14683	1	25	36	25	40	The two references in this sentence to geoengineering sit rather uneasily without further explanation and qualification; it reads very much as though they have been added in parentheses as place holders. If reference to geoengineering is to remain in this section, then it would be important to qualify that its full implications and effectiveness as a social-policy alternative or addition to mitigation or adaptation is not known	Rejected - we have expanded the discussion in this chapter to mention the controversy on geoengineering in a balanced manner. This is an important topic to address
11109	1	25	36	25	37	"If it is expected that global mitigation efforts will be limited, then adaptation (and perhaps also geoengineering) will play a larger role in overall policy strategy." - "will" should be replaced by "must". My personal belief is that we are too late to mitigate climate change, so a more important task will, and must, be to adapt as much as possible. While the report reflects this approach, I think all possible means should be exploited to emphasize the need for adaptation.	Reject - "must" is an inappropriate value judgement
15424	1	25	37		40	DELETE BOTH INSTANCES OF: "(and perhaps also prepare geoengineering)" -- one instance in line 37 and one in lines 39-40. Only a few scientists in a few countries are proposing geoengineering as a climate change response. It is premature (and radical) for the IPCC to suggest here that geoengineering will play a role, perhaps a large one, in overall policy strategy, on par with mitigation and adaptation.	Rejected - we have expanded the discussion in this chapter to mention the controversy on geoengineering in a balanced manner. This is an important topic to address
17741	1	25	38			list few adaptation measures here	Text has been rebalanced
17742	1	25	39			delete the words "and perhaps also prepare geoengineering"	Rejected - we have expanded the discussion in this chapter to mention the controversy on geoengineering in a balanced manner. This is an important topic to address

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
8970	1	25	39		40	Please omit the word "should" when referring to Geoengineering. The IPCC whole cloth approach should not be an endorsement of this.	Rejected - we have expanded the discussion in this chapter to mention the controversy on geoengineering in a balanced manner. This is an important topic to address
7356	1	25	40	25	47	An international element of "adaptiation" that is relevant here is the responsibility for emissions that have caused the impacts for which adaptiation is required. Coordination on providing just compensation to affected communities is an essential part of international cooperation, as agreed under the UNFCCC and should be referred to here.	Rejected - yes, but there isn't really any science on this. So for now we are just focusing on the shift in underlying realitis and what that means for social science
10480	1	25	41	25	47	Repetition of 1.4.3. Suggest merge	good point; for now we will leave it in place and look at overall flow after the editing.
7892	1	25	43	25	44	This sentence could be read as downplaying the responsibility of high emitting nations. It should be rephrased or made explicit that this is not the intention.	Rejected - the statement is just a fact. It is what motivates collective action and the central political challenge of the last 20 years on climate change.
17068	1	25	43			"Even the biggest nations…"; again, these nations should be listed so a complete snapshot of the current situation in the world is given, while also allowing posterity to read this report and assess what each nation has done, what impact it has had, etc.	Rejected - not needed; other figures offer that information, and our point here is a larger one about strategy.
13681	1	25	44	25	44	Replace "most" by "a significant share of". Reason: Many adaptation options are global, such as research on drought-resistant crops or early warning systems for large-scale meteorological diturbances such as El Nino.	Rejected - we don't agree
4864	1	25	46		47	The outcomes of the recent political negotiations on adaptation related cooperation contradict to this statement: "The need for (and difficulty of) achieving international collective action is less daunting".	Rejected the statement is correct. The international negotiations on this topic have been dealing with just a very small slice of adaptation--the int'l compensation aspect
7160	1	25	47			Use the expression "international collective mitigative action", rather than "international collective action". Add the word "mitigative" to describe the kind of action that is needed.	Taken into account - edited line 47: "...is PERHAPS less daunting THAN FOR MITIGATION…"

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
7161	1	25	49	26	3	The two sentences contained within these four lines (the first beginning with 'In general' and the second beginning with 'That insight') express what might be considered conventional wisdom. But I for one am not comfortable with them or the sentiment they express, principally because I find that they extend a false hope or false sense of optimism that somehow mature ecomomies are less sensitive to the weather than less developed economies. Yet currently, the US (an archetype for a mature economy) is suffering one of the worst droughts and heat spells in recored history. If these conditions persist for the next year or two (which is no longer a remote possibility) and crop production in the US falls by 1/3 to 1/2, it seems to me that the maturity of the economy is no guarantee that the US won't suffer as much or more than any less mature (or agrarian) economy. Especially if one considers that in the US most people have never really had to deal with hunger and famine, whereas many of the less mature economies have (at least to some level). I personally am no longer convinced that mature economies are less sensitive to shocks produced by the weather than any other economy, especially when allowing for how humans may react when sufficiently stressed and feeling misled by (and angry at) their political leaders. But countries encompassing large areas or more climatic regions may have more buffering capacity (and larger areas under cultivation) than smaller countries. But if the weather induced damage is sufficiently wide spread no economy is going to fare very well. I would recommend that these two sentences of the text be rewritten to empahsize that the climate situation is pressing (but clearly not hopeless, of course). But please do not give the impression that there are some ecomonies (meaning societies) that are more likely to suffer than others. In the long run (and maybe less than 1/2 century) all economies are going to suffer. And the situation is likely to become progressively worse with each passing year.	Rejected - but they are correct--pretty much all the impacts work shows that the impacts on people (and as a fraction of economic output) are higher for societies that depend more on the "outdoors" for livelihood. Thus lower income places (where dependence on agriuclture is high) are quite vulnerabilithy. And lower incomre usually narrows options. That result has been known for 30 years, was confirmed in the MINK studies among a zillion others, and is highly robust
9252	1	25	5	25	29	Mention could be made of the cross-technology ability to bank green energy, eg using excess solar, wind or hydro to pump compressed air underground for later use, instead of peak-supply fossil fuel plant. Also of the cominatio of biofuels and CCS, to take CO2 out of the atmosphere.	Rejected - This level of detail is too much here
3573	1	25	10	25	10	Replace "creating" with "creation"	Accepted - text changed
12087	1	25	14	25	15	This statement "They also agree that without radical technology innovation deep reductions are not possible by 2050 (IEA, 2010b)" is incorrect. There is a wealth of economic/technical "deep cuts" literature since the mid 1990s which shows that deep cuts to greenhouse gas emissions can be achieved with existing low carbon technologies by 2050.[See Comment #1 above] A full list of this literature can be provided if interested. Also, in the last 5 years, there is a new literature showing how nation's can meet 100% of their electricity needs with combinations of energy efficiency and renewable energy. Please see Elliston B, Diesendorf M, MacGill I, 2012, 'Simulations of Scenarios with 100% Renewable Electricity in the Australian National Electricity Market'. Energy Policy 45:606-613. http://www.ies.unsw.edu.au/docs/diesendorf-simulations.pdf This paper provides an overview of the literature here - 15 studies for different countries, regions of the world and also global studies on how nations, regions and the world can meet 80-100% of its energy needs through renewable energy.	Sentence has been deleted in the revisions.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
12089	1	25	16	25	20	Energy efficiency/energy conservation AND demand management strategies AND technologies are important because they can be implemented quickly between now and 2020. And the IEA's Energy and Green Growth report states that energy efficiency measures will achieve the majority of GHG mitigation by 2020. Gert Jan Kramer and Martin Haigh (2009) No quick switch to low carbon energy. Nature 462, 568-569 found that "Energy efficiency is the only strategy that has a chance ofenabling the achievement of greenhouse gas stabilization at 450ppm. This is because historically, - It takes 30 years to span the 1000-fold growth needed to get from low carbon energy supply pilot-plant scale up to 1-2% of the world's total primary energy supply -- a sustained growth rate of 26% pa. - After this, historically the deployment rises more linearly to its ultimate share in the energy mix, which depends on direct economic competitiveness at scale. As the authors explained "Our best chance of beating these deployment laws requires efforts on multiple fronts…One implication of the deployment laws is that more action is required on the demand side to increase efficiency and curtail consumption. The good news is that demand-side solutions are subject to different laws. In principle, everyone in the developed world could use less energy tomorrow."	Taken into account - see 1164 and 1170. Gert Jan Kramer and Martin Haigh (2009) is quite different from RCP 2.6. There is no description as 'Energy efficiency is the only strategy that has a chance of enabling the achievement of GHG stabilization at 450ppm'. Therefore, we will keep the text as is.
12088	1	25	25	25	26	The text currently states that "Efficiency improvements that lower service costs may directly or indirectly induce additional demand (rebound effect) for energy services, thus partly offset the efficiency gains (Sorrell et al., 2009; Lee and Wagner, 2012".....This should be qualified with a statement that "this risk of negative rebound effects can be significantly reduced through the implementation of effective policies....and reference the IPCC AR5 WGIII policy chapter" Please see European Commission (2011) Addressing Rebound Effects. EU Commission at http://ec.europa.eu/environment/eussd/pdf/rebound_effect_report.pdf	Taken into account - combined with other comments
5319	1	25	26	25	30	"There is need to educate consumers about the financial and environmental benefits of rational energy use and the rebound effect, which will support effective consumer choices." Here and in other chapters, the authors seem to make the assumption that consumers are systematically bounded rational and poorly informed. There may, however, be considerable hidden consumers switching cost, which are ignored. For example the new energy saving bulbs partially have a different light spectrum, which some consumers seem to find disturbing. Such preferences are not just irrational. There are also other environmental external costs through such bulbs, such as the emissions of quicksilver. Three comments about the rebound effect. 1) Rebound means that some new more energy efficient technology will be used more extensively than the old, less efficient technology . In this sense, some rebound is even socially optimal, because the high use rate may outweigh the social cost of additional use. (See the excellen book by Franz Wirl: "The economics of energy conservation programs," Kluwer, 1997 and articles cited in there. 2) Empirically observed rebound effects are often larger than optimal due to ill-defined incentives. Command and control, such as the EU-directive on light bulbs, induces a higher rebound rate than optimal regulation through prices would induce. So the rebound is not the consumers' fault in the first place, but the regulators' ill defined rules. This complex is actually well understood by energy economists. (See also Wirl, 1997). 3) To avoid rebound by education is an illusion (and probably highly costly)	Taken into account - combined with other comments

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
3575	1	25	28	25	29	Delete last sentence (repetition from line 22)	Taken into account - in response to other comments we have done that and replaced with a different sentence
4252	1	25	28			The rebound effect is unlikely to be affected much by education - surely a better approach is likely to be a carbon tax or similar mechanism	Taken into account - combined with other comments
3287	1	25	3	25	4	Add reference to chapter 13, International Cooperation, at the end of the sentence.	Accepted - added xref
11584	1	25	3	25	4	The word finance should be added	Accepted - edited to say: "…international cooperation, FINANCE, and technology…"
3574	1	25	23	25	23	Replace "The same time…" with "At the same time …"	Accepted - Thanks! Text updated
4253	1	25				There should be discussion of policies which combine both mitigation and adaptation e.g. Land use policies which can reduce the adverse impacts of climate change and greenhouse gas emissions or housing policies which combine both perspectives	Rejected - This is beyond the scope of our chapter. The urban planning chapter does this
14820	1	25				It is not at all clear that "Interactions bteween mitigation and adaptation" qualifies as one of the six "particularly notable challenges" worth including in sec 1.4. The notion of "balance" between the two is somewhat flawed, as the balance is actually occuring among the multitudinous objectives considered by policy makers (and choices made by consumers and citizens).	Taken into account - change section heading for 1.4.5 to "Rising Attention to Adaptation"
10479	1	25				Reference to WG II	Taken into account - will add cross reference
15096	1	25	31	25	31	Change:¨ Interactions between mitigation and ADAPTATION¨	Taken into account - combined with other comments. Title is changed
11585	1	25	32	26	6	This section needs to recognise that the heavy burden of adaptation is being forced on the vulnerable and poor countries who have not contributed to the climate change problem. These are the countries which are required to undertake mitigation actions and provide adaptation support.	Taken into account - combined with other comments.
12090	1	25	32	25	40	This paragraph and entire sub-section completely ignores mitigation and adaptation synergies. Please see IPCC AR4 WGIII Adaptation and Mitigation synergies for the Forestry Sector at http://www.ipcc.ch/publications_and_data/ar4/wg3/en/ch9s9-5-2.html More examples of mitigation/adaptation synergies can be provided.	Taken into consideration -we will consider rephrasing
12091	1	25	32	25	40	This paragraph and entire sub-section suggests that it is ok for nations to focus less on mitigation whilst focusing more on adaptation or vica versa. This ignores the fact that there is a scientific literature showing that there is a) a limitation to adaptation strategies for the worst case long term climate change scenarios for many countries [[Please see IPCC AR4 WGII on "Limits to Adaptation at http://www.ipcc.ch/publications_and_data/ar4/wg2/en/ch17s17-4-2.html" and b) therefore mitigation is essential to avoid these worst case climate change scenario's which risk pushing the socio-enviro-economic systems past points which they can adapt c) Finally, it is worth noting that developing countries will bear a high percentage of negative impacts from climate change. Developing countries have a relative lack of adaptive capacity and financial and other resources to apply all cost effective adaptation measures. See World Bank (2009 World Development Report. World Bank at http://siteresources.worldbank.org/INTWDRS/Resources/477365-1327504426766/8389626-1327510418796/Overview.pdfTherefore, based on these scientific and economic facts, and given the evidence in the literature [see Comment 1] significant mitigation is feasible technically and economically,.....the text could legitimately find that there is significant scientific and economic evidence to support nations choosing to prioritise both mitigation and adaptation simultaneously. This appears to a more scientifically sound approach rather than urging nations to choose either focus on mitigation or adaptation, as the current text appears to be implying.	Rejected - we don't say this at all. We say that adaptation is rising in importance. And we talk about some of the macro issues. The stuff about relative impacts on developing countries gets us even further afield.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
15097	1	25	37	25	37	Eliminate:(AND PERHAPS ALSO GEOENGINEERING)	Rejected - we have expanded the discussion in this chapter to mention the controversy on geoengineering in a balanced manner. This is an important topic to address
4306	1	25	37	25	40	delete text on geoengineering in brackets (line 37 and line 39/40) or mark it as „highly contested“	Rejected - we have expanded the discussion in this chapter to mention the controversy on geoengineering in a balanced manner. This is an important topic to address
15098	1	25	39	25	40	Eliminate: (AND PERHAPS ALSO PREPARE GEOENGINEERING)	Rejected - we have expanded the discussion in this chapter to mention the controversy on geoengineering in a balanced manner. This is an important topic to address
17698	1	25	16	25	30	Business case for Energy efficiency can be related to Energy Security	Rejected - too vague
17699	1	25	48	26	6	Even if it will be addressed later the tradeoff between adaptation and mitigation should be explained. Also the fact that the countries that will need to adapt more are the least responsible for CC.	Taken into account - Discussion on co-benefits has been beefed up but a detailed assessment of the topic is addressed elsewhere in the report.
17743	1	26				There should be a FAQ "What is climate change adaptation"	Taken into account - we will consider this
10836	1	26				I am not sure of the definition of mitigation. It is very broad. The way it is worded, world war, global recisions, etc, all seem to qualify as mitigation? I would have thought of mitigation as more of a deliberate act to reduce emissions. Consider changing	Taken into account - Replace 'occurs when any activity that results in' with 'is an activity with the purpose to reduce'.
9927	1	26				What's the implication of uncertainty in the report? Because uncertainties can be found not only in mitigation costs, technological change and cliamte change but also in modeling and analyzing. To make it clear, please make it clear what uncertainty is in AR5.	Rejected - we have addressed this extensively throughout, and chapters 2 and 3 do that as well. No action needed
7893	1	26	1	26	3	The stage model seems to re-emerge here ("mature"), see comment 28.	Rejected - see our responses to your many other comments on the stage model
17069	1	26	1			"… those that are least responsible for emissions" ; island states? much of Africa? ; again, these nations should be listed so a complete snapshot of the current situation in the world is given, while also allowing posterity to read this report and assess what each nation has done, what impact it has had, etc.	Rejected - we are making a macro point here--adding lots of country names will make it harder to read and understand accurately
13196	1	26	12	26	15	IPCC has always been very cautious not to retrict its analysis to anthropenic climate change and has always stressed the difference between the meaning of climate change, when used in an IPCC report oas opposed to the meaning in the UNFCCC framework where the climate change is the anthropgenic climate change only. This sentence should be deleted or rewritten to avoid contradiction with the WG I approach.	Accepted - definition will be revised

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
18415	1	26	16			Is a population policy that aims to reduce population growth and reduce emissions also mitigation? In that case you have to quote Chinas effort to control population. Emissions reduction from economic crisis? “any activity that results in emissions of greenhouse gases (GHG) in the atmosphere at levels lower than would otherwise occur”. This is misleading. Please use definition from AR4 until an assessment report changes the definition.	Rejected - we don't need to quote china in a FAQ. No action needed
5760	1	26	21	26	24	Please rephrase, e. g. "Anthropogenic GHGs mostly come from (…). A substantial fraction also … ."	Rejected - text is ok
17070	1	26	23	26	24	This should reference WG1 #'s and be quantified, such as "While msot GHG come from FF conversion (~60%), a substantial fraction also comes from other activities like agriculture (~20%), industrial processes (XX%) and municipal waste (~XX%)."	Taken into consideration - we were asked to write FAQs that were very short and simple. We will considering expanding the defintion.
12192	1	26	5		6	The term “more recently” is a) very vague and b) not correct. It is not correct with regard to 2 aspects: 1. already in the first decade there was a scientific and political debate on the trade-offs of between adaptation and mitigation and what the best policy strategy would be. 2. It is unclear what exactly you mean with “policy strategies”, but if you refer to the global level, the debate is an “older” rather than a “recent” one. Discourse on 'strategies' on adaptation started at least at the beginning of the second decade of UN climate negotiations leading to the Marrakesh Accords.	Rejected - edit at 1230 may be sufficient
7357	1	26	5	26	6	The international climate negotiations have always included an element focused on adaptation, including for example the "share of proceeds" agreement for the CDM under the Kyoto Protocol. It is true that the focus has increased significantly in the last five years but the "twenty years" characterisation is an overstatement and does not adequately reflect the detail of UNFCCC negotiations.	Rejected - edit at 1230 may be sufficient
12516	1	26	6			Change “contemplate” to “progress” -- work in adaptation has long since gone beyond “contemplation”	Accepted - edit to line 6: "…more recently begun EXTENSIVE DISCUSSIONS AND POLICY PLANNING ON THE strategies…"
12230	1	26	9	26	24	While the two FAQs included are important, more work should be considered in order to add FAQs on e.g. What do we need to do in order to meet the 2 deg target?, what is the difference between emissions reported to UNFCCC and emissions estimated form life cycle analysis or those including trade?, etc. etc.	Noted.
4040	1	26	3	26	6	Perhaps the debate or case for links between adaptation and mitigation should be more centred on the valued outcome. Both mitigation and adaptation are means to an end, the end being reducing losses to what is valued. Instead, the sentence (and indeed the whole section 1.4.5) seems to be framed in terms of adapation and mitigation as ends in themselves. However, for AR5, this framing of the probem should be updated to reflect the fact that we have now moved on from such framing (see Lynch, A. H.; Tryhorn, L.; & Abramson, R. (2008). Working at the Boundary: Facilitating Interdisciplinarity in Climate Change Adaptation Research. Bulletin of the American Meteorological Society, 89(2): 169-179).	Rejected - the extra cite is not needed here. The overall tone in the report is about goals--not mitigation and adaptation for their own sake.
11110	1	26				I don't think this FAQ is necessary. It does not say anything, and terms and definitions are usually parts of reports under the heading "Glossary". However, a compendium on climate change, including mitigation and adaptation, has been missing from the webpage of IPCC (many other organizations maintain such a website, or parts of their website is dedicated to climate change or its several aspects) - why IPCC could not develop and maintain such a website, based on its reports e.g., which could then be THE official scientific webpage of climate change for anyone in the world?	Noted.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
6881	1	26	12	26	15	The UNFCCC definition of climate change differs from the IPCC definition of climate change! The IPCC definition includes both natural and anthropogenic causes of climate change. Thus this FAQ, in our view, will be very misleading if it's meant to explain what in IPCC is meant with climate change mitigation, but starting off with a non-IPCC definition for climate change.	Noted.
7708	1	26	9			Only two FAQ in Chapter 1? For exmaple, the significance of Kyoto Protocol from the scientific and technological view point would be frequently asked by the general public.	Noted.
13257	1	26	23	26	24	Add deforestation in the following sentence: "While most GHGs come from fossil fuel conversion, a substantial part also come from other activities like agriculture, deforestation, industrial processes and municipal waste."	Taken into account - replace sentence at 23-24 with commentor's suggested sentence
18134	1	26	23	26	24	Deforestation as another source of emissions should be included here.	Taken into account - combined with other comment
16666	1	27				The chapter "makes arguments." This sounds prescriptive to me.	Taken into account - combined with other comment
15425	1	27	8		10	Geoengineering cannot claim “reducing economic loses due to productivity shocks” when geoengineering is largely speculative and its impacts are unknown; adverse impacts on the climate and economy, at least the climate and economy in some parts of the world, are as likely.	Rejected - in fact, in emergency mode this is exactly what people think geoengineering will do. Text ok.
16915	1	3		4		Six interesting points, unfortunate that the main chapter then quickly dives into “six major changes” (in section 1.2.1); this could be confusing for readers. I think there could be additions to either list. Regarding the “six arguments” in Exec Sum could consider a seventh, an observation along the following lines: This Fifth Assessment – and the more recent literature it draws upon – has been compiled during a period of unprecedented transition in global affairs spanning economics, geopolitics, international energy markets and the climate change negotiations themselves. This makes it exceptionally difficult to make robust predictions. The most obvious evidence from these trends lead to a pessimistic assessment of the prospects for rapid progress in tackling climate change, but in a time of major global transition, surprises leading to a rapid turnaround in the global trend of emissions cannot be ruled out.	Rejected -- The essential parts of the suggested 7th pointed are already covered.
9379	1	3		4		Even though a broad approach on diverse contributors to mitigation might be necessary to reach the goals, something more needs to be said about the role of governments, because they are still the most powerful institutions in terms of drafting laws and implementing regulations.	Rejected - text is balanced
4141	1	3	1	4	22	Please do not use probabilistic qualifiers ("is is likely", "it is very likely", "it is certain") with statements that you cannot underpin with data. I assume that you used these terms in a more colloqial sense but there is the risk to create confusion with regard to the IPCC calibrated uncertainty language.	Taken into account - text revised to use probalistic qualifiers more precisely
7438	1	3	1	26	21	This is a general comment on the whole report. At times it reads like a PhD thesis. It tries to cover every angle of ‘sustainable development’ and in my opinion gives far too many references.	Noted
7439	1	3	1	26	21	There is a distinct bias against so-called ‘traditional biomass’, which is defined as biomass, both processed and unprocessed used for cooking and heating by households in developing countries. It assumes that these households cook indoors with ‘green’ biomass on inefficient stoves.	Rejected - text is balanced in treatment of traditional biomass
7440	1	3	1	26	21	Their number has been put at 2.7 billion and is forecast to grow to 2.8 billion by 2020. Yet the only solution offered is to wean them away from biomass with electricity and/or liquid and gaseous fossil fuels.	Rejected - outside scope of this chapter
7441	1	3	1	26	21	Many households cook outside and about 10% cook with charcoal, which is a smokeless fuel with an energy value higher than most coals! Incidentally, nothing is said about people cooking with coal, which is more polluting than most biomass.	Rejected - too detailed for the purpose of this chapter
7442	1	3	1	26	21	There are simple and cheap ways to reduce indoor air pollution: namely, better ventilation, using dry biomass, improved stoves with chimneys, improved kitchen practices etc.	Rejected - outside scope of this chapter

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
7443	1	3	1	26	21	The paper also assumes that collecting fuelwood and residues places an undue burden on women and children, when they could be undertaking more productive tasks or going to school.	Rejected - outside scope of this chapter
7444	1	3	1	26	21	. However, these collectors also sell fuelwood and charcoal. An estimated 30 million people are employed in its production transport and trade.	Rejected - outside scope of this chapter
7445	1	3	1	26	21	It helps with poverty alleviation and promoting other forms of energy in its place, may increase poverty and accelerate deforestation to grow subsistence and cash crops.	Rejected - outside scope of this chapter
7446	1	3	1	26	21	The various chapters are full of acronyms. Each acronym is usually defined only once, and some not at all. In my opinion, acronyms should be constantly spelled out, otherwise readers like myself will be mystified as to what is being said.	Taken into account - will be checked in final edits
2325	1	3	1	3	12	In the discussion of the market-based approaches, the signed commitment declaration called "Corporate Sustainability Forum Joint Commitment for Climate Transparency and Disclosure in Rio+20" would be recent remarkable step in mitigation of GHGs. More details http://www.unglobalcompact.org/docs/issues_doc/Environment/climate/Joint_Commitment_Statement.pdf	Rejected - Our purpose is to discuss macro trends
4868	1	3	10			"United Nations Framework Conventional on Climate Change	Taken into account - text revised
4587	1	3	18	3	18	Given that "capabilities" is a technical term, I would not use it here; why not use again "policies"?	Taken into accont - text revised
4588	1	3	21	3	21	"understanding" rather than "information"	Rejected - text is fine
8470	1	3	21		22	Public opinion influences design, but design, politics and media also play a significant role in affecting or shaping the framing or content of public opinion (see for example the work of Doris Graber, Rosalee Clawson or Jonathon Morris)	Noted
3604	1	3	22	3	22	Please specify or give examples for "events in the world" .	Rejected - the paragraph already discusses the economic recession. No further explanation needed
4589	1	3	24	3	24	"diplomatic outcomes"; do you mean there is a gap between the scale of the mitigation challenge and the "diplomatic outcomes" actually obtained; please, clarify	Noted - that's exactly what we mean.
15551	1	3	24-26			The global economic set-back "beginning around 2008" is not (as far as I am aware) formally classifiable as a "worldwide" recession. In the OECD, perhaps, yes. If I am wrong, and it is in fact, formally classifiable as a "worldwide recession", I suggest the insertion of the words "largely concentrated in industrialised countries" after the word "recession" and before the word"beginning"	Rejected - worldwide is ok. Discussion on post 2008 global economic situation not core theme of Ch.1
4590	1	3	27	3	27	arguments about what. Please, clarify	Noted
14782	1	3	27	4	22	The choice of these six arguments as the most important to highlight in this ES is not at all clear. It is also not clear how they related to the remainder of the chapter, which should presumably probide the substantiation for these arguments. (It is also not clear how these related to the six main messages presented in 1.2.1.1 - 1.2.1.6) Many other possibilities for key arguments come to mind, which are perhaps better supported by the text. For example the chapter could elaborate and highlight statements relating to the following points -- "the scale of the mitigaiton challenge has grown enormously since 2007" and discussion of why the level of ambition thus far has been so low. -- "large new supplies of unconventional resources", which seems to be dominating near (medium?) term trends in energy use around the world.	Noted - We map the rest of the text pretty closely on the arguments. And the first of the proposed alternative arguments is, in fact, what we say. The second is incorrect--the flood of unconventional resources is still pretty isolated.
7857	1	3	27	4	22	What is the claim that is to be substantiated by the six arguments, or are just matters of facts stated? All six "arguments" are well known and rather trivial. What is the point of stating them?	Noted
7831	1	3	27			The sentence might better read: The present chapter identifies six conclusions.	Taken into account - text revised
6811	1	3	28		29	this sentence has the wrong oder and emphasis: 'Those include population, the structure of the economy, behaviour, and the state of energy technology.' Infact, fossil energy systems are to blame for 75% of the anhropogenic atmospheric emissions - and should be listed here first, and named, not 'state of energy technology' but 'fossil fel combustion'.	Noted - our language here is meant to map directly on the Kaya/IPAT kind of analysis--that's why we use it that way.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
16242	1	3	28	3	29	Replace "energy technology" with "technology" to avoid impression of a narrow energy supply perspective.	Accepted - text revised
15525	1	3	29		30	Should add 'patterns of consumption.'	Accepted - text added
4591	1	3	29	3	29	individual or societal behavior?	Accepted - text added
15552	1	3	29			Insert the words "investment decisions" between the word "behaviour" and the words "and the state of…[etc]"	Accepted - text added
12506	1	3	29			Add after "technology" -- "and induced effects, e.g. anthropogenic land use conversion, forest, peat and other land emissions in changing climatic conditions." The following sentence refers to the choice of fuels and the efficiency of the energy system, but does not address land-based emissions that are also a consequence of the four factors affecting GHG emission levels.	Accepted - text added
13672	1	3	29	3	29	Add after …"technology": "and availability of energy resources". A country with high renewable energy resources has a different mitigation potential than a country where such resources are absent.	Accepted - text added
17398	1	3	29			"the state of energy technology" is likely too narrow as it excludes other important technologies / practices in the land use sector.	Taken into account - combined with other comments
2326	1	3	29			the term "behaviour" is unclear. It should be social behaviour or Individual behaviour or Institutional behaviour.	Taken into account - combined with other comments
4011	1	3	30			suggested wording: "the choice of production and consumption patterns as well as fuels and the overall efficiency of the energy system"	Taken into account - combined with other comments
14777	1	3	30		33	"In nearly all countries… " This statement is a retrospective statement that pertains to countries and a time period during which there were minimal or zero deliberate attempts at achieving emission reductions. If this conclusion were applied to the future period, it follows that suggest that the most plausible route to lowered emissions would be economic decline. Is this the intended message? It is reinforced by the statement "In *addition*, for *some* countries it is *likely* that...", which suggests that actual deliberate measures to induce mitigation are secondary to economic decline as a mitigation policy.	Taken into account - text revised to clarify. Deleted "in addition, for some countries" in line 32
6812	1	3	31		33	This is non-sequitur, makes little sense. There is absolut no evidence that 'market based policies' have been successsful in lowering GHG emission - but there is evidence to the contrary. Also, what does 'the state of the economy' have to do with 'polciies'? It is of course a truism that in a fossil fuel economy a lowering of industrial output will lower emissions, but this is not what is likely meant here. Also important to refer to the Rebound Effect, or Jevons Paradox, when calling for efficiency improvements - these can only have the desired effect when combined with renewable energy based energy systems replacement and sufficiency (lifestyle based consumption pattern) improvements.	Taken into account - The state of the economy has a lot to do with emission policy potentials, and the experience with market based politics is mixed. But text has been revised to clarify meaning
11016	1	3	32			The text states: 'In addition, for some countries it is likely that there is a large role for regulatory and market policies focused on controlling emissions. [1.3; high agreement, robust evidence]'. Comment: This is a judgment, but I would substitute "for most countries" in place of " for some countries" and insert "a mix of" after "large role for".	Taken into account - combined with other comments
4592	1	3	35	3	35	there are other national priorities which are more common and more realistic such as economics growth, poverty alleviation, millenium goals, military power; sustainbale development often does not go beyond the rhetoric for diplomatic consumption	Noted
12507	1	3	35			Add after "green growth," -- "terms of trade." The draft extensively documents the impact that trade has on emissions and rightly focuses on emerging study and documentation of consumption-based life-cycle emissions analysis.	Taken into account - text revised

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
11107	1	3	35	3	37	The mere fact that governments have to address different but related policies at the same time does not automatically guarantee "that actual progress in controlling emissions is larger than it may seem when analysts focus just on policies that governments have identified as “climate change.	Noted - we agree with this point, but our point here is slightly different, which is to emphasize that the total mitigation effort is hard to observe accurately.
13673	1	3	37	3	37	Add "-related" after "climate change"".	Accepted - word added
4866	1	3	4			{Add} "adopt climate {change} mitigation	Accepted - word added
2327	1	3	4			"National governments" would be national governments with simple "n"??	Accepted - text revised
7832	1	3	40	3	41	the following language is sugegsted: … improvements to climate mitigation programs need to address these broader national priorities.	Rejected - we can't make that value judgement.
9185	1	3	40	3	40	replace "mitigation" by "mitigation and adaptation" (or "mitigation and adaptation and SRM")	Accepted: text revised to say "mitigation and adaptation as well as other possible responses such as geoengineering."
13358	1	3	42			This understates the situation somewhat. All relevant scientific assessments agree that the 2 degrees C goal cannot be achieved given the current trajectory of aggregated global emissions, even given variations in modelled sensitivities. I suggest the word 'likely' be replaced by 'clear'.	Taken into account - text revised to conform to IPCC standard definitions
14778	1	3	42		43	"It is likely that the current trajectory…" This is a statement that embeds an unstated long-term extrapolation of our present emission path, without which it is not possible to make a statement about long-term temperature rise. What is actually implied is a statement about the likely temperature rise if we do not increase the level of mitigation ambition beyond what has been evidenced so far. This should be made claer, otherwise this statement is easily misinterpretted to mean that we have already committed the climate to a likely chance of exceeding 2C, which is incorrect.	Taken into account - paragraph text revised for clarity
17793	1	3	42	46		This is probably the most important statement - however it would be nice to add a sentence on the consequences for the assessment itself	Noted
17400	1	3	42			Recommend moving this 'argument' to be the first argument mentioned as it seems to be of much greater significance than then others.	Rejected - the order of our arguments is ok for now.
16961	1	3	42			Is the term "likely" used consistently throughout the WG3 report? … and across WG reports? You might consider a different word given the use of "likely" in quantifiable uncertainty terms elsewhere	Taken into account - text revised to conform to IPCC standard definitions
4869	1	3	43			in order to avoid the negative accent: "more aggressive goals >> more ambitious goals	Rejected - "aggressive" is what we intend here
4593	1	3	44	3	46	It the two degrees Celsisus target is unlikely to be met, why single out the 1.5 degree target, especially in an Introduction? This whole sentence seems to be superfluous	Noted - 1.5 is a reality in diplomacy. It needs to be discussed even if it is challenging to think about.
14779	1	3	44		46	"It is extremely unlikely…" This statement seems wholly unjustified given the evidence presented. Is this a statement about the science, claiming that no future emissino path can be described that keeps warming below 1.5C? Is it a statement about the availability of technologies to enable such a path? Is it a statement about the economic viability of acheiving such a path? Is it a statement about the political plausibility of implementing measures necessary for such a path? This categorical statement is extremely ill-defined, and should either be heavily qualified or eliminated.	Rejected - This is a statement about the plausible achievability of this path. But qualifying phrase has been revised to conform to IPCC standard definitions

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8702	1	3	44			This is an extremely important and potentially controversial statement. Please add all appropriate qualifying conditions under which it is true. For example, do you mean it is politically infeasible? Certainly, it is not physically infeasible. Also, compared to the previous statement regarding meeting a 2 degrees target, which is only 0.5 degrees higher, the statements are too dramatically different for such a small temperature difference. The careful reader will likely be puzzled.	Noted - qualifying phrase has been revised to conform to IPCC standard definitions. But it should be noted that 0.5 degrees difference between the two targets is not a small difference in reality. The small numbers can be misleading
13359	1	3	45			I suggest adding 'given current mitigation efforts' to this sentence.	Rejected - our statement is actually stronger--not just current mitigation efforts but also all likely future mitigation efforts.
15526	1	3	47	4	2	Should also mention the demand side - energy efficiency and changes in consumption patterns are also important	Taken into account - we address this elsewhere.
15553	1	3	48			Insert the words "capable of substantially mitigating emissions" between the word "trajectories" and the words "bi it is…[etc.]"	Accepted - text revised
17681	1	3	48	3	48	the word "here" seems to be there	Accepted - text revised
4009	1	3	5			suggested wording: "Those policies have been local, national and international as well as sectoral in scope"	Taken into account - combined with other comments
4010	1	3	6			suggested wording: "market-based approaches such as emission trading systems along with regulation and voluntary initiatives"	Accepted - text revised
4867	1	3	6		7	{Add} "market-based approaches such as emission trading systems{, energy or carbon taxes} along with regulation; they encompass many diverse “green growth”{, eco-efficiency} strategies	Taken into account - combined with other comments
7829	1	3	6			It is suggested to speak of "regulatory approaches" instead of "regulation".	Taken into account - combined with other comments
4585	1	3	7	3	7	add "and voluntary measures" after mitigation	Taken into account - combined with other comments
7830	1	3	7			It is suggested to substitute "nations" by "countries" as the latter is the more apprpopriate term usually in the IPCC context..	Accepted - text revised
4586	1	3	8	3	8	"economic" unduly restricts welfare; welfare may include happiness	Accepted - text revised
6860	1	3	13	3	14	WGIII, II or I or SYR? Please Clarify.	Taken into account - citation in text clarifies
6861	1	3	42	3	46	The topic of climate targets (and climate change commitments, allowable emissions etc.) is thoroughly assessed in the WGI AR5 contribution. We strongly suggest to ensure consistency in the underlying assessment with the careful assessment provided in WGI AR5, primarily Chapter 12. Reference to Chapter 12 needs to be added. As a general comment, we strongly suggest to avoid reassessing topics concerning the physical science basis in order to reduce duplication and inconsistencies between the WGIII and WGI contributions to AR5.	Taken into account - This is a topic that requires an analysis of the physical and the socioeconomic basis. But if necessary, the outcome of WG1 will be reflected in social science (including economics) literatures, which will be cited mainly in Chapter 6, and those will be reflected in this chapter.
2928	1	3	11			delete "also" which is not necessary	Accepted - text revised
2927	1	3	4			"have seen active efforts" to be replaced by "have seen relatively active efforts" in order to be more nuanced	Accepted - text revised

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
3893	1	3	27	4	22	The six arguments referred to in the executive summary appear to be based on the premise that governments can force their citizens to incur the proposed costs, without losing office in the process. No evidence is put forward in support of the proposition that what is being advocated is politically feasible. An analytical problem here is the absence in the chapter of a positive theory of state and bureaucratic action. Yet disappointing policy outcomes are likely when there is no mature and well-developed understanding of current incentive structures. On a more encouraging note, there is less reason to be pessimistic about voluntary, spontaneous responses to the issues. A great many citizens and organisations will be more motivated to consider the future than the corrupt and venal administrations that are so prevalent according to Transparency International, and others. Would not the chapter be better organised if it distinguished between mitigation approaches that depend on government force and mitigation processes that make use of voluntary initiatives? Any implicit notion that if governments fail, all is lost must be resisted.	Rejected - this goes beyond what we can say as scientists, even if we have a political economy theory of action in mind.
15080	1	3	10	3	10	It is incorrent the name of UNFCCC not is Conventional is Convention	Accepted - text revised
13654	1	3	27	3	30	Factors affecting cc mitigation said to be population, structure of the economy, behaviour, and state of energy technology. This draws from the Kaya identity approach (Sathe Jayant et al), which is flawed in that it considers population as the main driver of emissions. However data shows otherwise (Sattherwaite etc al.)	Noted - elsewhere in the chapter we make it clear that economic drivers and technoogical drivers are more important. Following team discussion, this section has been rewritten
15081	1	3	28	3	29	I propose to include in the factor the governments will and the availability of financial resources at national and international level in order to solve the main sources od GHG emissions, mainly in developing countries.	Taken into account - we already include this.
13655	1	3	42	3	43	Emphasis on emission trajectories which are subject to higher uncertainties (are counterfactual) than more robust indicators of temperature increase such as carbon budgets (cumulative emissions) (Allen et al., Meinshausen et al.)	Taken into account - Emission trajectory also implies levels of cumulative emissions. Text added.
15079	1	3	5	3	9	I propose delete this part or improve ¨ They have included market-based approaches such as emission trading systems along with regulation; they encompass many diverse “green growth” strategies that nations have adopted with the goal of promoting human economic welfare and jobs while also cutting an array of environmental impacts including emissions of carbon dioxide (CO2) and other greenhouse gases (GHGs). Because market-based approaches neither is the best example nor the main lines in cutting GHG emissions, and ¨green growth¨ is very controvertible and didn´t reach consensus in High Level Meeting of Rio+20 and I propose to omit here and in all text	Rejected - Our language is broad here and points to lots of different strategies.
17680	1	3	42	3	43	The term "likely" migth suggest the evidence is not "robust". I line 44 for robust evidence the term extremely is used.	Taken into account - qualifying phrases revised to conform to IPCC standard definitions
17693	1	3	x	33	y	Usage of words that can be hard to understand for the non native english speaker,prone, parse, germane, halving Reapeted words in the same sentence	Noted
4024	1	31	30	31	43	the correct reference is: Shindell, D., J.C.I. Kuylenstierna, E. Vignati, R. van Dingenen, M. Amann, Z. Klimont, S.C. Anenberg, N. Muller, G. Janssens-Maenhout, F. Raes, J. Schwartz, G. Faluvegi, L. Pozzoli, K. Kupiainen, L. Höglund-Isaksson, L. Emberson, D. Streets, V. Ramanathan, K. Hicks, Kim Oanh N. T., G. Milly, M. Williams, V. Demkine, and D. Fowler. Simultaneously mitigating near-term climate change and improving human health and food security. Science, 13 January 2012: Vol. 335 no. 6065 pp. 183-189 DOI: 10.1126/science.1210026.	Taken into account - citation added
7159	1	325	33			The parenthetical expression, '(and a lot more likely)' is a bit confusing. I suggest "with some change in climate inevitable, 'and significant change looking increasingly likely,' " .	Rejected - text seems fine

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
18255	1	4				3. Adaptation to climate change impacts “In that context it is very likely that adaptation to climate change should be viewed as a complement to mitigation policies, not a substitute.” Yes adaptation and mitigation are complemented each other, but both are related with development (“economic development is perhaps the best hope for adaptation to climate change”, Economics of adaptation to climate change: Synthesis Report, World Bank, 2010). Then innovation policies could be either specific, or attending both, or even overlapping adaptation and mitigation policies and actions.	Taken into account - cite to World Bank report
9380	1	4				A seventh significant change can be seen in the grown emphasis on ethical issues; climate change is discussed in terms of "justice", "the most vulnerable persons", "environmental rights", "sustainability" etc.	Rejected - langauge recalibrated a bit, but mostly this is not a topic for our chapter
14357	1	4	1			Cryptic. What technologies? Sounds like a plea for geoengineering. If this is the case, be explicit.	Rejected - This is a discussion on deep cuts, therefore geoengineering is out of scope.
8703	1	4	1			I think you mean "climate change targets" not "trajectories" in this sentence.	Rejected - "climate change trajectories" phrase not found in text. Insufficient information provided
14781	1	4	16		22	It is not at all evident that "sohpisticated techniques" have in fact yet been developed that have been usefully applied to assessing geoengineering.	Taken into account - following team discussion, text revised for clarity. Geoengineering is not the only, nor most obvious option to discuss from a risk management perspective.
7858	1	4	16	4	19	What are the "more sophisticated techniques" you mention? At least in chapter two only conventional economic wisdom can be found.	Noted - In this context, the words mean such as CCS, BECS (bio with CCS), Hydrogen etc. and not including geoengineering. The latter has been mentioned separately
14330	1	4	18	4	19	The text refers to research on risk management strategies and mentions "emergency geoengineering" as one policy response. The brackets at the end of this sentence to refer chapter 2. However, chapter 2 does not mentio geoengieering. There is no in-depth research or literature on risk managment specifically of of geoengineering. Thus mentioning geoengineering as one example before the brackets appears slightly misleading.	Accepted - chapter 2 is about tail risks and management. Team will liase with ch 2 to consider whether/how geoengineering is useful for managing tail risks and to discuss including the topic of geoengineering in the chapter

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
15417	1	4	18		19	DELETE: "and emergency geoengineering [chapter 2; low agreement, medium evidence]". It is not clear what "emergency geoengineering" means, though the phrase implies that there is another category of geoengineering that is for non-emergency purposes. Geoengineering itself is neither mitigation nor adaptation according to IPCC definitions of both concepts in AR4. (IPCC, 2007:84 and IPCC, 2007:76). This point was also discussed in the Joint Expert Meeting on geoengineering held in Lima in June 2011, and there was NO agreement among workshop participants to define geoengineering as either mitigation or adaptation, although some participants proposed that the definitions of mitigation and adaptation could be revised to accommodate geoengineering techniques. The definitions of adaptation and mitigation do NOT accommodate geoengineering, but it should not be implied, therefore, that geoengineering can be considered another (equally valid), "third" option. Geoengineering is highly controversial and speculative and this should be made clear in AR5, at the first mention of geoengineering.	Taken into account - 'emergency geoengineering' phrase changed to 'possible deployment of geoengineering technologies as a last resort in case the dangers of extreme climate change appear quickly'
4594	1	4	19	4	19	why limit to geo-engineering and not simply to technology to be more general?	Noted - because there is a special role for geoengineering
15418	1	4	19		21	DELETE: "In that context it is very likely that adaptation to climate change should be viewed as a complement to mitigation policies, not a substitute [1.4; high agreement, limited evidence]." REPLACE WITH: Adaptation to climate change is an unavoidable and necessary measure for countries affected by climate change, but should never be seen as a substitute for mitigation. Adaptation always has and always will play a larger role in the overa policy strategy of developing countries than mitigation has played or will play.	Rejected - text is ok as is; proposed revision has language "always and always will play a larger role" that may not be true, in fact.
15554	1	4	2			Insert new third sentence to this para (after the one ending "….excessive emphasis") as follows: "On the other hand, there is a recognised linkage between path dependency and technology choices, particularly in the cases o (e.g.) large-scale infrastructure and building stock"	Accepted - sentence added but paragraph has been revised
15419	1	4	21		22	DELETE: "There is rising scholarly attention to the role of adaptation in light of the GHGs already loaded into the atmosphere and likely emitted in the future." The "scholarly attention" would need to be referenced along with noting the level of agreement for the assertion (that scholarly attention to adaptation is rising). If the implication is that focus is shifting to adaptation because of failures to mitigate, this is a dangerous message to send to Northern countries that should retain or concentrate focus on emissions reductions. If the implication is that the "scholarly attention" to adaptation includes attention to geoengineering, this is flawed, as there is no justification for considering geoeningineering a form of adaptation.	Rejected - We don't need to cite in the executive summary. And the confidence statements we put after each paragraph apply to the whole paragraph; we don't need them for every sentence.
16963	1	4	24			WG3 is charged with "assessing scientific research", but this report is framed in terms of 6 somewhat arbitrary arguments. Is this really the most objective way to present the state of science as it relates to mitigation?	Rejected - The arguments are neither arbitrary nor unscientific.
15274	1	4	24	4	24	"Working Group 3" to be "Working Group III", keep consistence.	Editorial – copyedit to be completed prior to publication
4595	1	4	25	4	25	add "and their cumulative impacts"	Accepted - text revised
4596	1	4	26	4	27	delete last sentence of this paragraph (see rationale on next line)	Taken into account - combined with other comments
2240	1	4	26	4	26	There is no energy balance at any place on the the earth's surface and there is no overall "energy balance". Every geologiust knows that the earth's energy fluctuates over every time scale	Rejected - the reference here is to planetary balance.
4597	1	4	28	4	28	add "after this one" "- the fifth IPCC comprehensive assessment-"	Rejected - text is ok.
4850	1	4	28		37	This text is common for all the AR5	no action needed, insufficient information

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
2328	1	4	28	4	37	In this paragraph, "such assessments" is used repeatedly. It would be better to note at least one place the specific name of assessment. Otherwise, readers may be confused.	Taken into account - combined with other comments
8704	1	4	32			the important word "consistent" is not defined here - please state what is meant	Taken into account - text revised
15238	1	4	35	4	36	Good!	Noted
15528	1	4	35			Could also mention World Bank (2012). 'Inclusive Green Growth: The Pathway to Sustainable Development' World Bank, Washington DC.	Accepted - cite added to text where we talk about "green growth". But text has been revised
7859	1	4	35	4	37	What is ment by "neutral language"? Please be more precise. Are you referring to value-neutral language? This claerly is not the case. Throughout the chapter we see many implicit assumptions which are value-laden or even prescriptive. Questions of viability, for instance, are never completely neutral. To address the challenge of anthropogenic climate change value judgments and judgments of different courses of actions are inevtiable, but they must be made explicit as well as comprehensible.	Taken into account - paragraph has been deleted
16964	1	4	36			This report is MANDATED to be policy-relevant, not INTENDED. The language should be strengthened to cement the fact that IPCC reports are - by intergovernmental decision - to be objective and not policy-presriptive	Taken into account - paragraph has been deleted
4598	1	4	38	4	39	delete the entire line after "This chapter" and continue with the next line "focuses first on the main messages.."	Accepted - text revised
13674	1	4	4	4	4	Add sentence "However, some policies such as market mechanisms and emission taxes have shown their ability to mitigate greenhouse gas emissions under widely varying circumstances". See evidence in Chapters 15 and 13.	Rejected - sentence is not really needed. In Chapter 15, there are descriptions that other policies are effective as well.
14783	1	4	41		42	"… raising questions about the viability…2 degrees" Again, without elaboration and explanation about whether this is a scientific, technological, economic, or political assessement, this statement is easily misinterpretted.	Taken into account - we will consider this
6808	1	4	42			There is sufficient evidence that 2 degrees are too high, and that 450 ppm carry a massive risk of overshooting that target. http://pubs.giss.nasa.gov/abs/ha00410c.html, many other sources	Rejected - outside scope of this chapter. This is to be treated in WGI
17643	1	4	43	4	45	Is this sentence added the norm "adaptation"? (In section 1.4, "adaptation" was introduced, and was mentioned the intractions between mitigation and adaptation.)	Rejected - text is ok. Here we discuss about conceptual issues. Mitigation is a measure.
18009	1	4	43	4	43	“green economy” is one of the key concept in the introduction. In order to introduce this concept in a comprehensive way, the recent international consensus regarding this concept, namely the language agreed in Rio+20 need to be reflected.	Rejected - We cite the concept and some of the literature and explain. This is a mitigation report and not an assessment of green growth concepts. No further action is needed
11391	1	4	43	5	10	The separated references to sustainable development and green growth creates the impression that these are two different concepts. However, as pointed out above in the general comments, the multilateral consensus coming out of Rio+20 is that green growth (as part of the concept of green economy) is simply among the tools that can be used to achieve sustainable development, rather than a replacement concept for sustainable development itself. In this regard, all references to green growth should be deleted or at least be indicated as “green growth in the context of sustainable development”	Taken into account - text revised
15240	1	4	47			mention of nuclear may be contentious?	Noted - Whether it is contentious or not is not the issue in IPCC. We address issues in a scientific manner.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
4870	1	4	5			[Del] consistent use of the term: "participate in climate [change] policy	Accepted - text revised
12508	1	4	6			Add after “including” -- “subnational governments and” The role of municipalities and other subnational entities is well covered in the draft and deserves recognition here in the summary.	Taken into account - combined with other comments
4871	1	4	7			{Add} "different environmental, {social,} business and	Accepted - text revised
15527	1	4	9		15	Should also add 'economic growth.'	Rejected - text is ok as is.
8471	1	4	9		15	Uncertainty is important, but so is complexity and variability as part of that equation. Simply focusing on uncertainty implies that a greater degree of certainty can be generated (through science, for example) and that may not be true. It may be helpful to refer to climate change as a "wicked problem" (See the recent work of Val Brown) and in particular the interaction effects that occur between policies and policy instruments across domains (work in eco-health, for example, helps illustrate this)	Taken into account - text expanded and revised to include complexity, but not variability
14780	1	4	9		15	This fifth main argument about uncertainty unhelpfully confounds and equates many different types of uncertainty, all of which are relevant to some extent, but this statement de-emphasizes the fundamental, profound *downside* risk associated with disruption of the climate system. Other types of uncertainty (such as in future economic growth rates, technological progress, policy effectiveness) are certainly relevant, but in an important way they are secondary to the uncertainty associated with the magnitude of the potential climate damages. Neglecting this point leads to an attenuation of the meaning of a "robust," "adaptive" strategy, underemphasizing the necessity for a precautionary response.	Rejected - different types of uncertainty should be illustrated but disentangling the many kinds of uncertainty here in the executive summary isn't really hepful (and the illustration of climate uncertainties being more important isn't always true). Note that chapter 2 does this in detail
16962	1	4	9	4	15	In this discussion of uncertainties, no mention is given to one of the biggest uncertainties of all - actually measuring the emissions themselves. As the recent Guan et al (2012) paper showed in Nature Climate Change, emissions ucnertainties in China can be on the order of 1 Gt(!)	Taken into account - Text added to address all main sources of uncertainty, not only in the emissions. For efficient and effective mitigation policies the sources with large uncertainties should be estimated more accurately, if feasible.
18419	1	4				The idea that the mitigation challenge has grown enormously since 2007 should be stressed in the introduction (pag 4 last paragraph).	Rejected - team discussed this; stressing this point is not necessary
8842	1	4	25	4	25	It currently defines Mitigation as "the effort to control the fundamental sources of climate change". Perhaps it should be emphasised that the primary focus of mitigation is to control the fundamental anthropogenic sources of climate change, with geo-engineering of naturall climate drivers a last resort (which is not to say that there shouldn't be geo-engineering research in preparation).	Taken into account - text edited to clarify meaning of 'mitigation'
15084	1	4	26	4	26	To add in line 26 : ….notably the emission of GHG AND pollutants that can affect the planet’s energy balance	Rejected - sentence ok as is
6299	1	4	35	4	35	What is meant by "neutral" language? Re-word, avoiding "value neutral" but perhaps "non-partisan."	Taken into account - combined with other comments. Text has been revised
4245	1	4	14	4	15	There should be mention of co-benefits of mitigation strategies at this point particularly health co-benefits. See for example Haines A, McMichael AJ, Smith KR, Roberts I, Woodcock J, Markandya A, Armstrong BG, Campbell-Lendrum D, Dangour AD, Davies M, Bruce N, Tonne C, Barrett M, Wilkinson P. Public Health benefits of strategies to reduce greenhouse gas emissions: overview and implications for policy makers. Lancet 2009; 374:2104-14. Also the WHO series of papers on health in the green economy http://www.who.int/hia/green_economy/en/	Taken into account - Discussion on co-benefits has been beefed up but a detailed assessment of the topic is addressed elsewhere in the report.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
15082	1	4	19	4	21	Not is real the asseveration ¨ In that context it is very likely that adaptation to climate change should be viewed as a complement to mitigation policies, not a substitute¨. The adaptation policies not can be seen as a complement of mitigation policies, each with their personality and objectives, in many developing countries the adaptation is the main way and measures because their GHG emissions are very low	Noted - no action needed
15083	1	4	21	4	22	To add in : ¨There is rising scholarly attention to the role of adaptation in light of the GHGs already loaded into the atmosphere and likely emitted in the future AND THE CLIMATE CHANGES THAT IS OCCURRING AND THOSE PROGNOSTICATED	Rejected - no changes needed--proposed changes here don't add further meaning to exisiting sentence
17682	1	4	1	4	2	If no specific set of technologies is outlined a technology can be removed it there are no technical or economic capabilities to implement it	Noted - insufficient information. No action needed
17683	1	4	25	4	26	The planets energy balance? Maybe it could be more specific regarding the green house effect of GHGs because action is towards reducing them not sending energy into space	Noted - no action needed
7002	1	4 of 33	25	4 of 33	26	Add "and enhancing GHG sinks also", after "to control the fundamental sources of climate change".	Accepted - text revised
7003	1	4 of 33	29	4 of 33	29	Add "man-induced", besides "global climate change".	Taken into account - text has been revised
7004	1	4 of 33	36	4 of 33	37	The last phrase in this paragraph has been included systematically in PCC Assessments since the first one, but the results have been worsening day after day and year after year, and thast is also policy relevant!!!! Maybe it's time to find another way for obtaining appropriate results with another phrase or another steps more effective.	Taken into account - sentence has been deleted
6813	1	5				Changes since AR 4: should one not also mention, above all, that emissions and GHG concentrations are growing unabatedly, and that the natural global carbon mechanism shows serious signs of getting out of control - reference ice melt rates and discovery of large and sustained methane streams from thawing permafrost areas? Much of this section isn't really very well focused on the topic at hand, stretches are even superfluous. This seems a bit incongruous with what is daid ion pages 14 and 15.	Rejected - text needs to stay focused on what we actually do in chapter 1. other revisions will address this point somewhat
12216	1	5	10	6	39	The focus of this section is on development in developing countries. While appreciating that, please consider to include efforts done to mitigate climate change also in the developed world. Both initiatives that developed countries have taken in order to assist developing countries (e.g. REDD+) and initiatives to mitigate national emissions in developed countries, e.g. in Europe.	Rejected - there is extensive discussion of this in the main text. No further action needed. Text will be added in next section on green growth in response to the credit crunch recession also enhanced by US and EU.
2241	1	5	10	5	19	Sustainable development is impossible. There are only two directions, forward and backward. The climate and everythingh in it evolves and we should try totake advantage of its course. To try and stop is leads to disaster.	Noted - no action needed
8472	1	5	10		19	Important to note the difficulties of implementation, and the often-ignored gap between strategy, planning, policy and then implementation. It is typically assumed (see Wildavsky 1973) that implementation is an automatic step - this is often not true, and is impact by both political and bureaucratic structures. It is also important to note that equity issues also include social, health and political equity at the individual levels, all of which factor into climate change "policy"	Noted - the main text addresses this adequately. No action required
18010	1	5	10	5	10	“green economy” is one of the key concept in the introduction. In order to introduce this concept in a comprehensive way, the recent international consensus regarding this concept, namely the language agreed in Rio+20 need to be reflected.	Taken into account - combined with other comments that suggest using sustainable development or green growth. We use them all. No further action needed
17401	1	5	10			It's not clear to me that "green growth" is a term that is of comparable importance and longevity as "sustainable development" -- perhaps consider de-emphasizing its prominence in the document.	Taken into account - combined with other comments

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
17646	1	5	10	9	11	After reading subsections 1.2.1.1 and 1.2.1.2 are well, the reader might get the impression that since the publication of AR4, only developing and emerging countries have taken strong action against climate change while the industrialized world only has a deep financial crisis on its track record since AR4. An overview section on policies within industrialized countries might mend to this issue.	Taken into account - text has been revised to include paragraph on industrialized countries' actions
4012	1	5	11	5	19	suggested wording: "Since the paradigme of sustainable development was advanced through international processes such as the Brundtland report (World Commission on Environment and Development, 1987) it gradually has been accepted and popularized as a framework to harmonize economic development and environmental protection . This approach, which emphasizes the integration of selected policy goals, is particularly important for climate change as it intersects with many development and environmental goals—including challenges of establishing fairness between country regional groupings and generations of peoples. In many respects, climate change is becoming the key environmental challenge of sustainable development (see chapter 4)."	Taken into account - there are lots of comments that point in all different directions on the language here. Other comments and responses will address this topic.
9107	1	5	11	5	13	I think that the generalization only applies when production-based inventories are concerned. There is a lot of evidence that with production-based perspective cities may cause more emissions as well.	Noted -- No further action needed
4873	1	5	13		14	[Del] "as one of basic [principles] approaches	Taken into account - text has been revised so suggested change is no longer relevant
15239	1	5	14	5	15	together with achieving social equity (e.g. see UNESCO)	Rejected - suggested change is not necessary. No further action needed
4600	1	5	15		15	I would add as a reference:(…; Agenda-21, 1992) since the latter is the first major international policy document in which the exprtession Sustainble Development appears	Rejected - statement may not really be true. No furthre action needed
4874	1	5	17			{Add} "economic{, social} and environmental goals	Accepted - but paragraph has been revised
16965	1	5	17			Introducing terms like "fairness", which have many definitions and are (by definition) subjectively interpreted, would steer this report away from its mandate to remain objective and not cast value judgements.	Rejected - The report needs to reflect the literature. There is a huge literature on justice and fairness, and this is a big issue for lots of countries so the chapter needs to reflect it even if concepts can be interpreted value-laden.
6442	1	5	18	5	19	"Fossil fuels resources are...cost-competitve with other energy forms." This statement needs to be qualified in terms of the economic framework in which it is made. For example, the externalities associated with fossil fuel combustion are not fully paid for by the fossil fuel industry or use (despite the existence of various emissions trading schemes). Fossil fuels are only cost competitive today because they do not pay their way for the environmental damage caused.	Taken into account - the quoted sentence is not found anywhere in the chapter text, but reference added to chapter 3 that discusses externalities in more details
17685	1	5	18	5	18	aspects instead of respects…	Rejected - respects is the correct word
4599	1	5	2		2	add at the end of the line "as well as in the science related…"	Rejected - suggested change is not necessary. No further action needed
12509	1	5	20			Add after "including" -- "sovereignty, domestic order, and international relations especially terms of trade and security,..,."	Taken into account - suggested changes are too complicated. Other edits will fix language here.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
13360	1	5	22			It is an overstatement to suggest that the goals and interests framed by developing countries are 'paramount'... in other words, 'more important than all others' goals and interests'. While the future growth in emissions from major emerging emitters is highly significant, the actions of developed countries in both reducing domestic consumption and emissions and providing effective funding to assist in mitigation and adaptation remain powerful dialogic influences shaping developing country actions, goals and interests. I suggest replacing 'paramount' with 'critical'.	Accepted change- but paragraph has been revised
16966	1	5	23			Here, and elsewhere, it could be quite beneficial to list the actual countries the text is referring to. Not only does it give a complete snapshot of the current situation in the world, but it will allow posterity to read this report and assess what each nation has done, what impact it has had, etc.	Taken into account - combined with other comments
7861	1	5	24	5	25	What do you mean by "necessary industrialization and urbanization in a traditional growth pattern"? Are you suggesting that conventional growth patterns are inevitable or desirable? If so, this is problematic for at least two reasons: first, there are well know possibilities to create properity without conventional growth; second, you would be implicitly suggesting that the main cause of rising GHG emissions - conventional growth - can/should be addressed to a limited extend only. See comment 25.	Taken into account - paragraph has been rewritten
16889	1	5	28		35	Policies that try to do too many things or meet multiple objectives frequently don't do anything well -- multiple objectives raise cost and decrease effectiveness. (Sorry, I don't have much to cite here, so probably not that helpful.)	Rejected - topic of "policy effectiveness" is beyond scope of the chapter.
16967	1	5	29			This should be CHANGES IN extreme weather events (extreme weather events would happen without climate change - it is how their magnitude, frequency and location change with a changing cliamte that is of most interest)	Accepted change- but paragraph has been revised
4013	1	5	30	5	31	suggested wording: "Mindful of these impacts, these countries have acknowledged that climate change should be acoounted for prominently in sustainable development strategies."	Accepted change- but paragraph has been revised
13361	1	5	31			It is more accurate to claim that 'many of these countries have acknowledged that climate change is 'an increasingly important component of sustainable development'.	Taken into account - combined with other comments
18011	1	5	31	5	35	“green economy” is one of the key concept in the introduction. In order to introduce this concept in a comprehensive way, the recent international consensus regarding this concept, namely the language agreed in Rio+20 need to be reflected.	Taken into account - combined with other comments
16968	1	5	31			Where is it cited that climate change is THE important component to sustainable development. This probvlem presents itself elsewhere and can be fixed simply by replacing THE with AN.	Taken into account - combined with other comments
8705	1	5	31			do you mean "most" important component?	Taken into account - combined with other comments
11392	1	5	31	5	35	The reference to green growth here should be “in the context of sustainable development” so as to link it to the multilateral consensus from Rio+20.	Taken into account - combined with other comments
6814	1	5	33			The use of unconventional sources is a sign that the peak is behind us, not ahead. I would quote the IEA's Chief Economist on that who consistely asserts since 2009, that the 'peak' - ie sustained conventional supplies - occurred in 2006. The fact that the world economy is now fossicking for remnant, risky, dangerous and increasingly expensive fossil sources should be cause for alarm, not complacency (as here implied).	Rejected - discussion and statements (ahead, behind,…) on "peak" is beyond scope of chapter.
9108	1	5	33	5	43	I'd like to ad that cities may also be promoters of consumption intensive lifestyles leading to high GHG loads. This seems evident and a bigger problem than it is often credited if kept in mind that cities generate 90% of global economy.	Rejected - we talk about cities elswhere. no action needed
13362	1	5	36			This opening sentence overstates current realities and does not clarify what 'this approach' is. I suggest 'Many developing countries have made considerable efforts to address both sustainable development and climate change. Their collective efforts include all major mitigation measures...etc'	Taken into account - combined with other comments
11715	1	5	36	5	37	Efforts are not only for developing countries. [Developing countries] shoud be amended to [Developed and developing countries].	Taken into account - paragraph has been revised

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
6455	1	5	36	6	2	Make it shorter. To delete the sentence after "For example".	Taken into account - section has been revised
16890	1	5	36		47	There is a common myth that lowering emissions from the BAU pathway halts growth -- it is untrue. Please make sure people understand this.	Noted - comment is very general; team will address this generaly
17402	1	5	36	5	40	Strongly recommend adding agriculture to this set of mitigation arenas, both related to GHG reduction and C sequestration.	Taken into account - section has been revised
7862	1	5	36	5	36	On which concept of Susatainbable Development relies this statement? In addition, the following lines are very China-friendly. We should not downplay Chinese efforts to mitigate GHG emissions (especially with respect to inaction by some developed countries), but the message in this paragraph is one-sided given rapidly rising emissions and other enviromental problems in China.	Taken into account - section has been revised
10062	1	5	36	6	2	This passage is mainly about China's effort to maintain sustainable development. Currently, China's four big cities have implemented vehicle purchase restriction. This kind of policy instrument is unique, convincing and has seldom been used in western countries. I suggest adding a piece of text describing this effort.	Rejected - this level of detail is not included in the exectuive summary. Such policies are discussed in some detail in the chapters on urban planning and on transport systems
16969	1	5	36			Claiming that developing nations have "made great efforts" is a bit of a subjective statement, particualrly with emissions trends and projections do not necessarily support "great efforts" by some people's interpretation.	Taken into account - text has been revised.
2329	1	5	37	6	15	Their efforts cover all major mitigation measures- here, the term "all" so optimistic. It cannot be noted that all major mitigation measures have been adapted in all developing countries equally. The critical economic argument here is how BRICS examples comparable with generalization of developing countries. These are common mistakes in this high level assessment report or policy report. Here, I would like to quote the WHITE PAPER (5 September 2011) of Bloomberg" However, developing world officials and non-governmental organisations are accusing developed parties of failing to deliver on their pledges. And that only a small proportion of the promised funds are 'new and additional', with the rest diverted from other aid budgets or previously announced –according to a report by the Institute of Policy Studies, endorsed by Pakistan, Bangladesh and Solomon Islands. In addition to the financial implications, a failure to deliver the $30bn could exacerbate the resentments between developed and developing parties, which have already hindered progress towards a new global climate agreement" Citation:- www.bnef.com/WhitePapers/download/47	Rejected - these are poltical arguments beyond scope of our chapter. Bloomberg's White Paper is not relevant for the IPCC report.
8706	1	5	39			This sub-section should probably discuss the debates over economic growth, and whether growth is sustainable in the long run.	Rejected - the debate over economic growth is not central to this chapter. Economic growth is discussed in section 1.2.1.2. No further action needed
11716	1	5	40	6	2	Many countries are playing leading role so that it is not natural to cite the example of only China. [For example, China has……(Xie, 2009; Guo, 2011; Ye, 2011)] should be deleted.	Taken into account - India was also an example. Added examples from industrialized countries as well.
11890	1	5	40	5	45	Provide a refence for this statement.	Accepted - references added

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
16970	1	5	40	5	45	It might be worth stating how uncertain the economic and emissions data coming out of China are. Again, see the Guan et al. (2012) paper in Nature Climate Change as an example. With so many people and disparate sources, it is inevitable that the economic and emissions data would be alden with uncertainties, but explainging what they are, how they arise, and even how they might be reduced would be a huge benefit.	Rejected - generally countries with fast changes in the economy (e.g. REF in early 90s and China in 2000s) have larger uncertainties in compiling complete statistics. The discussion on uncertainty is expanded elsewhere. This is too much detail here.
3061	1	5	42	5	43	Energy intensity values are meaningless because the values of GDP used are affected by inflation and variations in exchange rates. The increase in the yuan exchange rate and inflation in China make meaningless the advertised reductions of energy intensity.	Rejected - These variations are well known and the measures are still useful. The issue of exchange rate is not applicable here. No action needed
15275	1	5	42	5	44	The report described the energy/carbon intensity target of China, should we mention "eleventh five year plan" and "twelfth five year plan" of China?, instead of just tell readers the range of the year. Because it is very useful to mention this by telling pelple China has its specific phase plan.	Rejected - This level of detail is not appropriate for this chapter. No action needed.
4014	1	5	45			should be "policy targets" not "policy goals".	Rejected - text is fine. No action needed
6443	1	5	46	5	46	The word 'dramatically' should be replaced with potentially, since CCS has never been demonstrated on a full-scale electric power plant. Similarly the next sentence should begin "Possible applications include…"	Taken into account - however, unable to find the word 'dramatically' anywhere in the text. Unable to locate for suggested change
16971	1	5	46			The statistics on China's INSTALLED wind capacity can be a bit misleading because there are vast amounts of capacity that is not grid-connected and, therefore, does not produce any useable zero-carbon energy (yet). This speaks to larger issues of industrial policy that the report may not want to delve into, but it might be worth highlighting this aspect.	Noted - this is an important point, but we address it elswhere (and really needs to be addressed in the chapter on electricity/industry). As the comment suggests, we should not delve into the industrial policy issues
16972	1	5	47	6	2	Is this statement still true, post-Fukushima?	Taken into account - Statement is correct. We have not seen a significant retraction globally in nuclear programmes after Fukushima
4872	1	5	7			[Del] "within which [governments] various actors have tried	Accepted - text revised
12082	1	5	40	6	50	The current text about China's climate change mitigation refer to efforts from the last few years and commitments for the next 5-10 years. I recommend noting also that China achieved significant decoupling of GDP from energy usage and greenhouse gas emissions from 1980-2000. Very few people are aware of that between 1980 and 2000 GDP grew over 6 fold whilst energy use only grew 2 fold in China. Please see Figure 3b and discussion in Levine, M. Zhou, N., Price, L. (2009) The Greening of the Middle Kingdom: The Story of Energy Efficiency in China. Lawrence Berkeley National Laboratories and US DOE. http://china.lbl.gov/sites/china.lbl.gov/files/LBNL-2413E.Story_of_EE_in_China.pdf	Rejected - this is too much focus on China, especially as other comments suggest we be less China-centric.
7860	1	5	1			Neither throughout nor at the end of section 1.2 did we find any explicit message. Is the key message that the 2° goal is not viable any more? Please be more explicit.	Rejected - The message seems clear enough based on other comments

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
15085	1	5	2	5	3	I propose to change: ¨Since AR4 there have been many developments in the world economy, emissions and policies related to climate change¨ by ¨Since AR4 there have been many CHANGES in the world economy AND SOCIETIES, COUNTRY emissions and policies related to climate change¨	Rejected - proposed text is too complicated. No action needed
15086	1	5	6	5	7	I propose to include:¨ First, there have been large changes in the economic, SOCIAL, ENVIRONMENTAL and political context within which governments have tried to address the climate issue¨. Because the governments have taken different measures in order to preservate the communities, natural resources, among many others.	Rejected - proposed text is too complicated. No action needed
12080	1	5	8	5	9	General Comment - In both IPCC AR4 WGII Mitigation Report and again here in this draft there is a failure to recognise the fact that now many governments and research bodies have developed important economic/technical/policy studies on how to achieve, for nation X, deep cuts to GHG emissions by 2020 and 2050. These detailed "deep cuts by 2050" studies for each nation did not exist before 2000. The fact that these dtailed studies exist is very important as these studies provide national governments with studies relevant to their specific nation's conditions and stage of development. Such "national deep cut" studies/models compliment the IPCC WGIII Mitigation report work, and provide national government's with evidence to justify adopting the IPCC's recommended 2050 GHG targets. A sample of just some of the many "deep cut" studies includes; Interlaboratory Working Group (2000) Scenarios for a Clean Energy Future for the USA, Oak Ridge National Laboratory, Berkeley, CA, Lawrence Berkeley Laboratories, CA and National Renewable Energy Laboratory, CO. Department of Trade and Industry (2003) Our Energy Future – Creating a Low Carbon Economy, Energy White Paper, UK Department of Trade and Industry, Version 11.Saddler, H., Diesendorf, M. and Denniss, R. (2004) A Clean Energy Future for Australia: Energy Strategies, WWF, Canberra. National Institute for Environmental Studies (2005) Japan: Low Carbon Society Scenarios toward 2050, National Institute for Environmental Studies, Japan . Department of Trade and Industry (2007) Meeting the Energy Challenge: A White Paper on Energy, Department of Trade and Industry, UK. von Weizsäcker, E., Hargroves, K., Smith, M., Desha, C. and Stasinopoulos, P. (2009) Factor Five: Transforming the Global Economy through 80% Improvements Improvements in Resource Productivity, Earthscan, London. More such "deep cut" studies can be provided, if interested.	Taken into account - This is a good point. Examples of emission programs in other countries added. But to clarify, IPCC did not make this recommendation.
12081	1	5	8	5	9	General Comment - Since the last IPCC AR4 WGIII Mitigation Report, there is one more key fact that "has been learnt" - namely that the co-benefits of action on climate change are significant (greater oil independance, reduced exposure to oil price rises, air pollution reductions, energy/water efficiency nexus opportunities, materials/energy efficiency nexus opportunities, healthier populations from active sustainable transport, biodiversity improvements, soil productivity improvements, national security co-benefits and poverty reduction co-benefits etc) . When these co-benefits are included in economic cost/benefit analysis it significantly reduces the overall net cost of action on climate change mitigation. This economic fact justifies andmotivates greater policy integration across government department's to enable a more integrated approach for action on climate change mitigation. Once these co-benefits are taken into account, then this strengthes the economic case for government's adopting a integrated "green growth" policy approach to climate change mitigation policy reform. see OECD (2012) Environmental Outlook to 2050: The Consequences of Inaction. OECD athttp://www.oecd.org/env/environmentalindicatorsmodellingandoutlooks/oecdenvironmentaloutlookto2050theconsequencesofinaction.htm and Smith, M. Hargroves, K. Desha, C (2010) Cents and Sustainability. Securing Our Common Future through Decoupling Economic Growth from Environmental Pressures. Earthscan.London.	Taken into account - This is a good point and we will add co-benefits into our discussion of the scale of the mitigation challenge

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
3362	1	5				This section choses to rely on "green growth" for framing, a fair choice. However, a broad discourse is criticial of this concept, perceiving "green growth" as a greenwashing of "economic growth", camouflaging large scale projects with regressive distributive properties, which are in many cases still environmental harmful because of their scale, even if efficiency gains are substantial. Such discourses might reasonably reflected in the text.	Taken into account - combined with other comments
4851	1	5				1.2.1.1 This text is too "political": (i) important references to the efforts and positions of the developing countries, however, it is unclear why there is no word on the relevant activities and problems of the developed countries; (ii) it is also missing as a key message that all the good efforts taken together are not enough to achieve global s.d. and halt the global ghg-emissions.	Taken into account - other comments address this in other places of the text
4250	1	5				I think that the increased recognition of climate change co-benefits including to health is an additional development since AR4 and should be added at this stage to the other 6 climate change mitigation strategies	Taken into account - we added more explicit discussion of co-benefits elswehere. Combined with other comments
18421	1	5		6		Sustainable development and green growth (pag 5 y 6)	Taken into account - combined with other comments
18422	1	5		6		Again, an exaggerated optimism regarding the SD agenda in emerging countries and the “great efforts” they have done on SD and climate change (pag 5 last paragraph). Especially India, China and Brazil. BRICS meeting is anything else than rhetorical (pag 6 paragraph 3)	Taken into account - we will review text carefully after redraft to ensure balance and accuracy
11017	1	5	10			The title of the section is ‘Sustainable development and green growth’. Comment: This presumes a consensus about growth as a goal. However, this is increasingly questioned. I suggest that the words ‘Sustainable development and a green economy’ are substituted. Section 1.2.1.1 should also acknowledge the growing trend among developed countries to question whether ongoing economic growth is a desirable goal for developed countries. A suggested insertion, at the end of section 1.2.1.1, is: ‘There is also a nascent movement among some in developed countries to question the desirability and feasibility of ongoing economic growth for developed countries, if sufficient ‘space’ is to be provided for developing countries to raise their living standards.’ Ref: Schneider, F., Kallis, G., & Martínez-Alier, J. (2010). Crisis or opportunity? Economic degrowth for social equity and ecological sustainability. Introduction to this special issue. Journal of Cleaner Production, 18(6), 511-518 http://www.cemus.uu.se/dokument/msd2010-2011/article%20for%2024th.pdf.	Taken into account - there are lots of comments that point in different directions. Text has been revised to reflect multiplicity of goals and discussion on green growth is shortened. Suggested insertion was not added.
17647	1	5	10			This section lists several examples of sustainable development policies, yet these examples contain mostly absolute numbers that are of limited value if one does not know the initial levels or is given the relative change (e.g. p. 6, line 9 onwards: these numbers contain limited information without a relative comparison)	Noted - these examples are intended to be illustrations, not detailed treatment. No further action needed
15087	1	5	11	5	11	I propose change: ¨Addressing climate change has become IN ONE OF THE MOST important component of sustainable development.	Taken into account - text has been revised
15088	1	5	14	5	14	To add: ¨ …..principles to harmonize economic AND SOCIAL development and environment protection¨	Taken into account - combined with other comments
13248	1	5	14	5	14	Sustainable development includes social equity, so I suggest to state: "(…) principles to harmonize economic development, social equity and environmental protection."	Taken into account - combined with other comments
6300	1	5	14	5	14	Add social development here. The Brundtland report supported the notion of sustainable development as including social, environmental and economic…	Taken into account - combined with other comments
15089	1	5	17	5	17	To add: ¨ …..economic, SOCIAL and environmental goals¨. Because for example the fight against the poverty and hunger are social aspects, and sustainable development includes the three aspects.	Taken into account - combined with other comments

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
8218	1	5	17	5	17	Authors should include “social goal” as well, along with “economic and environmental goals”. Sustainable development encompasses the three pillars: environmental, economic and social dimensions.	Taken into account - combined with other comments
15090	1	5	18	5	19	To change: ¨…...climate change is becoming IN ONE OF THE MOST key environmental challenge of sustainable development AT THE PRESENT AND IN THE FUTURE ¨. Because the anthropic overexploitation and degradation of natural resources is in this moment the most important environmental challenge.	Taken into account - combined with other comments
15091	1	5	20	5	21	To include: ¨Governments have many different goals, including economic development, ENVIRONMENTAL PROTECTION, poverty alleviation and living standard improvement.¨	Taken into account - combined with other comments
15092	1	5	22	5	24	To change in the following form: ¨Of paramount importance are the goals and interests framed in DEVELOPED COUNTRIES, MAIN CONTRIBUTORS TO THE ACTUAL SITUATION, AND IN developing countries, especially the emerging economies, whose economies are expanding rapidly. ¨	Rejected - suggested text is too complicated
15093	1	5	30	5	32	To change: ¨Mindful of these impacts, these countries have acknowledged that climate change should be tackled as ONE important component of sustainable development—such as through “green growth” strategies	Taken into account - combined with other comments. Overall, the section has been revised
8219	1	5	30	5	30	“mindful of these impacts, these countries have acknowledge that climate change should be tackled as the important component of sustainable development – such as “green growth”.. Comments: Some references on this for different country context would be helpful	Taken into account - combined with other comments, we will beef this up a bit. Overall, the section has been revised
4246	1	5	33	5	33	Not just health care improvement but more broadly health improvement since many determinants of health lie outside the healthcare system	Taken into account - combined with other comments, we are beefing up discussion of co-benefits elswhere.
5383	1	5	34	5	34	adapt to climate impacts --- should be -- adapt to climate change impact	Accepted - text changed, but overall section has been revised
15094	1	5	36	5	37	Add: ¨ Through this approach, developing countries have made great efforts on sustainable development and addressing climate change WITHOUT COUNT IN MANY TIMES WITH THE ALL NECESARRY FINANCIAL RESOURCES AND TECHNOLOGIES ¨	Rejected - suggested text is too compliated; also, combined with other comments
10975	1	5	36	6	2	It is stated that only developing countries tried hard in mitigation; however, developed countries also contributed to take measures to global warming through CDM. Therefore, the paragraph around here should be amended.	Taken into account - paragraph added in section 1.2.1.1 discussing efforts by industrialized countries, though discussing CDM does seems not essential in this context.
4359	1	5	45	6	2	presenting all low carbon energy sources, such as hydro-power or nuclear power, as sustainable is questionable	Noted - there is a wide range of reviews; our text reflects that
11348	1	5		6		It might make sense to introduce the situations surrounding developed countries (not just developing countries). If it is discussed elsewhere in the report, that can be cited.	Taken into account - paragraph added in section 1.2.1.1 discussing efforts by industrialized countries. Combined with other comments. No further action needed

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
3886	1	5	20	5	35	This section is written as if all countries are either democracies or governed by benevolent despots. However, according to a report by the Economist Intelligence unit (http://graphics.eiu.com/PDF/Democracy_Index_2010_web.pdf) around a 3rd of the world's countries are led by authoritarian regimes. As is all too evident some of them commonly put things like the maintenance of power, subjegation of women and/or the elimination of rival tribes ahead of professed goals whose main purpose might be to impress the democratic world. Should not the text distinguish more clearly between what regimes profess to do and what they actually do? Formally what is needed is a positive theory of the exercise of state power. (For literature on this see Buchanan, Tulloch and Mancur Olsen)	Rejected - this takes us somewhat beyond our mandated.
17684	1	5	11	5	11	"has becomed the important component" for "the most important" unless al the others are in the same	Taken into account - combined with other comments
17686	1	5	33	5	33	these countries have acknowledged "in greater or lesser extent" that climate change…	Taken into account - section has been revised
17687	1	5	36	5	36	Probably the BRICS but not all developing countries have made "a great" effort on sustainable development	Taken into account - section has been revised
7005	1	5 of 33	21	5 of 33	21	Add "in equity conditions" after the word "improvement".	Rejected - edit is not needed
7006	1	5 of 33	38	5 of 33	38	Add "and renewable" after "low carbon".	Rejected - edit is not needed
7007	1	5 of 33	41	5 of 33	41	Add "renewables," after "advance", and before "green".	Rejected - edit is not needed
16053	1	6	12	6	19	This paragraph paints a too rosy picture of BRICS, a group which has recently decreased its carbon efficiency and been very reluctant on international negociations. Their important political role is to be recongnized with more balance	Taken into account - combined with other comments. Text has been revised, discussion on BRICS has been removed
6457	1	6	12	6	28	Redundent. To delete these two paragraphs.	Taken into account - the paragraphs have been shortened and revised
16891	1	6	12		19	This demonstrates the myth -- if we only lower CO2 emissions by halting use of energy, this could indeed cap growth -- but in fact there are many technologies that are only somewhat more expensive. Economic and energy system modeling demonstrates that growth is only slightly reduced but does not in fact reverse. See Bossetti and Frankel.	Taken into account - the paragraph has been removed
10416	1	6	12	6	19	This has to be enumerate rather than wordy. Targets envisoned should be provided	Noted - comment not pertinent in this context.
4602	1	6	13	6	13	"this area"; which one are you talking about? Energy technologies? Please, clarify.	This paragraph has been removed. Comment is no longer relevant.
16975	1	6	16			It might be worth expanding how "sustainable and inclusive growth" differs from "cappin development"	This paragraph has been removed. Comment is no longer relevant.
4603	1	6	19	6	19	I would use Rio+20 as a reference as well	The paragraph has been removed. Comment is no longer relevant
16054	1	6	20	6	28	This paragraph paints a too rosy picture of two nations that have a blurred record for deforestation. Could the paragraph quote a "best case" country that have at least stopped cutting its forests?	Taken into account - there are countries that have made a lot of progress, and in the industrialized world there is net growth. But to caution that an overall situation is difficult to assess, added sentence "It remains difficult, however, to disentangle the role of policies from other factors that affect incentives for deforestation"

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
8709	1	6	20	6	28	The Amazon is the region of the Brazil with the largest number of protected areas. Over a third of its territory falls into one protection regime, whether in the form of conservation units, indigenous lands, either in military areas. Between 2003 and 2009, 70 federal conservation units were created with a total area of 26.4 million hectares. In all, the country has with 310 of these areas, the equivalent of 76.5 million hectares (Brazilian Ministry of Environment http://www.mma.gov.br/). This fact is one of the reasons to explain the decrease in deforestation by the constitution of a blocking barrier formed by the conservation unities. Another strong reason to the deforestation decrease is related to economic strategies adopted by the government with the intent of discourage the agriculture in illegal areas. Among the main agreements signed is the Soy Moratorium, which prohibits the export of soybeans produced in illegal areas, and the pact with the loggers, which determines that the private sector does not buy timber from deforested areas. However, the deforestation problem in Amazon is strongly related to social problems, where people don't have options to deal with the absence of development and are driven to use the land in the wrong way. In this sense, the success implementation of the Nagoya protocol can take this region to a different overview by the appreciation of the natural products of the forest instead the substitution of natural vegetation by monocultures.	Taken into account - this is a helpful comment, but action item is unclear. This paragraph was removed in latest edit
16976	1	6	20	6	28	As Indoensia accoutns for some 25% of the global GHG emissions from LULUCF, it's a glaring omission not to say something about what they are doing (or not doing) with respect to mitigation of their LULUCF emissions	The last few sentences of the paragraph have been removed. Comment is no longer relevant.
9462	1	6	23		25	It remains inconclusive whether this reduction in deforestation was due to prices or policies. For more see - Assunção, J., e Gandour, C. C., & Rocha, R. (2012). Deforestation Slowdown in the Legal Amazon: Prices or Policies? Rio de Janeiro, Brazil: Climate Policy Initiative.	Accepted - added text "It remains difficult to disentangle the role of policies from other factors that affect incentives for deforestation." and cited the suggested article
7863	1	6	23	6	25	Clear-cutting of rain forests is not simply forestry; this is a euphemism and an example of the non-neutral language.	Rejected - we think the language is ok here; we clearly signal the variety of factors at work
16892	1	6	29		39	Low carbon emitting energy technologies will likely remain more costly than conventional techs for the foreseeable future. The question is how can developing countries justify paying the premium in the face of other development needs. There really is not a big tradeoff here, but it looks like it at first glance, especially if one does not really understand how trade, especially emissions trading, fits into this picture.	Taken into account - This is an important point, i.e. whether changing accounting system can encourage the realization of low carbon development or not. This may lead to the shrinkage of international trade itself. Paragraph has been revised. The discussion on accounting is removed but acknowledged the challenge of high upfront investment costs of low carbon technologies.
11717	1	6	3			With regard to No.2, [other] is not needed.	Rejected - text is fine. No action needed
6456	1	6	3	6	11	Make it shorter. To delete the sentence after "For example".	Taken into account - combined with other comments, the paragraph has been shortened

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
16977	1	6	30	6	32	You must insert SOME between OF and DEVELOPING, as the 2012 PBL-NEAA report, "Trends in Global CO2 Emissions" clearly showed that per capita emissions in China, Iran and South Africa are on par with those of developed EU nations	Accepted - text inserted
11018	1	6	32			"Low carbon technologies available today are not sufficient to offset the emission increase driven by the economy growth." This is unclear and should be replaced by "Low carbon technologies available today by themselves are unlikely to be sufficient to offset the emissions increase driven by economic growth, but other emissions drivers besides technological progress need to be taken into account."	Taken into account - sentence replaced with:" Current investment in low carbon technologies is insufficient to offset the emissions increases associated with projected economic growth in both developed and developing countries."
11019	1	6	32			'Low carbon technologies available today are not sufficient to offset the emission increase driven by the economy growth'. This is unclear and should be replaced by "Low carbon technologies available today by themselves are unlikely to be sufficient to offset the emissions increase driven by economic growth, but other emissions drivers besides technological progress need to be taken into account."	Taken into account - combined with other comment
13363	1	6	32			This sentence is potentially inaccurate. It confuses policy intent and constructed capacity with technological capabilities. 'The range of low carbon technologies available today' refers ambiguously to what has been installed to date, and to the technical abilities of existing technologies. It is correct if the former and incorrect if the latter, as a smorgasbord of low carbon technologies could provide for all needs (with a range of economic caveats). I suggest 'Current investment in low carbon technologies is insufficient to offset the emissions increases associated with projected economic growth in both developed and developing countries'.	Taken into account - combined with other comment
14784	1	6	32		33	"Low carbon technologies available today… growth" sounds like a statement about technologies, when it is fact a statement about costs and affordability.	Taken into account - combined with other comment
7864	1	6	32	6	33	In our opinion, the claim that "low carbon technologies available today are not sufficient to offset the emission increase […]" is false (e.g. SRU 2011, Jacobson/Archer 2012). In any case, rather than portraying this as a well-known fact you should discuss the evidence supporting and challenging your claim and link this with the discussion in chapter 6.	Taken into account - combined with other comment
16978	1	6	32	6	33	The statement about low carbon technologies avaialble today not being sufficient to offset the emissions increase driven by economoci growth seems odd. Certainly, solar, wind and nuclear are sufficient zero-carbon technologies - it's economics more than anytihng that precludes these from advancign faster than economic growth, no?	Taken into account - combined with other comment
16979	1	6	33	6	39	In a world with sovereign boundaries and international trade, the idea of "traded carbon" is inevitable. Counting physical emissions within a given nation's boundaries is challenging enough, framing such a large piece of this report around 1 or two recent studies - while an interesting academic exercise - does not seem to be a valuable, practical contribution to the policy-relevant discussion currently given all the uncertainties in accounting.	Taken into account - In fact, the Waxman-Markey bill in the US envisioned doing just that. And there are varied studies by WTO lawyers looking at legal feasiblity of this. France is making moves in this diretion; ditto EU more generally. This is important. See, for example, the next comment which says exactly the opposite of this comment. This paragraph has been revised.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
16055	1	6	34	6	39	It is very helpful to recognize the role of indirect emissions. Can it be noted that it is not yet discussed in the international negociation?	Rejected - our job is to stick to the science here, so we won't make this point, but clearly it is an important point.
7865	1	6	34	6	39	Embodied emissions clearly is an important topic, especially for developing countries. We whish to ask, though, how the problem of embodied emsissions can be integrated into negotiations given the complexities of world trade. There is a realitic fear/possibility that this will only exaggerate disagreement and hamper successful negotiations.	Rejected - how this should be done is not our task, but see responses to comments at line 366
17729	1	6	37			the phrase "much improved technology" in the sentence "Without much improved technology, accounting systems and other arrangements the international economy system doesn't yet support and encourage the realization of low carbon development" does not make sense	The sentence has been removed. Comment is no longer relevant
14785	1	6	37		39	"Without much improved…" make the inability to shift to low carbon development paths appear to be the result of inadequate technologies or accounting systems, which are not the ultimate reasons. It would be much more helpful if this chapter actually discussed the reasons that mitigation has not been undertaken at a scale consistent with climate goals.	Noted - much of that discussion is in the realm of political choices and not the subject of scientific analysis. No action needed
3363	1	6	4	6	7	"driven by sustainable development strategies that emphasize the interconnection of many different policy goals such as energy and food security, local pollution control and climate change. For example, Brazil is one of the leading countries of bioethanol production." Does this example imply, that Brazil consciously designed a bioethanol policy to balance all these policy goals? Given the contention, the various calculation done on this issue, and the uncertainty of outcomes as induced by present and future Brazilian bioethanol it is a courageous move to take Brazilian ethanol as an example. Just to scrap on the surface of the discussion, here is an interesting study on the climate effects, and the interaction with livestock markets, of Brazilian bioethanol: Lapola, D. M. et al., Indirect land-use changes can overcome carbon savings from biofuels in Brazil. PNAS 107 (8), 3388 (2010).	Taken into account - No, the sentence means just what it says and does not imply anything. The example of Brazil in this paragraph was removed during editing.
4604	1	6	40	9	11	Section 1.2.1.2 is a very good introductory section	thank you
2242	1	6	40	11	16	The SRES Scenarios need to be completely changed to take into account this material	Rejected - No reference to SRES is made in text. In AR5 in Ch.6 the new RCP scemarios are discussed and compared with present emissions. SRES scenarios are published literature and cannot be changed. No further action needed.
7866	1	6	40	9	11	What is the the purpose of the descriptive anaylsis of the crisis? This section can be read as a complete affirmation of traditional GDP growth (see comment 25).	Rejected - Comment refers to motivation and not to text. No action needed.
11268	1	6	41	6	42	China, India, etc. are named explicitly everywhere in the report. Why do not say that the crisis started in poorly regulated financial speculation in the USA ("subprime crisis"). As matter of fact, Mexico and Turkey are also members of the OCDE.	Rejected - we have some discussion of the origins, but much detail and opinion on that matter is beyond scope of this essay

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
3887	1	6	41	6	42	The emphasis this sentence/citation puts on poorly-regulated financial speculation as a cause does not seem to be a mainstream view. The US federal inquiry into the causes might be a more authoritative source to cite (there is a link here http://www.nytimes.com/2011/01/26/business/economy/26inquiry.html). Note that the Wikipedia discussion of the causes here (http://en.wikipedia.org/wiki/2007%E2%80%932012_global_financial_crisis) identifies the bursting of the US housing bubble and the lack of provenance of the pervasive CDOs as major issues, and does not refer to financial speculation. Note too the central role in US housing finance by Fannie Mae and Freddie Mac.	Taken into account - phrase on the cause of the financial crisis has been removed
4875	1	6	42			{Add} [Del] "concentrated in [the] {some} OECD countries	Taken into account - combined with other comments
4876	1	6	44			{Add} "largest financial institutions in the US, {Western} Europe	Taken into account - combined with other comments
4601	1	6	6	6	6	I am not sure I would use bio-ethanol as the leading example of sustainble development policy in an introduction as bio-ethanol is controversial in some ways it is produced (e.g. corn but not sugar canes nor cellulose)	Taken into account - combined with other comments
16973	1	6	6			The statement on Brazil's bio-ethanol production needs to be expanded because there are many ways in which bio-ethanol production could NOT be sustainably developed. If Brazil is doing it in a sustainable way, it deserves to be elabvaorated upon just how they are achieving that so other nations can follow suit if desired.	Taken into account - combined with other comments
16974	1	6	8	6	11	When was this Solar Initiative in India launched? What has been committed in terms of resources and has anything been achieved yet?	Taken into account - Sentence has been added at the end of paragraph to include the suggested information
18423	1	6				There are inaccurate generalization regarding developing countries and climate mitigation, for example regarding carbon sinks (pag 6 par 4). Problem with the concept of energy intensity (pag 5 last paragraph) and with Brazilian data regarding deforestation rates (pag 6 paragraph 4). □	Taken into account - combined with other comments. No action needed
3958	1	6	3	6	11	Information about India is missing so it may be included."In India, thermal power plants constitute 65% of the installed capacity, hydroelectric about 21% and rest being a combination of wind, small hydro, bio-mass, waste-to-electricity, and nuclear. Moreover, India is rich in biomass and has a potential of 16,881MW (agro-residues and plantations), 5000MW (bagasse cogeneration) and 2700MW (energy recovery from waste). Biomass power generation in India is an industry that attracts investments of over Rs 600 crores every year, generating more than 5000 million units of electricity and yearly employment of more than 10 million man-days in the rural areas.This traditional biomass fuel – fuel wood, crop waste and animal dung is a potential raw material for the application of biomass technologies for the recovery of cleaner fuel, fertilizers and electricity with significantly lower pollution. During 2011, some 45000 small scale biogas plants were installed. Cumulatively, India has installed 4.44 million small scale biogas plants. "	Rejected - this is way too much detail for our chapter
15095	1	6	37	6	39	Add: ¨Without much improved technology, accounting systems,FIANCIAL ASISTANCE FOR DEVELOPING COUNTRIES, and other arrangements the international economy system doesn't yet support and encourage the realization of low carbon development.	this paragraph has been revised. The discussion on accounting has been removed.
4360	1	6	6	6	6	same comment for bio-ethanol	Taken into account - combined with other comments

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
4852	1	6				1.2.1.2 It is a fair, however, a too detailed economic analysis of the world macroecon. situation in terms of its relevance for the changing c.c. policies. Concerning the implications (pages 8-9), an essential one is not mentioned, namely the drop of the ghg-emissions due the decrease of econ. growth rate in many developed countries.	Noted - our assessment is balanced
15524	1	6	40			The macroeconomic narrative makes sense to me but covers some potentially controversial topics. There are, for example, differing views on the relative importance of financial system factors (such as poor regulation) and of saving behaviour (e.g. excessively low saving rates in rhe USA, excessively high ones in China). I would suggest shortening this section substantially and keeping away from discussing the causes of the macroeconomic crisis. This is not the place to try to fashion a consensus view of those causes.	the first three paragraphs in this section have been condensed and causes of the crisis have been removed.
15468	1	6	40			It should be mention that the 2007 Finanical Crisis caused a significant decrease in emission rates in the first couple of years, due to a major decline in economic activity in many countries (as shown in Fig 1.1). This would highlight the importance of global economic activity on emissions from the current mix of energy sources. Although it is briefly mention in section 1.3.1, it should be also mention in the earlier section	Taken into account - we mention this already in this section but have expanded it a bit.
13249	1	6	43	6	43	"The crisis spread rapidly in the fall of 2008 (…)". The reference to a season is biased according to the (northern or southern) hemisphere. It should be better to reference a month.	Rejected - 'fall' is fine
4090	1	6	43	6	43	Delete reference to Sornette & Woodward - too obvious a fact, large body of literature.	Rejected - reference is fine as is
17688	1	6	33	6	34	low carbon technologies are not sufficient? In what way? New energy sistems arnt influenced so much by the technological locl in	Taken into account - combined with other comments
7008	1	6 of 33	32	6 of 33	32-33	Add "if BAU development is considered to be the only alternative; a very different outcome would be attained in the case that more efficient final use technologies could be accessible to those countries", before the period.	Rejected - suggestion is too complicated - no action needed
7009	1	6 of 33	39	6 of 33	39	Add "or zero" before "carbon development".	Rejected - edit is not necessary. no action needed
3687	1	7				Page seven figure needs explanation	Taken into account - explanation seems sufficient, but we will recheck with final edit
17730	1	7				If possible, include the the data for 2011. By the time this report is published, latest data in this figure 1.1 will be four years old; this will make it consistent with the sentence in line 23 - "….since then..." Also include South African data in this figure.	Figure will be revised to show available data for world regions.
16984	1	7				This is a really valuable and interesting figure. Mexico should be included. Perhaps use the Major Economies Forum (MEF) nations (which account for some 75-80% of global GHG emissions) as a guide for this framing.	Figure has been redone. Countries are now grouped so comment is no longer relevant
9109	1	7	11	7	12	To my knowledge assessments exist where cities in general seem to cause higher GHG loads than the rest of the country on per capita basis, e.g. Heinonen and Junnila (2011c).	Rejected - this work is misleading because it needs to control for income and trade; too much depth for our chapter. No action needed
16983	1	7	12	7	14	This statement / theme ought to be connected back to the earlier discussion/framing on transboundary carbon emissions (incurred via trade) - if that framework persists. This rgowth in trade has facilitated poverty alleviation, economic growth and an increased standard of living in many developing economies.	Rejected - we have the right balance here. No action needed
9110	1	7	14	7	16	I don't understand the sentence. If this refers to cities having lower per capita footprints, the comment above apply.	Rejected - we don't see the relevance of the comment to the text. No action needed.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
15241	1	7	16			Euro area is large compared with, for example, the UK, is is a fair comparison?	Rejected - figure has been redone. Countries are now grouped so comment is no longer relevant
15529	1	7	16			No African or Middle Eastern country mentioned?	Rejected - figure has been redone. Countries are now grouped so comment is no longer relevant
14786	1	7	19		20	Some scholars would argue that it is premature to claim that growth has been decoupled (as is indeed acknowledge in the parenthetical statement at line 23).	Rejected - this is about macroeconomic growth patterns. Such details is outside the scope of this chapter. No action needed.
11393	1	7	19	7	26	There is currently no consensus among economists about the decoupling of growth rates between developed and developing countries. The theory of decoupling should not be extended. The unprecedented acceleration of growth in the developing world in the new millennium in comparison with developed economies is due not so much to improvements in underlying fundamentals as to exceptionally favourable global economic conditions, shaped mainly by unsustainable policies in advanced economies. The only developing economy which has had a major impact on global conditions, notably on commodity prices, is China. However, growth in China has been driven first by a rapid expansion of exports to developed economies and more recently, after the global crisis, by an investment boom, neither of which is replicable or sustainable over the longer term. To maintain a rapid growth, export-led Asian economies need to reduce their dependence on foreign markets. For Latin American and African commodity exporters, gaining greater autonomy and achieving rapid and stable growth depend on their success in reducing reliance on capital flows and commodity earnings – the two key determinants of their growth which are largely beyond national control. See for example Yilmaz Akyuz, The Staggering Rise of the South? (Research Paper 44, South Centre, March 2012)	Rejected - this is about macroeconomic growth patterns. Such details is outside the scope of this chapter. No action needed.
9111	1	7	20	7	28	There is also evidence that the spatial form affects all other consumption choices and thus the emissions on a much wider scale than often taken into account.	Rejected - This level of detail is outside the scope for this chapter
14787	1	7	27		28	"especially in LDCs" is not necessary	Rejected - other comments suggest the opposite. no action needed
3306	1	7	3	7	3	I don't understand this sentence. Is there a missing noun?	Accepted - text has been revised
16056	1	7	3	7	10	"Developping countries were generally not affected" is an euphemism	Rejected - At the time of this writing, develping countries ARE being affected, so text is ok
16057	1	7	3	9	11	two pages of development on the economic crisis is too much. Page 8 until page 9 line 11 is more relevant to show shipting patterns of the internation economy.	Taken into account - this section has be revised to be more concise
7144	1	7	3		4	The sentence seems to have an extra word, 'with', near the end of the sentence.	Taken into account - combined with other comments
16980	1	7	3	7	4	Incomplete sentence	Taken into account - combined with other comments
16981	1	7	5	7	9	If this is true, it definitely needs a citation	Taken into account - text has been revised and shortened. Eliminated need for reference here.
16893	1	7	9			Suggest the following changes -- delete "small, open and export oriented" and at end of sentence add "closely linked through trade with countries which were more directly impacted by the financial crisis." Trade helps countries grow and develop -- it is not helpful to developing countries or to climate policy to suggest that trade is a bad thing.	Rejected - Trade also exposes countries to the fortunes of their trading partners. The text here does not suggest that trade is a bad thing but points to the potential risks of interdependence. No action needed

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
16982	1	7	9	7	10	This statement ought to be quantified - has the recession led to a significant and persistent delcine in FDI and ODA?	Rejected - we think the language is ok here
18424	1	7		9		World macroeconomic situation There is very positive vision of the role of developing countries in the 2008 financial crisis and its aftermath (pag 7 2 y 3 paragraph). Saying that technological innovation “has shifted” to large emergent economies is an exaggeration (pag 9 1 paragraph)	Accepted - the sentence has been revised and no longer says specifically a shift to emerging economies but more generally "has accelerated shifts in the global landscape for innovation" with a cite
5384	1	7	16	7	16	This figure should include: South Africa (as BRICS country) and also should include example from Africa and Example from Gulf oil rich countries…..	Rejected - figure has been redone. Countries are now grouped so comment is no longer relevant
4247	1	7	28	7	29	Where climate change mitigations have been linked to...	Accepted - word added
12083	1	7	3	7	4	The current text is not entirely correct where it says that "The financial crisis ended a seven-year period of substantial expansion of the global economy and with it a period of steadily rising and volatile with material and resource prices." Since the GFC started in late 2008, after a fall in material and resource commodity prices in 2009, resource commodity prices have continued to rise in 2010, 2011 and 2012. In 10 years, from 2001-2011, commodity price rises have eliminated the entire resource commodity price falls from the previous 100 years. Please see "Exhibit 6" in McKinsey Global Institute (2012) The Resource Revolution - Full Report. McKinsey Global Institute. pp30 at http://www.mckinsey.com/insights/mgi/research/natural_resources/resource_revolution	Taken into account - sentence has been revised
3545	1	7	4	7	4	'volatile with material…' - delete "with"	Accepted - sentence has been revised
3688	1	8				Page 8, the source of bullet points statement (whose statements are these?)	Noted - these are our assessments
10461	1	8				Not clear exactly what "energy" relates to since oil is decoupled. The web site graph gives only "fuel (energy) index". Which specific oil commodity is "oil"? May need a footnote to the caption to explain. But oil and energy are basically the same curve. Why have oil at all? Also put "Agr. Raw.mat." in full.	Taken into account - this figure to be redrawn and simplified in parallel with SOD
15531	1	8	12		13	Asian countries' policies with respect to building up foreign exchange reserves were also important. If global imbalances are to be discussed, they should not be ignored. But perhaps the whole issue could be put aside.	Taken into account - the discussion has largely been put aside.
11394	1	8	12	8	12	Perhaps another reference could be found in addition to the Lamy speech. Furthermore, additional references and discussion should also be provided for the argument that such a shift to emerging economies might also not take place given the extent to which they have still not decoupled from developed economies.	the paragraph is revised and the sentence has been removed. Comment is no longer relevant.
15530	1	8	13		14	This is an example of a potentially controversial statement that is not necessary in this context. For a different view, see Bowen, A, and K Mayhew (2008). 'Globalisation, import prices and inflation: How reliable are the 'tailwinds'?' Bank of England Quarterly Bulletin, Q3, London.	the paragraph is revised and the sentence has been removed. Comment is no longer relevant.
16988	1	8	13	8	17	Citations are needed	the paragraph is revised and the sentence has been removed. Comment is no longer relevant.
4466	1	8	17	8	19	This sentence seems out of place and is incomplete. There were several causes of the financial crash other than "lax regulation," and the rest of the paragraph pertains to the current macroeconomic situation, not that which prevailed prior to the crash.	the paragraph is revised and the sentence has been removed. Comment is no longer relevant.
16989	1	8	19			we didn't know the bust was going to be "inevitable", so suggest dropping the term.	good point but the paragraph is revised and the sentence has been removed. Comment is no longer relevant.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
2330	1	8	19	8	21	Obviously,it is clear the connection between financial crisis and extreme weather. But in report like IPCC, it should be elaborated logically this double exposure on countries rather than just one sentence.	Rejected - The commenter may have misunderstood the text as we do not say this. No action needed.
4467	1	8	24	8	27	It is premature to assert that "the momentum in global economic growth has shifted to the BRICS". They have been doing well in recent years, but future growth is notoriously difficult to predict. "Momentum" is not a concept that applies to economic growth.	Taken into account - text is revised
11395	1	8	24	8	27	There should also be a discussion here to highlight the possibility that such shift in momentum of grlobal economic growth, and hence a shift in future responsibility for global emissions, might not take place as expected or forecast due to the impacts of the current and future economic crisis as well as the potential impacts of climate change on emerging economies' growth and development.	Taken into account - text is revised to provide more clarity
18408	1	8	25		25	Are the BRIC´S guilty?. Emissions are growing without BRIC´s?, bullet is not clear. There also no statements about the finally results of the Kyoto Protocol.	Taken into account - other edits to this line will address this point to provide more clarity
9783	1	8	28	8	30	Embedded emissions should be stressed throughout the report; when reduction targets are discussed for international agreements, the point of consumption of the final good should be taken into consideration when setting country-specific reduction targets; there is a whole body of literature on virtual emissions and national footprints that could be considered here.	Taken into account - we address embedded emissions a lot
16894	1	8	28		30	Suggest adding additional sentence at end of this bullet point: "Consumption of imported goods is driving emissions growth in countries which have gained more share of global manufacturing."	Accepted - added phrase "suggesting the need for additional or complementary accounting systems that reflect the ultimate consumption of manufacturing goods that cause emissions rather than just the geographical place where emissions occurred during manufacturing" to the end of first sentence and added citation to the Peters et al (PNAS)
3307	1	8	31	9	2	This bullet point is unintelligible.	Taken into account - paragraph has been revised for clarity
7145	1	8	31		33	The direction in the 'shift in priorities' is not clear. The sentence might make more sense if the clause read: 'among them has been a shift,at least within the countries where economic growth remains sluggish, away from adopting climate policies on the own.'	Taken into account - paragraph has been revised for clarity
16985	1	8	5	8	6	"a wave of anxiety driven by public debt threatens the world economy" deseres a citation	paragraph has been removed. Comment is no longer relevant
16986	1	8	6			"Several highly indebted OECD countries in Europe…"; again, these nations should be listed so a complete snapshot of the current situation in the world is given, while also allowing posterity to read this report and assess what each nation has done, what impact it has had, etc.	Rejected - This level of detail is beyond the scope of the chapter. No action needed
8404	1	8	8	8		It is worth noting that the economic crisis doesn't concern energy companies, the revenues and profits of biggest fossil-energy companies in the last years have been enormous, and often increasing substantially from the previous years. See http://money.cnn.com/magazines/fortune/global500/2011/full_list/	Rejected - no scientific evidence/publication provided to support changes suggested by the reviewer. No action needed
8473	1	8	9		21	It may be helpful to note here that comparative advantage does often translate into significant disparities at the population and individual level, which may exacerbate the impacts of climate variability	Rejected - This is a good point but is too much detail here
17403	1	8	9	8	12	This point may not be relevant for food production for a number of reasons such as finite amount of arable / grazeable land (and fishable waters) and the large inefficiency of further clearing of tropical forests for food production. Consider including a footnote for this caveat.	Rejected - this point is not correct. No action needed

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
16987	1	8	9	8	11	Many economists would argue that this is not what has driven the shift in productivity so much as cheap labor and booming markets in emerging economies.	Rejected - there are mixed views on this. This paragraph has largely been revised. No action needed
12084	1	8	3	8	4	The current text simply says "Governments responded to the crisis in many different ways, often with fiscal stimulus packages as well as support to ailing banks." It is relevant for the IPCC to note very briefly in one sentance that "many national and state government's focused significant percentages of their "stimulus packages" on initiatives which were designed to simultaneously achieve climate change mitigation whilst creating jobs and boosting the economy. This is because many climate change mitigation strategies have a relatively good economic multiplier." This futher evidences the fact that there has been an historic shift amongst decision makers globally to now view climate change mitigation as an activity that stimulates the economy. Please see OECD (2011). Towards Green Growth. OECD, Paris, France. Please see HSBC Global Research (2009) Building a green recovery Governments allocate USD470bn and Counting. HSBC Global Research at http://www.hsbc.com/1/PA_esf-ca-app-content/content/assets/sustainability/090522_green_recovery.pdf	Rejected - there are mixed views on this, and other comments suggest we shorten this section. So no edits will be taken on this point, but we will add the OECD green growth citation elsewhere.
8220	1	8	9	8	12	While talking about the impact of financial crisis, particularly in the OECD countries, the author states that, “The net effect of these crises has further shifted production, investment and technology to emerging economies—a phenomenon that is consistent with the expectation that in a globalized world economy capital resources will shift to emerging economies that can make most productive use of investment (Lamy, 2011).” Comment: I wonder if there are other references that may be cited. The current reference (Lamy 2011) is a talk given in the 2011 Panglaykim Memorial Lecture on “Harnessing Global Diversity” at the Centre for Strategic and International Studies in Jakarta on 14 June 2011.	Accepted - added reference to Zhu (2011) "Emerging Challenges" in Finance & Development
17690	1	8	28	8	30	The qotation marks are wrong. The consecuences of embeded emissions can be briefly pointed out "that dificult the measure of GHG emissions between manufacturing and cosuming countries".	Taken into account - other edits address embedded emissions, which is really important. Combined with other comments
17689	1	8	4	8	4	ailing banks or failing	Rejected - word is ok. No action needed
18417	1	9		10		In some parts, like page 9 and 10, the language is a bit confusing; I think it is to avoid clear and strong assessments regarding delicate issues, such as emission growth in emergent countries. Executive summary It is quite optimistic regarding the political responses to climate change in the last two decades. In absolute terms it is accurate, but it fails to acknowledge the growing scientific evidence in relation to the magnitude of the threat.	Taken into account - other comments address this
2331	1	9		10		In Rio+20, public lobbying through environmental civil movements highlighted the demand of elimination of fossil fuel subsidies. (http://www.un.org/apps/news/story.asp?NewsID=42289). Governments have responsibility to move towards green energy alternatives. Still, fossil fuel companies hold considerable lobby power inside governments in developed and developing countreis. , it can be observed that solar powered devices using as emergency roadside telephones, car parking machines, railroad crossing signs and high way machines. This discussion would be an important factor in this section. □	Noted - text is ok. No action needed

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
17731	1	9	1			the word "this" should be "these"	paragraph is revised. This sentence has been removed; comment no longer relevant
15532	1	9	1		2	Also, general technical progress that enhances energy efficiency is likely to be slowed. See Bowen, A, e t al (2009): 'The implications of the economic slowdown for greenhouse gas emissions and targets,' CCCEP Policy Paper, LSE, October.	Accepted - added sentence: "Economic slowdown may also reduce the rate of technological progres that contributes to addressing climate change, such as in energy efficiency." and added cite to Bowen et al.
4877	1	9	1			{Cor} "in {this} these historically industrialized countries	paragraph is revised. This sentence has been removed; comment no longer relevant
7867	1	9	10	9	11	The juristdiction - in any meaning of the word - does not set policies.	this sentence has been removed; comment no longer relevant
16993	1	9	11			A 6th (or more appropriately, perhaps a new 4th) bullet might be warranted that discusses the salient point that there has been a decline and subsequent stabilization (or further decline) in emissions of most OECD nations over the past ~10 years. What are the lessons to be learned there? Are there transferable actions?	Rejected - Space limitations do not allow to discuss in detail underlying mechanisms/implications of all short-term trends summarized here
8707	1	9	11			Again, this sub-section ends without discussing the doubts on the part of many economists as to whether or not economic growth will return to OECD countries in the next 10-20 years. Yet, all the IAM model results in Chapter 6 assume steady and unlimited economic growth world-wide. This potential conflict in assumptions should be discussed up-front here in Chapter 1.	Rejected - text is balanced enough
17405	1	9	12			It's not at all clear why this section would be restricted only to energy systems. Consider expanding to include AFOLU issues or adding a separate sub-section on this topic.	Taken into consideration - discussion on AFOLU is needed and will be added
4878	1	9	13			{Add} "The {primary purpose of energy systems is to provide affordable energy services {to meet basic human needs, moreover, these fuel economic and social development.	Reject - The existing text is fine. No action needed
15242	1	9	14			this notion of 'development' needs to be broken down - what is 'progress' for example?	Taken into account - the paragraph is revised to be more clear
16994	1	9	16			The parentheses should also note that "regulatory" costs can be substantial (EIS, etc.)	Rejected - this point is correct, but if we address it we will need to qualify the statement a lot and that will make for an overly complex text
7868	1	9	19	9	20	In econmoic theory there is no freedom of choice whether or not to include externalities. The wording of this line suggests such a choice.	Taken into account - the sentence has been revised to reflect the commenter's point
16995	1	9	20			Expand final sentence with, "… and in most(?) cases around the world, they are not." [Are there examples of where they are that can be cited?]	Rejected - this point is correct, but if we address it we will need to qualify the statement a lot and that will make for an overly complex text
3878	1	9	21	9	22	"Following a decade of price stability at low levels, since 2004 energy prices have been high and volatile (see Figure 1.2)". Please, note that energy prices are missed in Figure 1.2..	Rejected - Energy prices are included in the figure. The line follows the "oil" line and so may be harder to see. No action needed
3546	1	9	24	26	24	Unbalanced parantesis in most references	Editorial - copyedit to be completed prior to publication

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
16996	1	9	24	9	27	These are cryptic statements deserving of expansion	Taken into account - sentence has been removed
7146	1	9	24 & 26			Remove extra '(' parenthesis.	Editorial - copyedit to be completed prior to publication
5458	1	9	27	9	32	Discussion of peak oil with differing opinions- no indication of consensus is provided here and would be helpful	Rejected - Discussion of peak oil is beyond scope of chapter 1. A simple reference to GEA chapter 7 will suffice where this is discussed in greater detail and very balanced.
8474	1	9	28		30	Important to note that "peak water" is also a factor, particularly in areas not often considered in this light, including Alberta, Canada	Rejected - The suggestion inclusion of "peak water" is beyond scope of chapter 1.
18250	1	9	3	9	8	shifting) to these emerging economies… . (See also chapters 5 and 16)".	Noted - cross reference is already in the text. No action needed
18251	1	9	3	9	8	All along Chapter 1 the concept is technological innovation, but in Chapter 5 is used technological change, and in chapter 16 is used technology development and transfer, as well Transfer and diffusion. So a definition is needed to grasp the interrelationship between Science, Technology, Innovation and Diffusion and then using the concepts properly in the whole text.	Rejected - beyond the scope of this chapter. Other chapters deal with this. Chapter 1 is an overview
18252	1	9	3	9	8	Another aspect is that innovation is not only technological but also non-technological (organization, marketing, services).	Rejected - this is a good point but other chapters that deal directly with technology and change can address this
18014	1	9	3	9	8	is there evidence to show that " technological innovation…has shifted(and is shifting) to these emerging economies".	Taken into account - the sentence has been removed and the paragraph revised to reflect the commenter's point
16992	1	9	3	9	8	This bullet is not substantiated in the preceding discussion and should be deleted	Taken into account - combined with other comments
11396	1	9	3	9	8	More basis should be provided for the assertion that "technological innovation … has shifted (and is shifting) to these emerging economies" considering that there continues to be many barriers and difficulties that are in place which prevent full and effective technology transfer to developing countries.	Taken into account - combined with other comments
18410	1	9	30		30	Concerns about availability of resources, not scarcity. Resources are not scarce by definition. Within technical properties of resource there is no consideration for scarcity.	Noted - unclear on suggested action. No further action needed
11020	1	9	31			In regard to peak oil, suggest add the following reference: Murray, J., & King, D. (2012). Oil's tipping point passed. Nature, 481, 433-435	Rejected - the existing cite is fine. A discussion on any "peak" theory is outside the scope of this chapter -- no action needed
8405	1	9	33	9	33	I suggest to add that it is a fact that from 2005 onwards, conventional crude-oil production has not risen to match increasing demand. Production is now 'inelastic', unable to respond to rising demand, and this is leading to wild price swings (See Murray J., King D., 2012, Oil's tipping point has passed. Nature, 481-433). This is an important change since AR4, because production of crude oil increased along with demand from 1988 to 2005.	Rejected - the existing cite is fine. A discussion on any "peak" theory is outside the scope of this chapter -- no action needed
13364	1	9	33			The term 'inadequate investment' seems strange choice of words in the context of this report. Perhaps 'low investment' would be better.	Accepted - wording changed to "low investment"

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
4605	1	9	33	9	33	After "unit": "and is more efficient than coal"	Rejected - text is fine as existing. No action needed
4015	1	9	33			suggested wording: "fossil resource and uranium endowment"	Rejected - suggested text is too complicated
7869	1	9	33	9	35	This sentence seems to suggest that much more conventionl (and unconventional) fossil fuels should be exploited. It, again, indicates the affirmation of traditional growth patterns, see comment 25.	Rejected - We do not agree with the commenter's suggested implication of the text. We think the text is fine. No action is needed
16997	1	9	33	9	35	Is this global or region-specific? Also need a citation	Rejected - this is a global statement thus not qualified
14788	1	9	4		8	"The largest…" This is overstated and should be put in context of the generaly global distribution of technological innovatoin capacity, which still resides overwhelmingly in the North, with pockets in the South being limited and constrainted to certain technological domains.	Rejected - no scientific evidence/publication provided to support changes suggested by the reviewer
16990	1	9	4			"The largest emerging economies"; again, these nations should be listed so a complete snapshot of the current situation in the world is given, while also allowing posterity to read this report and assess what each nation has done, what impact it has had, etc.	Rejected - this is too much detail for the chapter
17732	1	9	40			This sentence is too long	Accepted - sentence has been shortened.
4879	1	9	41			"high energy intensity (~ of the extraction?)	Rejected - no, of the fuel itself. We think this is clear enough in the text. No action needed.
7147	1	9	41			Remove both parentheses.	Editorial - copyedit to be completed prior to publication
2572	1	9	45	9	46	I would expect that a large number of contrasting views would have a large number of references	Accepted - additional references added
2573	1	9	47	10	8	Very important the mention to the infrastructure lock-in by the use of shale gas, World Energy Outlook 2011	Rejected - this is too much detail for here.
16991	1	9	5			"innovation and deployment of new technologies" - worth noting that many "effective systems" are also very controversial internationally in terms of tariffs, dumping, etc.	Rejected - this is too much detail for here.
17404	1	9	9	9	11	This is an important point, but it is phrased unclearly. Can the implications be more clearly articulated?	Taken into account - paragraph has been revised for clarity
18249	1	9	3	9	8	“Fourth, technological innovation that is an essential part of cutting emissions has shifted (and is	Noted - unclear on suggested action. No further action needed
18409	1	9	13		20	Paragraph says nothing new, space may be saved.	Rejected - we think text is ok. No action needed
4248	1	9	33	9	34	Has there really been inadequate investment in exploration and extraction capacity for conventional sources of gas and oil? Isn't the increased exploitation of unconventional sources an indicator that these are more productive in conventional terms than conventional sources? Surely the main lack of investments is in low carbon sources of energy?	Taken into account - combined with other comments. The word "inadequate" was changed to "low" per another comment
5315	1	9	33	9	35	The authors talk about inadequate investment in exploration and extraction capacity. At the same time they talk about unexpected surges in demand. Ex post, investment may not have been inadequate. But what is the benchmark for adequate? From a global warming perspective, the too low investment into oil exploration may be considered positive since it slows down CO2 emissions. The point in global warming is not carbon scarcity but (compared to the social cost) its oversupply. I therefore do not understand the concerns about underinvestment in fossil fuel extraction and exploration.	Taken into account - combined with other comments. The word "inadequate" was changed to "low" per another comment

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
3445	1	9	37			It should mentioned as well, among the new supplies from unconventional: tight gas and tight oil	Rejected - our text is ok. It is trying to signal the broad issues only
8221	1	9	3	9	4	Distinction must be made between innovation and deployment – I think there are more deployment and technology transfers than innovation in the emerging economies. Some clarification may be helpful. Have there been any studies that evaluate how technological innovations and the possibility of large new supplies from unconventional resources (e.g., oil sands, shale oil, extra-heavy oil, deep gas, coal bed methane (CBM), shale gas, gas hydrates) will affect the emission and environment.	Taken into account - the first sentence in that paragraph has been revised. Further differentiation, as suggested by commenter, would be beyond the space allocation of the chapter.
4091	1	9	44	9	44	unconventional oil and gas.	Rejected - this is a good point that gas be included. Per other comments, this sentence has been shortened and the portion of the sentence referred to by this comment has been removed.
17691	1	9	47	9	47	Why use "warming gases" instead of GHG?	Noted - to avoid repetition. No action needed
7010	1	9 of 33	20	9 of 33	21	Add "But whatever the costs are, the current world energy system is unsustainable because it's based mainly on fossil fuels, which are finite and pollute the environment", after the final period in line 20.	Rejected - we can't scientifically make that judgement here. It is probably true and that is the spirit of the whole ipcc report, but not in this one sentence
11578	1	o				In general what the chapter captures are the BRICs and the developed countrie(OECD and North America).The rest of the countries, the world, are not dealt with. It is to be noted that there are different categories of developing countries who all have the aspiration of improving the lives of their citizenry and develop. As they develop, they will emit GHGs.They need to be supported to move along green trajectories. Currently they are struggling in their efforts to sustainably develop and address the adverse effects of climate change. They are however doing a lot of work that is contributing to the objectives of the UNFCCC that can be provided as examples in this chapter such as work on energy conservation and efficiency improvements in industry, increasing the widespread use of renewables,development of low carbon energy sources and afforestation etc	Accepted, some more discussion on LDCs added; new categories agreed by DTG will address LDCs (and other categories of countries) systematically
12191	1	Page 25	Line 32ff			You say that there has been a shift in emphasis from mitigation to adaptation and that more countries are rightly focusing on adaptation? Why? What are the arguments, indicators and information you base this statement on? Has there really been a shift? At the global or at national levels (the latter would imply that there had been a focus on mitiation before)? And why do countries “rightly” focus on adaptation?	Taken into account - context is accurate. See response to 1177