

Review comments on the IPCC AR5 Synthesis Report First Order Draft - Topic 3

| Chapter | From Page | From Line | To Page | To Line | Comment  | Response  |
|---------|-----------|-----------|---------|---------|--|---|
| Topic 3 | 0         |           |         |         | This section presents many very important messages and figures, but the headings are misleading and confusing; In particular for sections 3.1., 3.2., 3.3. [European Union]  | We have revised the headings and adjusted the ordering of sections to present a clearer, more focused storyline.  |
| Topic 3 | 0         |           |         |         | Much of the text is highly condensed. Some of the condensed text contains unfamiliar jargon. Many non-expert readers will find such text very difficult to understand. It would be much better if the number of topics covered were reduced to free up space so that the highest priority information can be explained more clearly without jargon, or with clear definitions of essential jargon. Currently some of the text is a collection of somewhat incoherent factoids. There needs to be fewer factoids and more narrative. Specific suggestions given below. [scott power, australia]   | We have revised the text and removed jargon wherever possible, and have changed the ordering of sections to present a clearer narrative.  |
| Topic 3 | 0         |           |         |         | Figures tend to be too complicated, with too much information [scott power, australia]   | Where possible, the figures and captions have been revised to simplify them.  |
| Topic 3 | 0         |           |         |         | The overall structure of this chapter is not very clear. It would be helpful to start the chapter with an introduction that defines what is meant with an integrated approach (see our comment on page 73, line 3) and how the various sections of this chapter describe aspects of this integrated approach and/or transformations in systems. I.e. mitigation pathways (3.2), adaptation pathways (3.3), the potential effect of mitigation and adaptation (3.4) and the interactions among mitigation, adaptation and sustainable development (3.5). At this point, the sections of chapter 3 do not always cover the content suggested by their titles (see for example our comment on page 38 line 16-24) and there is some overlap between the sections, particularly between section 3.2/3.3 and section 3.4. [Government of Netherlands] | We have included an introduction and minimized overlaps between sections, except where repetition is considered necessary to the development of the narrative.                              |
| Topic 3 | 0         |           |         |         | It does not seem very clear how Topic 3 is intended to be distinctly separate from Topics 2 and 4, within the overall narrative of the report. [Government of United Kingdom of Great Britain & Northern Ireland]  | We have clarified the distinction and role of the topic in relation to the other topics.  |
| Topic 3 | 73        | 1         | 73      | 1       | title is vague [scott power, australia]  | The title for Topic 3 is pre-approved and cannot be changed.  |
| Topic 3 | 73        | 1         | 92      | 46      | Section 6.3 of WGIII has seriously been glossed over yet it contains cardinal message. I therefore propose change of title of section 3.2 from "Characteristics and risks of (evolving) mitigation pathways" to Climate stabilisation and risks of (evolving) mitigation pathways. This will enable bringing to the fore important aspects from section 6.3 of WG III which have so far been watered down in the current text as it stands. [Government of Zambia]   | Titles have been approved by the Panel  |
| Topic 3 | 73        | 1         | 92      | 46      | "Transformational adaptation" should be defined up front. It is used repeatedly in the chapter but not defined in any way until the last paragraph on page 82. See WG2 for the carefully-crafted language. [Government of United States of America]  | Transformational adaptation is only one aspect of transformation discussed in this section, thus we have provided a general definition of transformation as a footnote to the introduction. |
| Topic 3 | 73        | 1         |         |         | The concept of transformation could be defined more clearly at the outset. Alteration is also mentioned but a distinction is not made. [European Union]  | We have provided a general definition of transformation as a footnote to the introduction.  |
| Topic 3 | 73        | 2         | 73      | 2       | needs Introduction motivating Topic 3, outlining purpose and scope. [scott power, australia]   | We have added an introduction to Topic 3.   |

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|---------|----|---|----|----|---|---|
| Topic 3 | 73 | 2 | 73 | 2  | Please consider to include a short introductory para about the content of this topic. As it is done for topic 1, 2 and 4. [Government of Norway]  | We have added an introduction to Topic 3.   |
| Topic 3 | 73 | 3 | 73 | 3  | The Kaya factors are probably not known by all. The "Kaya factors" could be omitted, or just renamed as basic drivers of ... [Government of Sweden]   | Reference to the Kaya factors has been omitted.   |
| Topic 3 | 73 | 3 | 74 | 21 | Unclear what is meant with 'an integrated approach'. Suggestion: start section 3.1 with a sentence that explains that an integrated approach to climate change combines adaptation, mitigation and sustainable development policies. Move lines 18-21 of page 74 to the beginning of section 3.1. [Government of Netherlands]   | We no longer discuss integrated approaches in Topic 3 -- it is part of the Topic 4 narrative on current options for responding.   |
| Topic 3 | 73 | 3 | 74 | 21 | No confidence statements are given for statements in this section. [Government of Netherlands]  | We have added confidence statements where appropriate.  |
| Topic 3 | 73 | 3 | 74 | 21 | suggestion: add to this section conclusion "Adaptation is place and context specific.....) p. 22 SPM WGII [Government of Netherlands]   | This is now part of a bullet point in 3.3.  |
| Topic 3 | 73 | 3 | 92 | 46 | <p>General comments on Topic 3:<br/>Apparently it needs an introduction or providing aims and structures of the Topic 3 before the section 3.1. An introduction of the TOPIC 3 will be much helpful for readers to understand the main findings, messages and lessons gained through AR 5 cross over issues. Please refer to the 'WGIII TS.1 Introduction and Framing' to put introductory part for the Topic 3. Nevertheless overall structure is reasonable and well informed to transit for the Topic 4.</p> <p>Regarding to transformation pathways including mitigation pathways and adaptation pathways, it would be better to provide more characteristics of CDR(carbon dioxide removal) technologies – CCS (carbon dioxide capture and storage), BECCS (BioEnergy with CCS), CCU (carbon capture and utilization) and CDU (carbon dioxide utilization) with limit and uncertainties to apply for the transformation pathway as the importance of these technologies has been growing. section 3.2 and 3.3 would be suit to treat this. Possibly this can be either treated as part of Box 3.2 or add to Box 3.3.</p> <p>In addition Boxes (Box3.1, 3.2 and 3.3) would be better with minor revision of relocation and including more information which would enhance the contents. Please find our suggestions on relevant comments. [Government of Republic of Korea]</p> | We have added an introduction to the topic, and included more discussion of the characteristics of CDR and CCS including limits and uncertainties. We have also revised and reorganized the boxes and sequence of sections. |
| Topic 3 | 73 | 3 |    |    | Many concepts in this section are quite confusing and not necessary. This section should address the science supporting the needs for an integrated approach, and not simply build on concepts and philosophical values and statements. The overuse of transformation, global commons, procedural justice, ethical considerations makes this section quite academic. [European Union]   | The section has been shortened and its role and key themes clarified.   |
| Topic 3 | 73 | 3 |    |    | Section 3.1. This section is in our view key, but it could be even better if it can be more overarching and holistic. This could be done by closer intergration with the findings from section 4.6 "Trade-offs, synergies, and integrated responses.". Please consider to integrate these sections, and draft it so that policymakers seeking this kind of information finds it in one section that clearly communicates the whole narrative. [Government of Norway]  | Some concepts were moved to the introduction, such that 3.1 now focuses on key ethical dimensions of decisionmaking.  |
| Topic 3 | 73 | 5 | 73 | 5  | Unclear what is meant with 'transformations'. Suggestion: refer to definition provided in WG II SPM Box SPM.1 [Government of Netherlands]   | Transformation is defined in a footnote within the introduction, using the glossary definition.   |

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| Topic 3 | 73 | 5 | 73 | 5  | Express "will inevitably" in the terminology of uncertainly defined by the IPCC. [Government of United States of America]  | The headline has been rewritten without "inevitably".   |
| Topic 3 | 73 | 5 | 73 | 7  | Unclear what the difference is between transformations and alterations. Remainder of the paragraph (line 9 - 23) is focussed on transformation, alteration is not mentioned. Suggestion: remove alteration from statement. [Government of Netherlands]   | The text has been revised and alteration is no longer used in reference to transformations.   |
| Topic 3 | 73 | 5 | 73 | 7  | Statement does not capture the content of lines 9 - 23. Lines 9-23 do not explain how transformational responses can contribute to sustainability. [Government of Netherlands]   | The headline statement has been rewritten, and the content of lines 9-23 have been revised and included in the introduction.  |
| Topic 3 | 73 | 5 | 73 | 7  | The authors should revise this shaded box for clarity. We suggest the following: "Climate change will [Delete "inevitably" and replace with UNCERTAINTY LANGUAGE] lead to a range of transformations and alterations in natural and human systems. Failure to respond increases risks. However, transformational responses can contribute to sustainability." [Government of United States of America]   | This headline has been revised and no longer refers to transformations.   |
| Topic 3 | 73 | 5 | 73 | 7  | Please include this headline statement into section 3 of the SPM. [Government of Germany]  | The headline statement has been rewritten and the statement is no longer for consideration in the SPM.  |
| Topic 3 | 73 | 5 |    |    | What does "alteration" mean, and what is the relation to "changes" and "transformations"? Please clarify concepts. [Government of Germany]   | The text has been revised and alteration is no longer used in reference to transformations.   |
| Topic 3 | 73 | 6 | 73 | 6  | After.. as a result either of responding to climate change or of failing to do so, include the following: considering that transformation is understood in this summary as A change in the fundamental attributes of natural and human systems, and that could reflect strengthened, altered, or aligned paradigms, goals, or values towards promoting adaptation for sustainable development, including poverty reduction. WE NEED TO CONSIDER THAT TRANSFORMATION IS ONLY USED IN THE SUMMARY FOR ADAPTATION AND NOT FOR MITIGATION. [Government of Bolivia] | The definition of transformation is included in the introduction, as a footnote, with reference to the glossary.  |
| Topic 3 | 73 | 7 | 73 | 7  | Substitute the word sustainability by sustainable development in the context of poverty eradication. [Government of Bolivia]   | The headline statement for 3.1 has been rewritten without reference to sustainable development.   |
| Topic 3 | 73 | 7 | 73 | 7  | Suggestion: replace 'transformational responses can contribute to sustainability' by 'successful responses to climate change cannot be accomplished over the long-term without large-scale transformations and changes to systems' (line 17-18) [Government of Netherlands]  | The headline statement for 3.1 has been rewritten without reference to the role of transformations.   |
| Topic 3 | 73 | 9 | 73 | 10 | Please add economics and infrastructure as these are very important. [Government of Germany]   | These sentences have been included in the introduction. Infrastructure has been added, but not economics because all of the changes will influence economies so it is not a parallel example. |
| Topic 3 | 73 | 9 | 73 | 14 | Heavy handed statement predicting changes from climate change. Add confidence levels. [Government of Netherlands]  | These sentences have been revised and moved to the introduction, and because they are qualified and general, no confidence statement are considered necessary.                                |

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| Topic 3 | 73 | 9  | 73 | 14 | The authors should consider adding WGII 5.4 as supporting chapter reference. [Government of United States of America]   | These sentences have been included in the introduction. There are no references in the introduction, as it includes very general statements.                              |
| Topic 3 | 73 | 9  | 73 | 14 | Be clear about the timescale of these impacts - when will they be transformational and where? At least highlight that the impacts are expected to be much larger for higher temperature increases and perhaps smaller in the near-term (except in some regions). [Government of United Kingdom of Great Britain & Northern Ireland]   | These sentences have been revised and moved to the introduction, and qualified to accommodate these differences.  |
| Topic 3 | 73 | 10 | 73 | 10 | The statement 'and much else' needs a reference to underlying report where these other transformations are listed. [Government of Netherlands]  | The phrase 'and much else' has been deleted.  |
| Topic 3 | 73 | 10 | 73 | 11 | WG II SPM Assessment Box SPM.1 Figure 1, Table 19.4 and CC-KR Table describe risks associated with reasons for concern (Figure 1) and climate related hazards, vulnerabilities and risks (Table 19.4 and CC-KR) whereas this statement is about transformations in systems. Suggestion: refer to WG I SPM for transformations in natural systems and WG II SPM and WG III SPM for changes in human systems. [Government of Netherlands] | This sentence has been revised and moved to the introduction, where it does not have references.  |
| Topic 3 | 73 | 11 | 73 | 12 | Sentence can be merged with sentence on topic 3 , page 73 in line 22 and line 23, and reduce on text [Government of Zambia]   | This sentence has been deleted.   |
| Topic 3 | 73 | 11 | 73 | 12 | Statement on the scale of transformations is not supported by material from AR5 reports. Suggestions for reference: WG II SPM C-2; WG II 20.5;WG II 20.6. [Government of Netherlands]   | This sentence has been deleted.   |
| Topic 3 | 73 | 11 | 73 | 13 | Sentence should read "The scale of these transformations will be influenced by the rate and magnitude of climate change, resource competition and development pathways chosen". WGII 11.6 [Government of Zambia]  | This sentence has been deleted.   |
| Topic 3 | 73 | 12 | 73 | 14 | Exclude reference WG II 11.7 and WG II 12.6. For this statement on (the distribution of) climate impact reference WG II 11.7 ('Adaptation to Protect Health') and WG II 12.6 ('State Integrity and Geopolitical Rivalry') are not directly relevant. [Government of Netherlands]  | This sentence has been deleted.   |
| Topic 3 | 73 | 13 | 73 | 13 | The statement includes a subjective opinion about what is equitable and should be revised to remain neutral and descriptive only. It should be revised along the lines of "The impacts, however, will not be distributed evenly and the poorest are most vulnerable." [Government of United States of America]  | This sentence has been deleted. References to equity issues and the poor have been presented in a neutral manner.   |
| Topic 3 | 73 | 16 | 73 | 23 | DELETE THE WHOLE PARAGRAPH because as referred in the definition of transformation we can not speak only of change in values but in the strenghtening, altering of aligning paradigms (see WGII). Also, transformation is used in the summary WG II only for adaptation and not for mitigation. In this paragraph transformation is used for both mitigation and adaptation which is completely mistaken. [Government of Bolivia]       | The concept of transformation is be'riefly described and defined in the introduction, where it broadly refers to responses related to impacts, adaptation and mitigation. |
| Topic 3 | 73 | 16 | 73 | 23 | The authors should consider adding WGII 5.5. as supporting reference. [Government of United States of America]  | The paragraph has been deleted, and transformation has been defined in the introduction.  |
| Topic 3 | 73 | 16 | 73 | 23 | This para nicely integrates information from WG2 and 3. Please add the concept of climate resilience. [Government of Germany]   | Climate resilient pathways are discussed in 3.5.  |
| Topic 3 | 73 | 17 | 73 | 18 | how is success defined? what sort of systems? [scott power, australia]  | The word 'successful' has been deleted.   |

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| Topic 3 | 73 | 18 | 73 | 19 | Change suggested: "Successful mitigation will ultimately involve transformations in production and consumption patterns, involving goods and services, energy, and how they use the land surface." [Pedro Alfredo Borges Landáez, Venezuela]   | Thank you for the suggestion, but the paragraph has been substantially revised and moved to the introduction.                           |
| Topic 3 | 73 | 19 | 73 | 19 | Suggest changing "the way that human societies produce and use energy" to 'the way that human societies produce and use energy services'. In strict thermodynamic terms, one cannot produce energy - one can only convert it from one form to another with inevitable conversion losses to the environment. [H-Holger Rogner, Austria]   | This change has been made in the text.  |
| Topic 3 | 73 | 20 | 73 | 20 | Please give an example of a transformative adaptation [Government of United Kingdom of Great Britain & Northern Ireland]   | The reference to transformative adaptation has been removed.  |
| Topic 3 | 73 | 20 |    |    | Some adaptive responses may only require incremental measures, but many others will need to be transformative. [Stewart Cohen, Canada]   | This is an important point, but the sentence has been deleted.  |
| Topic 3 | 73 | 21 | 73 | 22 | WGII 2.1-3 can support this statement. [Stewart Cohen, Canada]   | This sentence has been deleted.   |
| Topic 3 | 73 | 21 | 73 | 22 | Abstract statement and unclear how this statement relates to the rest of the paragraph. Also, climate change does not result from changes in goals, values and paradigms as the statement now implies. Suggestion: make statement more specific by linking transformation to changes in goals values and paradigms. E.g. "Transformational responses to climate change often result from and lead to changes in goals, values AND paradigms" [Government of Netherlands]         | The sentence has been deleted.  |
| Topic 3 | 73 | 21 | 73 | 22 | Unclear what the goals, values and paradigms relate to. Suggestion: specify context. Energy? Equity? [Government of Netherlands]   | The sentence has been deleted.  |
| Topic 3 | 73 | 21 | 73 | 23 | goals, values or paradigms' too condensed. What sort of goals? What sort of values? What sort of systems? 'The outcome of transformations' too vague. Give more information. [scott power, australia]  | The sentence has been deleted.  |
| Topic 3 | 73 | 22 | 73 | 23 | Unclear if mitigation, adaptation and sustainable development pathways are cause, consequence or part of transformations. [Government of Netherlands]  | This sentence has been revised and moved to the introduction.   |
| Topic 3 | 73 | 22 | 73 | 23 | This sentence seems to miss the point made previously about other drivers of change - in other words the outcome of transformations will depend on a whole host of factors (not just the ones mentioned). And this is one of the reasons why a risk-based approach is a useful framing. But transformations will also need to grapple with deep uncertainty - that is not conducive to formal risk assessment [Government of United Kingdom of Great Britain & Northern Ireland] | These are important points that have been captured in the narrative for Topic 3, particularly in the introduction.                      |
| Topic 3 | 73 | 25 | 73 | 25 | As this section is about the human response to climate change, change statement in: "The human response to climate change has...." [Government of Netherlands]   | A significantly revised but related headline now says "Responding to climate change involves ethical dimensions and value judgments. ." |
| Topic 3 | 73 | 25 | 73 | 26 | This box is very generic. [European Union]   | The headline has been deleted.  |
| Topic 3 | 73 | 25 | 73 | 26 | This shaded box - while true - adds minimal value and should be deleted. [Government of United States of America]  | The headline has been deleted.  |
| Topic 3 | 73 | 25 | 73 | 26 | The shaded headline box uses language that is too subjective. Nor does it capture the content of all the subsequent paragraphs (e.g. lines 46-54). Recommend more neutral language along the lines of that in the WGIII SPM: "Many areas of climate policy-making involve value judgments and ethical considerations." [Government of Canada]  | The headline has been deleted.  |
| Topic 3 | 73 | 26 | 73 | 26 | Add that ethical dimensions include issues about distributive justice and compensatory justice as it is in underlying chapters about this issue in WGIII. [Government of Bolivia]  | The headline has been deleted.  |
| Topic 3 | 73 | 26 | 73 | 26 | Too condensed. What sort of analysts? Stakeholders of what? [scott power, australia]   | The headline has been deleted.  |

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| Topic 3 | 73 | 26 | 73 | 26 | Analysts and policy-makers can also be considered stakeholders. Suggestion: "...amongst analysts, stakeholders and other stakeholders." [Government of Netherlands]   | The headline has been deleted.  |
| Topic 3 | 73 | 28 | 73 | 28 | Global commons' is an extremely concept for report. Clearly define what a global commons issue is. 'Actor': explain clearly here as this is first appearance. [scott power, australia]  | This term has been deleted.   |
| Topic 3 | 73 | 28 | 73 | 28 | We suggest replacing the phrase "the atmosphere is a global commons" with the final language used in WGIII SPM, "climate change has the characteristics of a collective action problem at the global scale." [Government of United States of America]   | The wording has been changed as suggested.  |
| Topic 3 | 73 | 28 | 73 | 29 | Perhaps it should be added that for global commons, cooperation is often necessary in order to reach the solution that is best for all stakeholders. [Government of Sweden]   | The point is implicit in the explanation: Climate change has the characteristics of a collective action problem at the global scale. This means that effective mitigation will not be achieved by actors who independently pursue their own interests. .  |
| Topic 3 | 73 | 28 | 73 | 29 | Considering the diverse interpretations and implications of the term "global commons," recommend replacement of current AR5 SYR p73, lines 28-29 with approved text from AR5 WGIII SPM p4:<br><br>Effective mitigation will not be achieved if individual agents advance their own interests independently. Climate change has the characteristics of a collective action problem at the global scale, because most greenhouse gases (GHGs) accumulate over time and mix globally, and emissions by any agent (e.g., individual, community, company, country) affect other agents. *<br>*Footnote:"In the social sciences this is referred to as a 'global commons problem'. As this expression is used in the social sciences, it has no specific implications for legal arrangements or for particular criteria regarding effort sharing."<br>[Government of Japan] | The wording has been changed to refer to a collective action problem.   |
| Topic 3 | 73 | 28 | 73 | 29 | Strong statement, lacking further explanation, detail, reasoning or confidence label. Suggestion: reference to WG III SPM.2 [Government of Netherlands]   | Global commons' has been changed to 'collective action', which should be clearer.   |
| Topic 3 | 73 | 28 | 73 | 29 | Suggestion: Give example of the challenges of international cooperation. [Government of Netherlands]  | This clause has been removed.   |
| Topic 3 | 73 | 28 | 73 | 32 | This paragraph transmits messages that are excessively simplistic. The only 'news' here is the term 'global common' which can be easily avoided. Why this reference to the atmosphere when this is about the whole climate system? Wouldn't it be easier to make reference to the international and intergenerational responsibility?The paragraph below addresses that. [European Union]   | A commons problem (or a collective action problem, now that the terminology has been altered) is by definition a situation in which independent self-interested action by the participants will lead to an outcome that is less good for everybody. This point is separate from the responsibility of some agents for others. Wording has been changed to make the inference clearer. |

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| Topic 3 | 73 | 30 | 73 | 30 | We disagree that: "The benefits are uncertain and distant". The benefits of a government funded large scale photovoltaic energy production in semi-arid regions like Northeast Brazil, can bring immediate and tangible benefits for the small land owner, not only for the revenues obtained from the energy sold to the national grid, but also for the establishment of long term jobs opportunities for the industrialization of photo-voltaic cells and systems. From residential scale to industrial and larger scale photovoltaic energy generation also turn the rural area population less vulnerable to recurrent droughts, a natural phenomena of semiarid climate, which climate change scenarios indicate shall become more intense and recurrent in the future. Therefore, such a measure is both a mitigation and adaptation action of benefit, both climatic and socio-economically. [Government of Brazil] | Many of ' has been inserted into the sentence to reflect this point.   |
| Topic 3 | 73 | 30 | 73 | 30 | Rephrase "people who are not yet born" to "future generations" [Government of Netherlands]  | The sentence has been deleted.   |
| Topic 3 | 73 | 31 | 73 | 31 | Not all IAMs use optimisation. It might be wise to leave the word 'optimisation' out. [European Union]  | The comment is not related to the text, and perhaps misplaced.   |
| Topic 3 | 73 | 31 | 73 | 31 | It is suggested to add: "Furthermore, research and development in support of mitigation creates knowledge spillovers. International cooperation can play a constructive role in the development, diffusion and transfer of knowledge and environmentally sound technologies". [Tabaré Arroyo Currás, Mexico]  | This is an important point, but there is not enough space to include this in the SYR:  |
| Topic 3 | 73 | 31 |    |    | replace vague word "can make" with "supports" to make it more concrete. [Government of Netherlands]   | We intend 'can make possible' to show the precise way in which cooperation supports effective responses: it makes them possible. |
| Topic 3 | 73 | 31 |    |    | The slightly negative message from this sentence is not consistent with the rest of the para that purely refers to a theoretical concept - the need for international cooperation to solve the climate crisis - without judgments about challenges. Please remove the last sentence. [Government of Germany]  | This clause has been deleted   |
| Topic 3 | 73 | 34 | 73 | 35 | As the carbon dioxide emission does not directly generate 'damage', it is suggested to reformulate "Because the damage done by each country's emissions of greenhouse gases is distributed across the world ..." as "Because the damage caused by climate change is distributed across the world ...". [Government of China]  | This clause has been deleted   |
| Topic 3 | 73 | 34 | 73 | 37 | The first part of this sentence can be deleted, and make the paragraph start with 'Climate change raises...'. [European Union]  | This has been done.  |
| Topic 3 | 73 | 34 | 73 | 37 | In order to include both past and future perspectives, we suggest replacement of the text here with "Issues of equity, justice, and fairness arise with respect to mitigation and adaptation. Countries' past and future contributions to the accumulation of GHGs in the atmosphere are different, and countries also face varying challenges and circumstances, and have different capacities to address mitigation and adaptation." in WG3 SPM p.4 [Government of Japan]   | We have replaced the indicated text with a re-ordered version of the first of these sentences from the SPM of WG3.               |
| Topic 3 | 73 | 34 | 73 | 44 | In this paragraph, procedural justice and procedural fairness were used in the different sentences. It seems two phrases are different in meaning. Please keep them consintence at least in one paragraph. [Shiming Ma, China]  | This has been corrected.   |

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| Topic 3 | 73 | 34 | 73 | 44 | Justice, fairness and equity are used interchangeably which creates confusing. Suggestion: select one term and use consistently. [Government of Netherlands]   | This has not proved possible in reviewing the literature, since different disciplines use different terms, sometimes with slightly different meanings. A meeting of authors was held at LA4 in Addis Adaba to try to resolve the problem. It reached the conclusion that all three terms should be retained. |
| Topic 3 | 73 | 34 | 73 | 44 | In this paragraph, "procedural" has been repeated for three times including bold face in the topic sentence. It may give reader the feeling that the procedural equity is more important than outcome equity which is crucial in climate change negotiation on effort-sharing or burden-sharing (WGIII,13.4). And "procedure equity" again appears on Line 4 of Page 80. The last sentence of this paragraph could be changed into following: Achieving distributive equity among actors can also contribute to developing cooperation and effective governance. [Songli Zhu, China] | The term 'procedural' has been removed.  |
| Topic 3 | 73 | 36 | 73 | 36 | We suggest deleting the phrase "procedural justice" from this sentence. Procedural justice is only one possible framing related to climate change and sustainable development, and highlighting it in the bolded sentence may construe a strong and hence prescriptive endorsement of the use of this framing in shaping climate policy. [Government of United States of America]  | The term 'procedural' has been removed.  |
| Topic 3 | 73 | 37 | 73 | 37 | Before "For example" without dots and it must add space [Government of Vietnam]  | Space inserted   |
| Topic 3 | 73 | 37 | 73 | 37 | Include after sustainable development the issue of poverty eradication. [Government of Bolivia]  | Sustainable development has been removed   |
| Topic 3 | 73 | 38 | 73 | 38 | "sacrifice" may be a rather dramatic word here. [Government of Sweden]   | This word has been deleted from the text.  |
| Topic 3 | 73 | 38 | 73 | 38 | The word "sacrifice" it is correctly used. However, it might bring along a too negative meaning. It is recommended to use "trade-offs" or any other euphemism that might more accurately express the idea without deriving into such negative perception. Please remember all connotations of the word: <a href="http://www.oxforddictionaries.com/definition/english/sacrifice?q=sacrifice">http://www.oxforddictionaries.com/definition/english/sacrifice?q=sacrifice</a> [Tabaré Arroyo Currás, Mexico]   | This word has been deleted from the text.  |
| Topic 3 | 73 | 38 |    |    | Please exchange the word "sacrifice" with a more neutral word, or mention that no action involves advantages of the present generation to the "detriment" of future generations. Again, the notion that no-action will cause negative effects for all is underemphasized. [Government of Germany]  | This has been corrected.   |
| Topic 3 | 73 | 39 | 73 | 40 | Clarify meaning of scale in sentence: 'Adaptation often has distributional effects on both small and large scales. {WG II, 2.2}' [European Union]  | The text has been changed to read: Both adaptation and mitigation can have distributional effects locally, nationally and internationally, depending on who pays and who benefits  |



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| Topic 3 | 73 | 40 | 73 | 44 | While we recognize that this may be an attempt to define "procedural justice" - a not widely understood term - the language used to describe the concept, nonetheless, is prescriptive. The bullet states that procedural justice requires decisions be made in a way that respects the rights and views of all those affected. It also states that achieving distributive and procedural fairness can contribute to developing cooperation and effective governance. However, WG III 3.10.1.4 does not make any such contention. Instead, it states that people are often motivated by concerns about the fairness of procedures and outcomes, and that these concerns can both promote and hamper the effectiveness of negotiations. The authors should, therefore, delete the use of the phrase "procedural justice". [Government of United States of America] | The text has been revised to remove the appearance of being prescriptive, and the final sentence has also been revised.   |
| Topic 3 | 73 | 41 | 73 | 41 | Check that IAM is defined previously. [scott power, australia]  | Integrated Assessment Models is now spelled out.  |
| Topic 3 | 73 | 41 | 73 | 42 | Sentence structure implies that each group referenced by "some" is distinct from one another, whereas some overlap between those groups may exist. Suggestion: rephrase to: "in circumstances where some may lack information and understanding more than others, and some benefit whereas other suffer from past and future emissions." Omit "and some are not yet born". [Government of Netherlands]  | This phrasing has been removed.   |
| Topic 3 | 73 | 42 | 73 | 42 | See comments for p73 line 30, or omit "and some are not yet born" [Government of Netherlands]   | This phrase has been deleted  |
| Topic 3 | 73 | 43 | 73 | 43 | The meaning of the word "actors" are not clear that the writers state that "Because the atmosphere is a global commons, effective mitigation will not be achieved by actors". So, Use of the word "actors" should be revised. [Government of Vietnam]   | The sentence has been revised.  |
| Topic 3 | 73 | 46 | 73 | 46 | Value of what? [scott power, australia]   | Values are things that are valuable, such as human wellbeing  |
| Topic 3 | 73 | 46 | 73 | 46 | We could not find words "mediation" and "diverse values" in WGIII and SPM, hence no reference to them. [Government of Netherlands]  | WG3 Ch3, p 18 mentions 'values of very different sorts, which must be 'put together or balanced against each other'. 'Of very different sorts' and 'put together or balanced against each other' are replaced by 'diverse' and 'mediation' as more compact terms suitable for a headline. |
| Topic 3 | 73 | 47 | 73 | 47 | This is more of an introductory or framing statement without providing substantial information. Suggest using it in a possible introduction to the topic or to the overall SYR, to a reasonable extent. [Government of Sweden]  | This sentence has been reworded.  |
| Topic 3 | 73 | 47 | 73 | 47 | Implicit external reference ("Recent literature") whereas SYR should only reference AR5. [Government of Netherlands]  | Reference to 'literature' has been deleted.   |
| Topic 3 | 73 | 47 | 73 | 47 | The use of the term "value" in this sentence is confusing and does not seem consistent with the reference to valuation in the previous sentence. We suggest deleting this sentence. [Government of United States of America]  | The sentence has been reworded.   |
| Topic 3 | 73 | 47 |    |    | WGII 2.2 discusses ethics and values and could be added here. [Stewart Cohen, Canada]   | Thank you. Reference to WGII 2.2 has been added.  |
| Topic 3 | 73 | 49 | 73 | 49 | Replace "Economics provides" with "Risk and decision analysis provide". [Carl Southwell, United States of America]  | We think that economics is most appropriately cited for the wide range of methods mentioned here.   |

Review comments on the IPCC AR5 Synthesis Report First Order Draft - Topic 3

|         |    |    |    |    |   |   |
|---------|----|----|----|----|---|---|
| Topic 3 | 73 | 49 | 73 | 54 | Delete rows 49 to 54 and substitute by the following wording from SPM WGIII: Among other methods, economic evaluation is commonly used to inform climate policy design. [Government of Bolivia]   | We do not wish to remove so much content, as it is important to the overall narrative of Topic 3.   |
| Topic 3 | 73 | 51 | 73 | 51 | Reference missing: IAMs are discussed in WG III 3.9 [Government of Netherlands]   | Thank you. This has been included.  |
| Topic 3 | 73 | 51 | 73 | 51 | IAM: abbreviation for Integrated Assessment Model; introduced in Topic 2. For clarity: write out in full instead of using abbreviation. [Government of Netherlands]   | Integrated Assessment Models is now spelled out.  |
| Topic 3 | 73 | 51 | 73 | 51 | Vague: 'and elsewhere'. Add clear reference to other examples, WG III 3.6 is about cost-benefit and cost-effectiveness analysis which are already mentioned. [Government of Netherlands]  | We have moved the reference to WGIII 3.6. We cannot give a complete list given space constraints; it would be too extensive.  |
| Topic 3 | 73 | 51 | 73 | 54 | We suggest rewriting the last two sentences in the paragraph as follows: "Economic methods can take account of non-marketed goods, equity, behavioural biases, ancillary benefits and costs, and the different value of money to different people. They are subject to well-documented limitations." This edit retains the reference to the different value of money to different people but removes the implication that a lack of ethical basis is the primary or only limitation of economic methods. This wouldn't be strictly true, as the economics literature has long recognized non-constant marginal utility and discussed the possibility of inter-personal utility comparisons (as discussed in WG III Chapter 3). Because economic methods can, and some do, take into account this difference across marginal utilities (as noted in WG III Chapter 3) it should be included in the previous sentence. In addition, WGIII section 3.5.1 also discusses other limitations of economics such as valuation of non-marginal impacts, and accounting for uncertainty and irreversibility. [Government of United States of America] | The sentence has been reworded: Economic methods can reflect ethical principles, and take account of non-marketed goods, equity, behavioural biases, ancillary benefits and costs and the differing values of money to different people. They are, however, subject to well-documented limitations. |
| Topic 3 | 73 | 52 | 73 | 53 | Give an example of 'well documented limitations' or refer to specific section in WG III report in which limitations are mentioned. [Government of Netherlands]  | Reference to WG III 3.5 is made at the end of the sentence.   |
| Topic 3 | 73 | 52 | 73 | 54 | Economic methods are said to be: 'subject to well documented limitations, but they can be given some basis in ethics provided they take account of the different value of money to different people'. The phrase 'given some basis in ethics' seems too vague, but it would take a close reading of the sections referenced to make a better suggestion. Perhaps reword as: 'They are subject to well-documented limitations, but these can be addressed to some extent by taking account of the different value of money to different people'. This would take into account that many non-economists call for a less utilitarian form of ethics to govern decision making than that embodied in economics. [European Union]  | The sentence has been reworded in response to this comment and comment T3-59.   |
| Topic 3 | 74 | 1  | 74 | 2  | Boxed text doesn't quite capture the text in lines 04-21. Suggestion: add to the second sentence: "of mitigation and adaptation. These responses are interrelated and current policy choices may affect the range of options available in the future". Please delete boxed text. [Government of Netherlands]  | The headline has been deleted.  |
| Topic 3 | 74 | 1  | 74 | 2  | The shaded box does not add value and, therefore, should be deleted. [Government of United States of America]   | The headline has been deleted.  |
| Topic 3 | 74 | 1  | 74 | 2  | Saying that there are uncertainties and then to say there are options makes it confusing for policy makers. Suggested redraft "Uncertain climate change driven outcomes make climate policy a task of risk management. Last part of the sentence can stay as is it..." [Government of India]  | The headline has been deleted.  |
| Topic 3 | 74 | 1  | 74 | 2  | This headline statement is trivial and duplicates information given previously in the report. Please improve. [Government of Germany]   | The headline has been deleted.  |

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|         |    |    |    |    |   |  |
|---------|----|----|----|----|---|--|
| Topic 3 | 74 | 4  | 74 | 4  | Please consider to exchange "beset" with either "includes dealing" or "is associated" to generate "...climate policy includes dealing with uncertainty." or "...climate policy is associated with uncertainty" [Government of Norway]   | The sentence has been deleted.   |
| Topic 3 | 74 | 4  | 74 | 7  | Please change the order of these sentences. The key point is not the uncertainties, it is that "adaptation and mitigation choices in the near-term will affect risks of climate change...". Please make the second sentence the first in this para and make it bold - this is the key policy-relevant message. [Government of United Kingdom of Great Britain & Northern Ireland]   | The paragraph has been reorganized.  |
| Topic 3 | 74 | 4  | 74 | 9  | The authors should consider adding WGII 5.5. as supporting reference. [Government of United States of America]  | Thank you. WGII 5.5 has been added to the references.  |
| Topic 3 | 74 | 4  | 74 | 9  | These aspects on uncertainty should be removed here and be integrated into Box SPM.1 on P 29. Please restructure. [Government of Germany]   | This paragraph has been restructured.  |
| Topic 3 | 74 | 4  |    |    | Suggest deleting the bolded sentence and the word 'however' from the beginning of the second sentence. Making the rest of the second sentence up until "throughout the 21st century" into the bolded headline will then better represent the content and ideas of this paragraph. The current heading is somewhat redundant and extraneous, and not really a useful key message. [Government of Canada]   | This paragraph has been reorganized.   |
| Topic 3 | 74 | 5  | 74 | 7  | Statement is too broad and not particular relevant to the paragraph on uncertainties. [Government of Netherlands]   | This sentence has been moved.  |
| Topic 3 | 74 | 7  | 74 | 9  | Vague: "... if the limits to adaptation are exceeded" can be interpreted as 'adapting beyond the possibilities of adaption', whereas exceeding the time limit is implied here. [Government of Netherlands]  | This sentence is now in 3.3. Limits to adaptation is discussed in WGII chapter 17, with reference to WGII approved text. |
| Topic 3 | 74 | 8  | 74 | 9  | The authors should consider deleting this entire sentence in the interest of conciseness and particularly since the phrase "limits to adaptation" is not well-defined. [Government of United States of America]   | This sentence is now in 3.3. Limits to adaptation is discussed in WGII chapter 17, with reference to WGII approved text. |
| Topic 3 | 74 | 8  | 74 | 9  | Please change "limits to adaptation" to "limits of adaptation actions". [Government of Germany]   | This sentence is now in 3.3. Limits to adaptation is discussed in WGII chapter 17, with reference to WGII approved text. |
| Topic 3 | 74 | 11 | 74 | 16 | The authors should consider adding WGII 5.5 as supporting reference. [Government of United States of America]   | Thank you. This reference to WGII 5.5 has been added.  |
| Topic 3 | 74 | 11 | 74 | 16 | No distinction is made between reactive and proactive decision making under uncertainty here. Are they equally effective? More importantly it is important to point out differences between perception of risk and uncertainty by stake holders. As risk is calculable and uncertainty is uncalculable. Understanding and communicating uncertainty needs a participatory process which affects the outcome of decision making (mitigation or adaptation measures) and short-term versus longterm approaches. [Vahid Mojtahed, Italy] | We have said as much of this as space allows.  |
| Topic 3 | 74 | 11 | 74 | 17 | Seems like truism. Delete. [scott power, australia]   | The possibility of iteration is treated as an important point in the literature.   |
| Topic 3 | 74 | 12 | 74 | 12 | Implicit assumption that iterative decision-making is necessary/desireable. Make explicit statement on this and explain why. Suggestion: "Effective decision making and risk management under uncertain conditions requires an iterative approach...." [Government of Netherlands]  | Have added 'effective' at the beginning  |

Review comments on the IPCC AR5 Synthesis Report First Order Draft - Topic 3

|         |    |    |    |    |  |  |
|---------|----|----|----|----|--|--|
| Topic 3 | 74 | 12 | 74 | 12 | Lacking sufficient explanation for the conditions under which strategies can be adjusted. [Government of Netherlands]  | This does not seem necessary   |
| Topic 3 | 74 | 13 | 74 | 14 | This statement is an incomplete representation of the underlying text in WG III Chapters 2 and 3, as effective risk management strategies are likely to take into account not just stakeholder's perceptions of risk, but more importantly their "preferences towards" risk. The statement would provide a more complete descriptions written as "Effective risk management strategies are likely to take into account relative stakeholder's preferences for and perceptions of risk and how they respond to uncertainty." [Government of United States of America] | This was meant to be included under 'respond to'. The wording has been changed to make that clearer.                   |
| Topic 3 | 74 | 13 | 74 | 16 | Reference for these statements is missing [Government of Netherlands]  | Citations have been moved to a better position.  |
| Topic 3 | 74 | 15 | 74 | 16 | Vague: 'bias towards the status quo'. Explain what is meant with this statement. Path dependency? Resistance to change? [Government of Netherlands]  | It's hard to say this accurately in other words. It's not exactly resistance to change, but making biased evaluations. |
| Topic 3 | 74 | 15 | 74 | 16 | Unclear statement and reference is missing. Does this statement hold for all methods for decision making under uncertainty or only effective methods? Suggestion: "Effective methods for decision making under uncertainty...." [Government of Netherlands]  | The wording has been changed to make this clearer.   |
| Topic 3 | 74 | 16 | 74 | 16 | Add the following sentence after the existing paragraph: "Science and risk communication that is open, succinct, accessible, and effective is paramount to actionable climate change policy." [Carl Southwell, United States of America]   | Thank you for the suggestion, but unfortunately there is not enough space to elaborate.                                |
| Topic 3 | 74 | 18 | 74 | 18 | Too condensed: 'An integrated approach' integrated in what sense? Approach to what exactly? [scott power, australia]   | The Topic 3 text has been revised, and integration is now discussed in the Topic 4 introduction.                       |
| Topic 3 | 74 | 18 | 74 | 19 | Key statement of section 3.1 (explains what an integrated human response to climate change entails), should be the first sentence of this section. [Government of Netherlands]   | The Topic 3 text has been revised, and integration is now discussed in the Topic 4 introduction.                       |
| Topic 3 | 74 | 18 | 74 | 21 | WGII 2.5 can support this statement. [Stewart Cohen, Canada]   | The Topic 3 text has been revised, and integration is now discussed in the Topic 4 introduction. Add to Topic 4.5.     |
| Topic 3 | 74 | 18 | 74 | 21 | This para on the integrated approach considering mitigation and adaptation together with other aspects should be joint with previous paras on this matter. [Government of Germany]   | The Topic 3 text has been revised, and integration is now discussed in the Topic 4 introduction.                       |
| Topic 3 | 74 | 19 | 74 | 21 | Very broad statement but explained in more detail in lines 4-16 of this page. Change order of statements:statement on lines 19-21 should come before lines 4-16. [Government of Netherlands]   | The paragraph has been deleted.  |
| Topic 3 | 74 | 23 | 74 | 23 | Transformation' is a very important issue for report. Its definition should be given greater prominence. At very least it should be clearly defined when first used. This might be first time it is used. [scott power, australia]   | The word transformation is presented in the introduction to Topic 3.   |
| Topic 3 | 74 | 23 | 74 | 23 | Vague: "(evolving)". Suggestion: omit. [Government of Netherlands]   | The word (evolving) has been deleted.  |
| Topic 3 | 74 | 23 | 81 | 32 | The ...risks of (evolving) mitigation pathways... have not been adequately covered in this section. Please refer to WGIII section 6.7 [Government of Zambia]   | The word (evolving) has been deleted.  |
| Topic 3 | 74 | 23 | 81 | 32 | There is some overlap with the UNFCCC Box. Please assure that the box and section 3.2 are not repetitive [Lena Menzel, Germany]  | Repetition avoided where possible  |
| Topic 3 | 74 | 23 |    |    | Why is "evolving" put in parenthesis? We recommend to delete it. [Government of Germany]   | The word (evolving) has been deleted.  |

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|         |    |    |    |    |   |   |
|---------|----|----|----|----|---|---|
| Topic 3 | 74 | 25 | 74 | 26 | Awkward sentence structure. Rephrase to "Without (some/any) dedicated political effort, emissions are likely to increase over the century, even with major improvements in energy supply and end-use technologies." [Government of Netherlands]   | Headline 3.2 has been revised.  |
| Topic 3 | 74 | 25 | 74 | 26 | Consider making clear here what is meant by "improvements". [Government of Canada]  | Headline 3.2 has been revised.  |
| Topic 3 | 74 | 25 | 74 | 26 | Important sentence, please keep it. [Government of Germany]   | Headline 3.2 has been revised.  |
| Topic 3 | 74 | 26 | 74 | 26 | Unclear what is referred to by "the century". Suggestion: specify, rephrase to "during the 21st century". [Government of Netherlands]   | The term 'Forcers' is widely used; e.g., WGI SPM; TS and WGI ch8  |
| Topic 3 | 74 | 28 | 74 | 28 | "GHG": acronym not (properly) introduced/explained (even though it's generally well-known and quite well-understood, we would say all acronyms should always be explained at their first occurrence, at least for every new chapter) [Government of Netherlands]  | Taken into account. The text has been changed.  |
| Topic 3 | 74 | 28 | 74 | 29 | Statement is not straightforwardly substantiated from fig. 3.1. If population growth is low, growth in per capita income is low and energy intensity of GDP is on the orange track, than only a small decrease of energy carbon intensity is needed to also decrease CO2 emission. Suggestion: rephrase, explaining the relation among the Kaya factors in figure 3.1. [Government of Netherlands]  | Taken into account. The text has been changed.  |
| Topic 3 | 74 | 28 | 74 | 30 | Confidence statement not traceable to referenced sources. [Government of Netherlands]   | Accepted. Text has been changed (almost identical to suggestion).   |
| Topic 3 | 74 | 28 | 74 | 36 | This is very useful para [Government of Denmark]  | Taken into account. Text has been changed.  |
| Topic 3 | 74 | 28 | 77 | 12 | Section 3.2. provides very important information on transformation pathways, but the information comes too late in the SYR-report. Information on temperature rise is given in section 2.4.1, the related emission budgets and concentrations are given in sections 2.4.5 and 3.2, respectively. In addition, some information is given in Table 3.1. This is not user-friendly, please improve the structure of the SYR, and integrate information from WG1 and WG3 in a transparent way, also indicating potential differences. [Government of Germany]   | Taken into account. We agree that a synthesis is required for these issues. However, there is limited basis in the WG reports for discussing these issues in SyR, and thus we have not been able to give this a broad treatment here. However, we have expanded this slightly by introducing a para on non-CO2 before the para on SLCF. |
| Topic 3 | 74 | 30 | 74 | 36 | Greater transparency is important in this paragraph. It seems that the baseline ranges are not for all baselines in the literature, but for a (central?) subset; it is important to state this. The SRES scenarios which of course are also baselines are compared to the AR5 scenarios earlier in the text (SYR page 50) and in appearance is not consistent with this paragraph. I expect that few new baseline scenarios look like the lower SRES B1 which is like RCP 4.5. Suggest that this paragraph be written in a way that clarifies the apparent differences from page 50. [Haroon Kheshgi, United States of America] | Noted. Thanks. We have expanded this slightly by introducing a para on non-CO2 before the para on SLCF.   |
| Topic 3 | 74 | 33 | 74 | 33 | Statement on range similarity is not immediately evident from Figure 3.2 [Government of Netherlands]  | Partially taken into account. The basis for being quantitative on effects of SLCF is limited. We have changed the text in order to clarify. We have also added a new para on non-CO2 before the para on SLCF.   |
| Topic 3 | 74 | 33 | 74 | 33 | 430 ppm only traceable by approximation from WGIII Figure 6.6. No numbers present in listed references. [Government of Netherlands]   | Accepted.   |
| Topic 3 | 74 | 33 | 74 | 34 | The sentence should read "For comparison, the CO2eq concentration in 2011 was estimated to be....." instead of "For comparison, the CO2eq concentration in 2011 is estimated to be 430ppm....." [Government of Zambia]  | Accepted. We have added text about the differences in uncertainties related to various components.  |

Review comments on the IPCC AR5 Synthesis Report First Order Draft - Topic 3

|         |    |    |    |    |   |   |
|---------|----|----|----|----|---|---|
| Topic 3 | 74 | 33 | 74 | 34 | 1. The data of 2011 should be based on monitoring data. I can't understand by the uncertainty range is so wide?<br>2. Readers would be very desperate on the possibility to achieve 2 degree target since there is only 20 ppm (uncertainty range?) space left. [Songli Zhu, China]   | Citation to WG3, 6.3 has been included. The baseline ranges are cited in Table SPM 1 of WG3 as lying in the top two categories. |
| Topic 3 | 74 | 34 | 74 | 35 | Temperature increase ranges do not correspond with numbers found in listed references WGIII Table 6.6, Figure 6.12 or Figure 6.13; None of the listed references provide sufficient backing for the numbers in these lines. [Government of Netherlands]   | Citation to WG3, 6.3 has been included. The baseline ranges are cited in Table SPM 1 of WG3 as lying in the top two categories. |
| Topic 3 | 74 | 34 | 74 | 36 | Delete Figure SPM.5 from the following, as it does not depict baseline scenarios: 'Baseline scenarios result in global mean surface temperature increases in 2100 from 3.7 to 4.8°C (median values; the range is 2.5°C to 7.8°C when including climate uncertainty). (WGI 8.5 12.3, Figure SPM.5; WGIII 6.3, Box TS.6)'. [European Union]   | This has been corrected.  |
| Topic 3 | 74 |    | 81 |    | Please add more about the indirect benefits of mitigation, e.g. energy security. [European Union]   | A discussion of co-benefits is in section 3.5 (Box 3.5)   |
| Topic 3 | 74 |    | 81 |    | Please add some discussion on the benefits of mitigation such as short term health improvements (from reductions in particulates). [European Union]   | A discussion of co-benefits is in section 3.5 (Box 3.5)   |
| Topic 3 | 75 | 0  |    |    | Figure 3.1 : Strange thin and not straight lines connected to 2010 appear in every panel, should probably be removed. For panel d, the name of the scenario used should be given. The caption comes without line of cite, it should. [Thomas Stocker/ WGI TSU, Switzerland]   | Figure 3.1 has been deleted.  |
| Topic 3 | 75 | 1  | 75 | 1  | caption should include texts on all four panels. [Government of Denmark]  | Figure 3.1 has been deleted.  |
| Topic 3 | 75 | 1  | 75 | 2  | In Figure 3.1: same scalebar should be applied if it can. [Government of Vietnam]   | Figure 3.1 has been deleted.  |
| Topic 3 | 75 | 1  | 75 | 2  | In my perspective, there are several difficulties in understanding Fig 3.1 First, to me it is not clear what the significance of "1 outlier" in part (a) is (from what sample? Is it just a weird projection? Etc.). Second, to me it does not sound plausible that there should be so little variation in the possible future C intensity of energy (part d). Third, I think the "Kaya Factors" in the caption text need explanation for lay readers. [Helmut Haberl, Austria] | Figure 3.1 has been deleted.  |
| Topic 3 | 75 | 1  | 75 | 2  | Figure 3.1: Usefulness of the words History, Default and Fast unclear. [Government of Netherlands]  | Figure 3.1 has been deleted.  |
| Topic 3 | 75 | 1  | 75 | 2  | Figure 3.1: It would be helpful to show the net positive effect of the different factors: Carbon emissions. [Government of Netherlands]   | Figure 3.1 has been deleted.  |
| Topic 3 | 75 | 1  | 75 | 2  | Figure 3.1: No units on Y-axis; only explained in caption that Y-axis shows values resulting from normalization. [Government of Netherlands]  | Figure 3.1 has been deleted.  |
| Topic 3 | 75 | 1  | 75 | 2  | Figure 3.1: Harmonization mentioned but not (sufficiently) explained: harmonized what and to what criteria? [Government of Netherlands]   | Figure 3.1 has been deleted.  |
| Topic 3 | 75 | 1  | 75 | 2  | Figure 3.1: The "UN variants (H, M, L)" remain unexplained. [Government of Netherlands]   | Figure 3.1 has been deleted.  |
| Topic 3 | 75 | 1  | 75 | 2  | Figure 3.1: The legend is unclear, the axes do not have units nor explanations, the colours are not defined, what does "outlier" mean, the lines at the year 2010 are not needed, lay persons will not understand the terms "Integrated Models" nor "Kaya Factors". [Government of Germany]   | Figure 3.1 has been deleted.  |
| Topic 3 | 75 | 1  | 75 | 2  | Figure 3.1: this figure is difficult to understand with the provided legends and figure caption [Lena Menzel, Germany]  | Figure 3.1 has been deleted.  |
| Topic 3 | 75 | 1  | 75 | 2  | Figure 3.1: y-axes should have labels [Lena Menzel, Germany]  | Figure 3.1 has been deleted.  |
| Topic 3 | 75 | 1  | 75 | 2  | Figure 3.1: please include a reference for the figure, if possible [Lena Menzel, Germany]   | Figure 3.1 has been deleted.  |
| Topic 3 | 75 | 1  | 75 | 2  | Figure 3.1: "History" in figure 2.4 this is "Historical". Check for consistency [Lena Menzel, Germany]  | Figure 3.1 has been deleted.  |

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|         |    |    |    |    |   |   |
|---------|----|----|----|----|---|---|
| Topic 3 | 75 | 1  | 75 | 9  | Fig 3.1. Very unclear. Unexplained jargon. E.g. default, fast, harmoinzed, Kaya Factor. [scott power, australia]  | Figure 3.1 has been deleted.  |
| Topic 3 | 75 | 1  | 75 | 9  | The caption doesn't clearly explain the different panels in the figure. [Government of New Zealand]   | Figure 3.1 has been deleted.  |
| Topic 3 | 75 | 2  | 75 | 9  | Adding text explaining the Kaya identity would be helpful and would make clear that the factors shown in panels a - d are the Kaya Factors. [Government of United States of America]  | Figure 3.1 has been deleted.  |
| Topic 3 | 75 | 3  | 75 | 3  | What are "Kaya factors"? [European Union]   | Figure 3.1 has been deleted.  |
| Topic 3 | 75 | 3  | 75 | 3  | Figure 3.1, Caption: Kaya factors: unexplained; suggestion: refer to WGIII Ch. 5. [Government of Netherlands]   | Figure 3.1 has been deleted.  |
| Topic 3 | 75 | 3  | 75 | 3  | please explain, rephrase or omit "kaya factors" [Government of Denmark]   | Figure 3.1 has been deleted.  |
| Topic 3 | 75 | 3  | 75 | 9  | Figure 3.1: This figure is originated from WGIII Figure TS.7 or Figure 6.1 and it is highly recommned to put the indication at the end of the caption. [Government of Republic of Korea]  | Figure 3.1 has been deleted.  |
| Topic 3 | 75 | 4  | 75 | 4  | Figure 3.1, Caption: ".. Individual lines" But not all lines are explained. [Government of Netherlands]   | Figure 3.1 has been deleted.  |
| Topic 3 | 75 | 6  | 75 | 6  | Figure 3.1, Caption: what does the outlier add to the overall picture. Omit/remove from graph? [Government of Netherlands]  | Figure 3.1 has been deleted.  |
| Topic 3 | 75 | 11 | 75 | 11 | The phrase "It is technically possible to meet reach 450 ppmv CO2eq by 2100" should be replaced by " It is technically possible to meet reach 450 ppmv CO2eq by 2100" it means to remove "q" in '450 ppmv CO2eqq' [Government of Vietnam]   | Paragraph has been removed as part of a policy to include only one headline per subsection. |
| Topic 3 | 75 | 11 | 75 | 11 | The sentence should read: It is technically possible to keep concentrations below 450ppmv CO2eq by 2100, which .... [Government of Austria]   | Paragraph has been removed as part of a policy to include only one headline per subsection. |
| Topic 3 | 75 | 11 | 75 | 11 | delete "meet" [Government of Hungary]   | Paragraph has been removed as part of a policy to include only one headline per subsection. |
| Topic 3 | 75 | 11 | 75 | 11 | Delete either "meet" or "reach" [Government of Sweden]  | Paragraph has been removed as part of a policy to include only one headline per subsection. |
| Topic 3 | 75 | 11 | 75 | 11 | Inconsistent use of units: "ppmv" whereas rest of chapter mostly uses "ppm". [Government of Netherlands]  | Paragraph has been removed as part of a policy to include only one headline per subsection. |
| Topic 3 | 75 | 11 | 75 | 11 | Incorrect phrasing: "meet reach". Suggestion: improve message by replacing with "stay below". [Government of Netherlands]   | Paragraph has been removed as part of a policy to include only one headline per subsection. |
| Topic 3 | 75 | 11 | 75 | 11 | Suggest clarifying whether this statement is about meeting/reaching 450ppmv CO2eq (as currently worded) or stabilizing at this level. Meeting/reaching this level suggests continued increases thereafter. It could also be clarified that even stabilizing at the level would lead to a slow ongoing rise in global temperature even if temperature remained below 2degC this century. Furthermore, words such as meeting or reaching would be better replaced by phrasing that does not imply that we are trying to reach this objective or that does not omit the possibility that this is achieved by overshoot (i.e., for atmospheric concentration to be below or at the level of...). [Government of Canada] | Paragraph has been removed as part of a policy to include only one headline per subsection. |
| Topic 3 | 75 | 11 | 75 | 11 | 'meet' should be deleted. [Government of Switzerland]   | Paragraph has been removed as part of a policy to include only one headline per subsection. |
| Topic 3 | 75 | 11 | 75 | 12 | The description of "It is technically possible to meet reach 450 ppmv CO2eqq by 2100" should be deleted because this description does not exist in the approved WG3 SPM. [Hirofumi Kazuno, Japan]   | Paragraph has been removed as part of a policy to include only one headline per subsection. |

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|         |    |    |    |    |   |   |
|---------|----|----|----|----|---|---|
| Topic 3 | 75 | 11 | 75 | 12 | The use of the phrase "technically possible" without any qualifiers is not a complete characterization of the underlying text in WG3's report. The report notes significant uncertainty associated with the availability and scale of the technologies (e.g., BECCS) that many of these scenarios are using to meet the 450 ppmv constraint in 2100. In order remain consistent with the underlying text of the chapter this sentence would be better phrased as "It may be technically possibly..." or "It is likely technically possibly..." [Government of United States of America] | Paragraph has been removed as part of a policy to include only one headline per subsection. |
| Topic 3 | 75 | 11 | 75 | 12 | There may be no description of "It is technically possible to meet reach 450 ppm CO2eq" in the WG3 report. The description of "technically possible" is ambiguous and should be deleted. [Keigo Akimoto, Japan]   | Paragraph has been removed as part of a policy to include only one headline per subsection. |
| Topic 3 | 75 | 11 | 75 | 14 | I think the language in this para might be seen as policy-prescriptive, might be good to revise. "Meet" in line 11 should be deleted. [Helmut Haberl, Austria]  | Paragraph has been removed as part of a policy to include only one headline per subsection. |
| Topic 3 | 75 | 11 | 75 | 14 | Suggest "likely" to be written in italic. [Government of Japan]   | Paragraph has been removed as part of a policy to include only one headline per subsection. |
| Topic 3 | 75 | 11 | 75 | 14 | This is a summary for policymakers, and as such expressions of "technically possible" should be avoided. The expression has not been defined in the terminologies and could cause the confusion to the readers.<br><br>The headline message should be replaced with the text of WG3 SPM p.15 which states "There are scenarios reaching atmospheric concentration levels about 450 ppm CO2eq by 2100(consistent with a likely chance to keep temperature change below 2C relative to pre-industrial levels )(Topic 2)" [Government of Japan]  | Paragraph has been removed as part of a policy to include only one headline per subsection. |
| Topic 3 | 75 | 11 | 75 | 14 | The phrase "to meet reach" in this sentence is making the entire sentence difficult to comprehend. Consider rephrasing it [Government of Kenya]   | Paragraph has been removed as part of a policy to include only one headline per subsection. |
| Topic 3 | 75 | 11 | 75 | 14 | Name also the temporal scale, the sooner it is started the cheaper it is (mentioned elsewhere in the SYR). [Government of Netherlands]  | Paragraph has been removed as part of a policy to include only one headline per subsection. |
| Topic 3 | 75 | 11 | 75 | 14 | There are many typos in the current version of the SYR. This is only one example. We trust that the TSU sort out these, and will not comment on all editorial issues. In this sentence, please consider to delete "meet" and "remaining" and insert "within" after "2°C". [Government of Norway]  | Paragraph has been removed as part of a policy to include only one headline per subsection. |
| Topic 3 | 75 | 11 | 75 | 14 | Please add this statement to the SPM. [Government of Norway]  | Paragraph has been removed as part of a policy to include only one headline per subsection. |
| Topic 3 | 75 | 11 | 75 | 14 | Does this statement include political challenges? Please delete "reach" before "450 ppm". [Government of Germany]   | Paragraph has been removed as part of a policy to include only one headline per subsection. |
| Topic 3 | 75 | 11 |    |    | Explain to a reader why using "ppmv" and not "ppm". [Government of Netherlands]   | Paragraph has been removed as part of a policy to include only one headline per subsection. |
| Topic 3 | 75 | 11 |    |    | CO2eqq is an interesting term - perhaps you should delete one "q" ? [David Wratt, New Zealand]  | Paragraph has been removed as part of a policy to include only one headline per subsection. |
| Topic 3 | 75 | 11 |    |    | ppmv is used for the first time. Ppm should be used consistently. [Government of United Kingdom of Great Britain & Northern Ireland]  | Paragraph has been removed as part of a policy to include only one headline per subsection. |
| Topic 3 | 75 | 12 | 75 | 12 | Incorrect phrasing: "maintaining temperature change remaining". Suggestion: remove either "maintaining" or "remaining"; do not keep both. [Government of Netherlands]   | Paragraph has been removed as part of a policy to include only one headline per subsection. |
| Topic 3 | 75 | 13 | 75 | 13 | Too little explanation: "options". Options for what? [Government of Netherlands]  | Paragraph has been removed as part of a policy to include only one headline per subsection. |



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|         |    |    |    |    |   |   |
|---------|----|----|----|----|---|---|
| Topic 3 | 75 | 13 | 75 | 14 | instead of "poses ... challenges", why not say "requires considerable efforts"? It must be said to people that we have to face a serious task. [Government of Hungary]  | Paragraph has been removed as part of a policy to include only one headline per subsection.   |
| Topic 3 | 75 | 13 | 75 | 14 | Vague statement, too much generalization. [Government of Netherlands]   | Paragraph has been removed as part of a policy to include only one headline per subsection.   |
| Topic 3 | 75 | 13 | 75 | 14 | Please delete this sentence as unbalanced: "implementing the necessary technological and behavioral options poses substantial social, institutional, and technical challenges" or balance it with a notion that NOT limiting emissions would pose much bigger challenges. [Kaisa Kosonen, Finland]  | Paragraph has been removed as part of a policy to include only one headline per subsection.   |
| Topic 3 | 75 | 13 | 75 | 14 | "... poses substantial social, .... "reads somewhat confusing. Sentence starts at line 11 saying technically it is possible but at the end says there are technical challenges. And does not mention economic challenges. Technical challenges at the end of the sentence can be replaced by economic and financial challenges. [Government of India]   | Paragraph has been removed as part of a policy to include only one headline per subsection.   |
| Topic 3 | 75 | 13 | 75 | 14 | The last part of this sentence is unclear. Consider revising to: "however, implementing the necessary technological and behavioral options required to achieve this poses substantial social, institutional, and technical challenges". [Government of Canada]  | Paragraph has been removed as part of a policy to include only one headline per subsection.   |
| Topic 3 | 75 | 16 | 75 | 16 | It is suggested to delete "'meet". The sentence should read: A range of technological, behavioral, and policy options could be applied to reduce emissions, including ... [Government of Austria]   | Sentence has been revised.  |
| Topic 3 | 75 | 16 | 75 | 16 | Vague: "could" [Government of Netherlands]  | Sentence has been revised.  |
| Topic 3 | 75 | 16 | 75 | 16 | Typographical error: remove the word "meet" [Government of Canada]  | Sentence has been revised.  |
| Topic 3 | 75 | 16 | 75 | 16 | remove "meet" [Haroon Kheshgi, United States of America]  | Sentence has been revised.  |
| Topic 3 | 75 | 16 | 75 | 17 | This sentence as written makes no sense. It is missing some words or the structure is poor or both. I cannot infer what is intended so cannot make a constructive suggestion as to how to fix this. [Peter Thorne, Norway]  | Sentence has been revised.  |
| Topic 3 | 75 | 16 | 75 | 17 | The corresponding part of WG3 SPM includes various scenarios other than 2 degree likely, and does not specifically treat 2 degree scenarios. Thus, suggest replacement of the headline with the corresponding headline of WG3 SPM "There are multiple scenarios with a range of technological and behavioral options, with different characteristics and implications for sustainable development, that are consistent with different levels of mitigation" [Government of Japan]   | This option has been considered. Given the limited space in the SYR compared to the WG3 SPM, the choice was made to highlight that the scenarios indicate that there are options for keeping temperatures below 2C. |
| Topic 3 | 75 | 16 | 75 | 17 | The description of "A range of technological, behavioral, and policy options could be applied to meet reduce emissions, including reductions that would likely maintain temperature change below 2°C." should be changed to "There are multiple scenarios with a range of technological and behavioral options, with different characteristics and implications for sustainable development, that are consistent with different levels of mitigation." as described in the page 10 of the approved WG3 SPM. Original description is policy prescriptive, which is apparently not suitable for IPCC products. [Hirofumi Kazuno, Japan] | This option has been considered. Given the limited space in the SYR compared to the WG3 SPM, the choice was made to highlight that the scenarios indicate that there are options for keeping temperatures below 2C. |
| Topic 3 | 75 | 16 | 75 | 17 | Suggest editing the last part of this sentence to read: A range of technological, behavioral, and policy options could be applied to reduce emissions, including to achieve the reductions needed to likely maintain temperature change below 2°C. [Government of Canada]   | Sentence has been revised.  |

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|         |    |    |    |    |   |  |
|---------|----|----|----|----|---|--|
| Topic 3 | 75 | 16 | 75 | 17 | The sentence should be changed to "There are multiple scenarios with a range of technological and behavioral options, with different characteristics and implications for sustainable development, that are consistent with different levels of mitigation." (p.10 of WG3 SPM) [Keigo Akimoto, Japan]   | This option has been considered. Given the limited space in the SYR compared to the WG3 SPM, the choice was made to highlight that the scenarios indicate that there are options for keeping temperatures below 2C.  |
| Topic 3 | 75 | 16 | 75 | 23 | References to underlying AR5-report(s) missing. Suggestion: list reference to WG III SPM 3.1 [Government of Netherlands]  | Done   |
| Topic 3 | 75 | 17 | 75 | 17 | Likely should be written in italic [Thomas Stocker/ WGI TSU, Switzerland]   | Corrected  |
| Topic 3 | 75 | 17 | 75 | 17 | Must mention overwhat time period? [Government of India]  | The time period is not necessary. This is intended to mean over all time.  |
| Topic 3 | 75 | 18 | 75 | 19 | check that 'integrated models' has been defined previously. [scott power, australia]  | Removed "integrated models".   |
| Topic 3 | 75 | 19 | 75 | 19 | Units missing/incomplete: "720 CO2eq". Should be "720 ppm CO2eq". [Government of Netherlands]   | Corrected  |
| Topic 3 | 75 | 19 | 75 | 21 | "This range" in this context sounds strange. Suggestion: stay close to the phrasing of SYR SPM (p.15, I.51): " Mitigation scenarios span atmospheric concentration levels in 2100 from 430 ppm CO2eq to above 720 ppm CO2eq, which is..." [Government of Netherlands]   | Sentence has been improved for clarity.  |
| Topic 3 | 75 | 19 | 75 | 21 | Suggest providing here the current atmospheric GHG concentration in CO2eq, for context. [Government of Canada]  | There is not sufficient space. This is handled in an earlier part of the SYR.  |
| Topic 3 | 75 | 20 | 75 | 20 | Comparable nature not immediately evident from Figure 3.2 [Government of Netherlands]   | Reference has been removed.  |
| Topic 3 | 75 | 22 | 75 | 22 | Now that is one serious future projection - to 21000! [Peter Thorne, Norway]  | Corrected  |
| Topic 3 | 75 | 22 | 75 | 22 | Replace "21000" by "2100" would be more accurate. [Government of Vietnam]   | Corrected  |
| Topic 3 | 75 | 22 | 75 | 22 | 21000 should read "2100". [Government of Austria]   | Corrected  |
| Topic 3 | 75 | 22 | 75 | 22 | Too many zeros. [Government of Sweden]  | Corrected  |
| Topic 3 | 75 | 22 | 75 | 22 | '21000' should be '2100' [Government of Japan]  | Corrected  |
| Topic 3 | 75 | 22 | 75 | 22 | change 21000 to 2100 [Government of Netherlands]  | Corrected  |
| Topic 3 | 75 | 22 | 75 | 22 | Should this not be 2100 instead of 21000? [Government of India]   | Corrected  |
| Topic 3 | 75 | 22 | 75 | 22 | a typo error: delete "21000" and insert "2100" [Government of Italy]  | Corrected  |
| Topic 3 | 75 | 22 | 75 | 22 | in 21000 below 430 ppm: typo? this should probably read "by 2100" instead of "in 21000"? [Lena Menzel, Germany]   | Corrected  |
| Topic 3 | 75 | 22 |    |    | Typographical error: 21000 [Government of Canada]   | Corrected  |
| Topic 3 | 75 |    |    |    | Figure 3.1 is legible and clearly understandable which, unfortunately, does not apply to most of the graphical material in the draft SYR [H-Holger Rogner, Austria]   | Interesting. Many readers had the opposite impression!   |
| Topic 3 | 76 | 1  | 76 | 9  | This para contains very useful information. The information would be easier accessible if accompanied by a table. [Government of Denmark]   | Table 3.1 has been expanded to include this information.   |
| Topic 3 | 76 | 1  | 76 | 19 | Suggest that overshoot scenarios need to be explained more thoroughly. While the concept of overshooting a target is easy to understand what is not intuitive is how to bring atmospheric concentrations of CO2 back down to the target level when it is understood that CO2 is long-lived, that levels build up in the atmosphere and that levels stay high even if emissions cease. Just referring to BECCS is insufficient without explaining what this is and how negative emissions could be achieved with such technologies. [Government of Canada] | We have added a brief footnote on the meaning of overshoot. More generally, it is expected that the concept of carbon dioxide removal, and the associated negative emissions, is sufficiently well understood by readers that it does not need further explanation here. In addition, we have included a pointer to Box 3.3, in which CDR technologies are discussed in more detail. |

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|         |    |    |    |    |  |  |
|---------|----|----|----|----|--|--|
| Topic 3 | 76 | 5  | 76 | 5  | Confidence statement dissimilar to WGIII Table SPM.1; should be "more unlikely than not". [Government of Netherlands]  | This has been corrected in the WG3 SPM.  |
| Topic 3 | 76 | 7  | 76 | 7  | Confidence statement not explicitly clear from WGIII Table SPM.1; follows only implicitly from table. [Government of Netherlands]  | Table 3.1 has been expanded to include this information.   |
| Topic 3 | 76 | 8  | 76 | 8  | Not sufficiently clear what scale "Temperature" applies to: global? regional? [Government of Netherlands]  | This appears self-evident. No change has been made.  |
| Topic 3 | 76 | 8  | 76 | 9  | Unclear what is referred to by "the century". Suggestion: specify [Government of Netherlands]  | This appears self-evident. No change has been made.  |
| Topic 3 | 76 | 8  | 76 | 9  | Unclear what is referred to by "these scenarios". Suggestion: specify [Government of Netherlands]  | This appears self-evident. No change has been made.  |
| Topic 3 | 76 | 11 | 76 | 11 | It is not very clear what is meant with 'overshoot': In table 3.1, overshoots of either 530 ppm or 580 ppm CO2 eq are mentioned. Suggestion: "... involve temporary overshoot beyond atmospheric concentrations of at least 530ppm CO2eq" [Government of Netherlands]  | A footnote has been added.   |
| Topic 3 | 76 | 11 | 76 | 19 | Lacking: the role of financing and economics in the magnitude of deployment of BECCS. {WGIII 6.9.1, 11.13} [Government of Netherlands]   | There is insufficient space to address this issues.  |
| Topic 3 | 76 | 11 | 76 | 19 | This a very useful para [Government of Denmark]  | Thank you.   |
| Topic 3 | 76 | 11 | 76 | 31 | Text doesn't very well synthesize part of WGIII 6 (p 625, 17-23): There is only limited evidence on the potential of geoengineering by CDR or solar radiation management (SRM) to counteract climate change, and all techniques carry risks and uncertainties (high confidence). A range of different SRM and CDR techniques have been proposed, but no currently existing technique could fully replace mitigation or adaptation efforts. Nevertheless, many low greenhouse gas concentration scenarios rely on two CDR techniques, afforestation and biomass energy with carbon capture and storage (BECCS), which some studies consider to be comparable with conventional mitigation methods. The same goes for the SPM: p 16, lines 04-15 [Government of Netherlands] | This paragraph is only CDR. SRM is addressed, along with CDR to some degree, in a separate box.  |
| Topic 3 | 76 | 13 | 76 | 13 | Define BECCS on first use? [Peter Thorne, Norway]  | BECCS has been defined on first use.   |
| Topic 3 | 76 | 13 | 76 | 13 | "BECCS": acronym not (properly) introduced/explained; is only done in next paragraph. [Government of Netherlands]  | BECCS has been defined on first use.   |
| Topic 3 | 76 | 13 | 76 | 13 | We suggest defining BECCS on its first use. It is defined later down the page. [Government of United States of America]  | BECCS has been defined on first use.   |
| Topic 3 | 76 | 13 | 76 | 14 | What BECCS means could be added here (it is only defined in the SPM). [European Union]   | BECCS has been defined on first use.   |
| Topic 3 | 76 | 13 | 76 | 14 | References state that GHG concentration levels decline in the second half of century as a result of widespread deployment of CDR. The actual deployment of CDR is not consistently/explicitly mentioned as happening in the second half of the century, and may have taken place in an earlier stage. [Government of Netherlands]  | The paragraph states the widespread deployment of these technologies in the second half of the century.                                    |
| Topic 3 | 76 | 13 | 76 | 15 | Please replace "afforestation" with "afforestation, sustainable forest management and reducing deforestation" in the two lines (Reference from IPCC AR5 III SPM 4.2.4 P27) [GUOBIN ZHANG, China]   | There is insufficient space for this change. The point is understood. In addition, afforestation is the important point of this paragraph. |
| Topic 3 | 76 | 13 |    |    | Please provide an expansion (in parentheses) for the acronym "BECCS" - I think this is the first time it is used in the full SYR. [David Wratt, New Zealand]   | BECCS has been defined on first use.   |
| Topic 3 | 76 | 13 |    |    | BECCS needs to be spelt out at this first use and then in the following paragraph the abbreviation can be used. [Government of New Zealand]  | BECCS has been defined on first use.   |

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|         |    |    |    |    |   |   |
|---------|----|----|----|----|---|---|
| Topic 3 | 76 | 14 | 76 | 14 | Include after reference to BECCS the following wording: "According to WGI, CDR methods have biogeochemical and technological limitations to their potential on the global scale. There is insufficient knowledge to quantify how much CO2 emissions could be partially offset by CDR on a century timescale. CDR methods carry side-effects and long-term consequences on a global scale. [WGIII footnote 18)". [Government of Bolivia] | There is insufficient space for this information. The issues are raised in the paragraph, and there is a separate box that addresses some issues with CDR technologies. |
| Topic 3 | 76 | 15 | 76 | 15 | BECCS is not defined until line 29 in the next paragraph, well after its first use. Suggest revising. [Government of Canada]  | BECCS has been defined on first use.  |
| Topic 3 | 76 | 15 | 76 | 17 | Please consider to include this finding in the SYR SPM. Rationale: Many of the mitigation scenarios are heavily dependent on such CDR technologies, and we believe it is important to be aware of uncertainties, challenges and risks associated especially regarding how to implement them in a sustainable manner. [Government of Norway]   | It is in SPM3.5   |
| Topic 3 | 76 | 17 | 76 | 17 | Request to delete "(see Section SPM 4.2)", as it is not a relevant section to the sentence here. [Government of Japan]  | This has been deleted.  |
| Topic 3 | 76 | 17 | 76 | 17 | Editorial: We believe the reference to "(See section SPM 4.2)" is actually referring to WGIII SPM Section 4.2. [Government of Norway]   | This has been deleted.  |
| Topic 3 | 76 | 21 |    |    | instead of "involve", why not say "requires"? It must be said to people that we have to face a serious task. [Government of Hungary]  | The text has been changed to requires.  |
| Topic 3 | 76 | 22 | 76 | 22 | Vague: "potentially" [Government of Netherlands]  | Changed to "possibly"   |
| Topic 3 | 76 | 22 | 76 | 22 | Vague: "potentially". What does it depend on? Would "in some of the scenarios" be a more suitable alternative? [Government of Netherlands]  | Changed to "possibly"   |
| Topic 3 | 76 | 22 | 76 | 23 | "slower (faster) timescale." Suggestion: rephrase to "longer/shorter timescale". [Government of Netherlands]  | Simplified to only discuss higher levels.   |
| Topic 3 | 76 | 23 |    |    | The use of "higher (lower)" and "slower (faster)" is confusing - consider revising. [Government of Canada]  | Simplified to only discuss higher levels.   |
| Topic 3 | 76 | 24 | 76 | 24 | The sentence: "Scenarios reaching the concentrations by 2100" lacks the necessary clarity. It is suggested to be more explicit. The following wording is suggested: Scenarios reaching 450ppm CO2eq by 2100 or scenarios reaching higher (lower) concentrations include ..... [Government of Austria]   | Sentence has been corrected for clarity.  |
| Topic 3 | 76 | 24 | 76 | 26 | Please include footnote 16 from the SPM WGIII, as this is key information to policymakers. This would give the reader a better understanding of why the estimates have changed since AR4. In addition, it elaborates on the fact that the new range is much more dependent on negative emission technologies. [Government of Norway]  | This has now been included in the revised text.   |
| Topic 3 | 76 | 24 | 76 | 26 | Suggest adding text to clarify that scenarios with emission reductions in the lower part of this range (e.g. 40%) will require steeper emission reductions later. [Government of Canada]  | Included now in a footnote.   |
| Topic 3 | 76 | 25 |    |    | Appreciate reference to 40% to 70% reductions in GHG emissions by 2050, and ask that phrase about emission levels reaching near zero GtCO2eq or below in 2100 be added after "relative to 2010" to ensure consistency with approved text from AR5 WGIII SPM. [Government of Japan]  | This has not been included for space concerns.  |
| Topic 3 | 76 | 26 | 76 | 26 | ">0.4 Wm <sup>2</sup> " Suddenly, this unit representing radiative forcing appears. No further explanation. Also, should be W/m <sup>2</sup> or Wm <sup>-2</sup> , with 2 or -2 as superscript. [Government of Netherlands]   | This has been removed.  |
| Topic 3 | 76 | 26 | 76 | 26 | Substantial reliance on CDR technologies is not represented in Table 3.1; move reference to upper lines in table. [Government of Netherlands]   | Done  |

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|         |    |    |    |    |   |   |
|---------|----|----|----|----|---|---|
| Topic 3 | 76 | 26 | 76 | 27 | Editorial error: "by" is missing in this sentence. It should read: "Scenarios reaching these concentrations are also characterized BY a tripling..." [Government of Canada]   | This has been corrected.  |
| Topic 3 | 76 | 26 | 76 | 29 | The paragraph contain very useful information on the scale and options effective for mitigation therefore we suggest to include all the options which characterize the 450ppm scenarios in the WG3SPM p.15 line9-13. Especially, the wordings "more rapid improvements of energy efficiency" should be included in the SYR as well. [Government of Japan]   | These options have been included.   |
| Topic 3 | 76 | 26 | 76 | 29 | The current sentence addresses the year 2050, but the rest of the paragraph refers to 2100. Therefore, please replace the current sentence with the formulation of the SPM WGIII, P 21 section SPM.4.2.2 that gives information on both 2050 and 2100:<br>"In the majority of low-stabilization scenarios, the share of low-carbon electricity supply (comprising renewable energy (RE), nuclear and CCS) increases from the current share of approximately 30% to more than 80 % by 2050, and fossil fuel power generation without CCS is phased out almost entirely by 2100. [6.8, 7.11, Figures 7.14, SPM.7, TS.18]" [Government of Germany] | There is not space to include information on 2100. This paragraph focuses exclusively on 2050.  |
| Topic 3 | 76 | 26 | 76 | 31 | The fact that substantial increases in low C energy are required by 2100 to limit CO2 levels to 580-720 ppm (let alone 450 ppm) is not highlighted. This result is very important - it suggests that substantial increases in low C energy sources are needed full stop. [European Union]   | This point is already addressed in the last sentence, which states that the same changes are needed, but on a longer timescale for other goals. |
| Topic 3 | 76 | 26 |    |    | it should be clear that the use of these techniques and technologies affect the environment and the population. (Source: IPCC, The capture and storage of CO2: Summary for Policymakers and Technical Summary). [Government of Nicaragua]   | These issues are addressed elsewhere, including Topic 4.  |
| Topic 3 | 76 | 27 | 76 | 27 | characterized by a [Peter Thorne, Norway]   | Corrected with new language   |
| Topic 3 | 76 | 27 | 76 | 27 | It is suggested to insert "by" before "a tripling to nearly a quadripling" [Government of Austria]  | Corrected with new language   |
| Topic 3 | 76 | 29 | 76 | 29 | BECCS is supposedly part of the low carbon technologies represented in Figure 3.2, lower panel, which in turn is based on WGIII Figure 6.7 and/or Figure 7.16. In the context of those figures, BECCS is not explicitly mentioned. [Government of Netherlands]  | BECCS is explicitly mentioned in this paragraph.  |
| Topic 3 | 76 | 31 | 76 | 31 | Suggest adding "sustainable forest management" after "afforestation". [GUOBIN ZHANG, China]   | The focus here is on afforestation.   |
| Topic 3 | 76 | 33 | 76 | 34 | Is it necessary to write in bold from line 33 to line 34 in Table 3.1 "Key characteristics of the scenarios collected and assessed for WGIII AR5. For all parameters, the 10th to 90th percentile of the scenarios is shown"? [Government of Vietnam]   | This is a style issue that will be addressed by the copy editor upon completion of the report.  |
| Topic 3 | 76 | 33 | 76 | 43 | Please add here the footnote 20 from page 17 of the WG3 SPM, which gives carbon budget numbers for (the limited number of) 430 ppm scenarios. [Kaisa Kosonen, Finland]  | We have not included this information at this time, given the limited number of scenario studies reaching less than 430 ppm CO2e.               |
| Topic 3 | 76 | 33 | 76 | 43 | Table 3.1 is a key table to illustrate the relations among CO2 concentration, RCP number, and also temperature rise. At Table SPM.1 at WGIII (page 33) includes temperature rise. At page 119 line 55 and after, link between temperature rise and RCP are introduced but I am afraid that there is no summary table. I think audience of this report would like to know the co-relations among concentration, temperature rise and emission and its link with RCP number. [Takashi Hongo, Japan]   | Temperature information has been included.  |

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|         |    |    |    |    |  |   |
|---------|----|----|----|----|--|---|
| Topic 3 | 76 | 33 | 77 | 3  | <Table 3.1><br>This table should include all subcategories in the Table 6.3 of WG3 Final Draft such as "overshoot > 0.4 W/m <sup>2</sup> " for 500ppm and 550 ppm category labels. Current table does not supply sufficient information to policy makers. It rather leads to misunderstanding. [Hirofumi Kazuno, Japan]  | These have been included.   |
| Topic 3 | 76 | 35 | 76 | 36 | Table 3.1: 4th column: numbers seem inconsistent with those in Table 6.3 of WGIII. In all, Table SPM1 from WGIII SPM is more informative. [Government of Netherlands]  | Table has been updated.   |
| Topic 3 | 76 | 35 | 76 | 36 | Table 3.1: 5th/right column, 4th & 5th row from bottom: -183 and -134 seem inconsistent with the lower boundaries of the rightmost red and orange blocks in figure 3.2. [Government of Netherlands]  | Table has been updated.   |
| Topic 3 | 76 | 35 | 76 | 36 | Table 3.1: To column 2 row 3, suggest adding the words "majority overshoot" after "total range". Footnote 4 does say that the vast majority of scenarios in this category overshoot the 480 boundary, but it would be useful to have this flagged in the table itself especially as the inclusion or not of overshoot is indicated in other scenario categories in the table. [Government of Canada]   | While a good suggestion, there are technical difficulties in doing so. The majority of scenarios in the lower range overshoot their 2100 concentration, but it is not clear what proportion overshoot 480 ppm CO <sub>2</sub> . For this reason, we are continuing with the current formulation |
| Topic 3 | 76 | 39 | 76 | 39 | Reference to SPM.3 unclear: wrong reference? [Government of Netherlands]   | Good catch. This will be removed.   |
| Topic 3 | 76 | 39 | 76 | 39 | "750" should be "720", as in table 3.1? [Government of Netherlands]  | Good catch. This will be corrected.   |
| Topic 3 | 76 |    | 76 |    | The CO <sub>2</sub> eq concentration level in 2100 should be added in Table 3.1. In addition, some of the disaggregated scenarios such as overshoot<0.4 W/m <sup>2</sup> ↔overshoot>0.4 W/m <sup>2</sup> are missing in Table 3.1 compared to WG3 Table 6.3, but should be described also in Table 3.1 of Synthesis report. Furthermore, all the scenario categories represented in Table 6.3 should be described also in this table. [Keigo Akimoto, Japan] | We agree that more information should be included in this table, and we intend to add such information along with a further breakdown in scenario types.  |
| Topic 3 | 76 |    |    |    | Table 3.1. Using data from WG3 Table SPM.3, this should not state "-52 to -42", but "57 to -42". Would appreciate if you could make sure. [Government of Japan]  | Table has been updated.   |
| Topic 3 | 76 |    |    |    | Table 3.1. Please consider to include values for temperature (as in WGIII Table SPM.1) and sea level rise in this table. Rationale: Both temperature and sea-level rise are policy relevant factors. For sea-level rise the numbers are given in the WGI report (for all RCPs). In this way it will also be comparable to what was presented in Table SPM. 6 in AR4 SYR. [Government of Norway]  | Temperature information has been included.  |
| Topic 3 | 77 | 0  |    |    | Both for figure 3.2 and caption : Use () around units, use CO <sub>2</sub> -eq and use yr <sup>-1</sup> [Thomas Stocker/WGI TSU, Switzerland]  | This is the job of the document layout folks.   |

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|         |    |    |    |    |  |   |
|---------|----|----|----|----|--|---|
| Topic 3 | 77 | 4  | 77 | 6  | Figure 3.2: Unclear how lower panel is derived from referenced figures. Numbers in Figure 3.2 differ from WGIII Figure 7.16. [Government of Netherlands]   | We believe that the caption is sufficient to explain the linkage between the two figures. We have checked the numbers against those in Figure 7.16, and they appear to be the same. What may have confused the reviewer is that new numbers have been added to the figure here relative to Figure 7.16. However, the reviewer has pointed out in a separate comment that the categories are different for the highest concentration levels between 7.16 and the synthesis report, as well as the summary documents for WG3 (650 as the upper level versus 720). This means that the bars and the associated scale-up numbers should actually be different for this category between 7.16 and the SYR figure. We will correct this in upcoming versions. |
| Topic 3 | 77 | 4  | 77 | 6  | Figure 3.2: Legend refers to 580-720 ppm CO2eq, whereas WGIII Figure 7.16 lists that as 580-650 ppm CO2eq. [Government of Netherlands]   | This is correct. The figure was changed when moving from Chapter 7 to the summary documents in order to make the categories consistent with the upper panel in the figure.  |
| Topic 3 | 77 | 4  | 77 | 11 | Fig.3.2 very complicated. Unclear. Jargon not explained (upscaling) [scott power, australia]   | We believe the figure and caption is sufficiently clear, and the caption points the reader to the parts of the underlying reports where this material is addressed more thoroughly.   |
| Topic 3 | 77 | 4  |    |    | In figure 3.2, part A, should pay attention to the title as it is not very clear to every reader, particularly on everything from AR5 , please considerer modify it [Government of Costa Rica]   | We believe the figure and caption is sufficiently clear, and the caption points the reader to the parts of the underlying reports where this material is addressed more thoroughly.   |
| Topic 3 | 77 | 10 | 77 | 11 | The phrase "exogenous carbon price trajectpories" needs an explanation. [Government of Sweden]   | We will remove the phrase.  |
| Topic 3 | 77 | 12 | 77 | 12 | Carbon price is a very important factor for many models which are introduced at AR5. However, WGIII Figures 6.21 is missed at SYR. Figure 6.21 is better to be incorporated. New market sentiments surveys are disclosed on May 2014 by International Emission Trading and Thomson Reuters Point Carbon. Both show EUA price in 2020. The price gap between these survey and Figure 6.21 may indicate the necessity of additional measures for the transition path way. Data are available at the following report<br>"GHG Market Sentiment Survey 2014", Figure 3, page 3, by International Emission Trading Association.<br>"Carbon Market Survey 2014", Figure 2.6, page 14, by Thomson Reuters Point Carbon.<br>[Takashi Hongo, Japan] | There is insufficient room to include the carbon price information in a figure. The cost information is being included instead.   |
| Topic 3 | 77 | 13 | 77 | 13 | Consider replacing "based on" with "depending on" [Helmut Haberl, Austria]   | Change has been made.   |

Review comments on the IPCC AR5 Synthesis Report First Order Draft - Topic 3

|         |    |    |    |    |   |  |
|---------|----|----|----|----|---|--|
| Topic 3 | 77 | 13 | 77 | 13 | Vague statement: "other assumptions". Suggestion: specify or omit. [Government of Netherlands]  | Statement is now clearer.  |
| Topic 3 | 77 | 13 | 77 | 14 | Vague. Suggestion: reduce vagueness and correct confidence statement with regard to reference by changing bold sub-header to "Estimates of the aggregate economic costs of mitigation vary widely, but increase with stringency of mitigation (high confidence)." (WGIII 6.3). [Government of Netherlands]  | A change has been made that is similar in spirit to this recommendation. |
| Topic 3 | 77 | 13 | 77 | 22 | Insufficiently clear on what facts or figures in WGIII 6.3 the statements in these lines are based. [Government of Netherlands]   | This is based on material in 6.3.6.                                      |
| Topic 3 | 77 | 13 | 77 | 22 | This paragraph should include "mitigation scenarios that reach atmospheric concentrations of about 450ppm CO <sub>2</sub> eq by 2100 entail losses in global consumption of 1% to 4% (median: 1.7%) in 2030, 2% to 6% (median: 3.4%) in 2050, and 3% to 11% (median: 4.8%) in 2100 relative to consumption in baseline scenarios", as described in the page 17 of the approved WG3 SPM. This is because various information is necessary for the judgment of policy makers. [Hirofumi Kazuno, Japan]  | Information has been included.   |
| Topic 3 | 77 | 13 | 77 | 22 | HIGH PRIORITY COMMENT: It is thought that the paragraph misses an extraordinary finding reported by WGIII. I.e. "These numbers [those related to loss in consumption] correspond to an annualized reduction of consumption growth by 0.04 to 0.14 (median: 0.06) percentage points over the century relative to annualized consumption growth in the baseline that is between 1.6% and 3% per year." Current paragraph refers to the "1.6% to 3%" annual growth figures but it does not say that in the most ambitious case this growth would be only constraint to a 1.46% to 2.86%. This is a very important message as it backs up Dr. Edenhofer's now famous statement: "It does not cost the world to save the planet " [Tabaré Arroyo Currás, Mexico] | Information has been included.   |
| Topic 3 | 77 | 13 | 77 | 22 | Consider clarifying what kinds of economic models used to estimate the economic costs? Are all these integrated assessment models? What is the key parameter responsible for different cost estimates? [Government of Canada]   | The fact that these are based on modeling studies has now been included. |
| Topic 3 | 77 | 13 | 77 | 22 | The cost estimations of specific number "1% to 4% (median: 1.7%) in 2030, 2% to 6% (median: 3.4%) in 2050, and 3% to 11% (median: 4.8%) in 2100 relative to consumption in baseline scenarios" (WG3 SPM, p.17) should be added. [Keigo Akimoto, Japan]  | Information has been included.   |
| Topic 3 | 77 | 15 | 77 | 15 | The following wording is suggested: ..., with a single global carbon price, and all .. [Government of Austria]  | Change has been made.  |
| Topic 3 | 77 | 15 | 77 | 15 | Incorrect phrasing: "there is". Should be: "with". [Government of Netherlands]  | Change has been made.  |
| Topic 3 | 77 | 18 | 77 | 20 | Request that "global economy" be changed to "global consumption," in line with SYR SPM. Also request elaboration as in SPM. [Government of Japan]   | Sentence has been removed.   |
| Topic 3 | 77 | 18 | 77 | 20 | This sentence of "To put aggregate economic cost estimates in context, they arise in scenarios in which the global economy grows 300% to more than 900% over the century (roughly 1.6% and 3% annual growth)" should be deleted because these figures may create confusion for readers. To show the value of economic development and cost of mitigation simultaneously for comparison in discussing mitigation cost is misleading, since the same comparison is not referred to in describing global aggregate economic losses by climate change in other part of this synthesis report. [Hirofumi Kazuno, Japan]  | Sentence has been removed.   |



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|         |    |    |    |    |   |   |
|---------|----|----|----|----|---|---|
| Topic 3 | 77 | 18 | 77 | 20 | "the global economy grows 300% to more than 900% over the century (roughly 1.6% and 3% annual growth)" should be deleted. If you do not delete this, the same kinds of description is needed for climate change impact costs of 0.2-2.0% in Line 2 (also in p.85, L.37 and p.119, L.2). [Keigo Akimoto, Japan]  | Sentence has been removed.  |
| Topic 3 | 77 | 22 |    |    | The mitigation costs should also be put in the context of potential co-benefits. Please consider adding figure WGIII TS.14 (lower panel), as well as the following text from the WGIII TS, page 33, lines 16-17: "Recent multi-objective studies show that mitigation reduces the costs of reaching energy security and/or air quality objectives (medium confidence)". If considered necessary for providing a balanced view the whole paragraph on page 33, lines 16-22 could be included. [Government of Norway]   | 3.5 includes WG3 SPM6, which gets at these issues. We have added text here on co-benefits and adverse side effects. |
| Topic 3 | 77 |    |    |    | W.r.t Figure 3.2 see previous comment - legible & clear [H-Holger Rogner, Austria]  | Thank you.  |
| Topic 3 | 77 |    |    |    | Figure 3.2 labels to colour key codes small and faint. Consider increasing font size as well as enhancement [Government of Kenya]   | We will endeavor to maximize the readability of the figure.   |
| Topic 3 | 77 |    |    |    | figure 3.2: is "full range" mean the same thing as "total range" in Table 3.1 (which is actual not literally the total range). If so suggest changing to total range or providing definition. This applies to all of the scenario groups shown in this figure. [Haroon Kheshgi, United States of America]   | The range language has been removed from Figure 3.2.  |
| Topic 3 | 78 | 1  | 78 | 9  | Fig.3.2. Very unclear. Caption and text needs to be much clearer on what this table shows. [scott power, australia]   | The table has been completely revised.  |
| Topic 3 | 78 | 1  | 78 | 10 | Table 3.2 includes a number of columns relating to "consumption losses". The methodology for calculating such losses is questionable since it assumes a 'business as usual' baseline in which rising atmospheric concentrations of greenhouse gases create no climate change impacts and therefore do not affect consumption, no matter what level of warming. Such an assumption becomes progressively less tenable as one moves forward in time. By 2100, when 'business as usual' assumes an enormous increase in the consumption of fossil fuels (ie effectively an inexhaustible supply of fossil fuels) which may result in warming of 4 or 5 degC above pre-industrial, the calculated consumption losses are not credible. In addition, the consumption losses fail to take into account the beneficial impacts on consumption of co-benefits from mitigation policy, such as reductions in local air pollution. Hence, I am ratehr doubtful of the value of these figures which may seriously mislead the reader about the impacts of mitigation policies. [Robert Ward, United Kingdom] | The table has been completely revised.  |
| Topic 3 | 78 | 1  | 79 | 11 | Table 3.2: The title does not reflect the content and there are way too many notes. It is not clear how the economic costs are measured here and what is the carbon price used. Going through the footnotes it seems that the mitigation costs are measured in terms of discounted losses in consumption. However this should be clear from the table heading. Also its not clear why mitigation costs are measured in terms of losses in consumption. [European Union]   | The table has been completely revised.  |
| Topic 3 | 78 | 1  | 79 | 11 | Insufficiently clear on what facts or figures in WGIII 6.3 the statements/numbers in this table based. [Government of Netherlands]  | The table has been completely revised.  |

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|         |    |    |    |    |  |  |
|---------|----|----|----|----|--|--|
| Topic 3 | 78 | 1  | 79 | 11 | <Table 3.2><br>The description in the 1st point of Notes should be revised to explain that most models assume an upper limit for nuclear energy in the models' default technology assumption from the standpoint of public acceptance. This is the reason why mitigation cost does not increase so much in the scenario of "Nuclear phase out". [Hirofumi Kazuno, Japan] | The table has been completely revised. |
| Topic 3 | 78 | 1  | 79 | 11 | In Table 3.2, the units to identify the cost do not appear. Dollar signs (or word) should appear. [Government of Costa Rica]   | The table has been completely revised. |
| Topic 3 | 78 | 6  | 78 | 6  | The text here suggests that there will also be figures in the table on the increases in costs when delaying through 2020 - but in the table there are no figures for dealing through 2020. It would indeed be extremely useful and relevant to also have figures for costs of dealing through 2020. [Government of Denmark]  | The table has been completely revised. |
| Topic 3 | 78 | 7  | 78 | 7  | It would be very useful with an explanation of why 55 Gt is chosen as the dividing line here - is 55 for example the baseline for 2030? [Government of Denmark]  | The table has been completely revised. |
| Topic 3 | 78 | 8  | 78 | 8  | Use of 16th-84th percentile range is an odd choice - why not 10th-90th as has been used elsewhere in this report? [European Union]   | The table has been completely revised. |
| Topic 3 | 78 | 9  | 78 | 9  | Suggest adding to the caption the potential bias of cost numbers given that is explained in WG3 section 6.2.4: add "The inability of some models to produce scenarios with very low CO <sub>2</sub> eq concentration may bias the ranges reported in this table towards lower estimated cost." [Haroon Kheshgi, United States of America]                                | The table has been completely revised. |
| Topic 3 | 78 | 9  | 78 | 10 | Table 3.2: Table is based on many different figures in the WGIII report. Difficult to assess consistency and correctness of synthesis. [Government of Netherlands]   | The table has been completely revised. |
| Topic 3 | 78 | 9  | 78 | 10 | Table 3.2: Too many numbers, unclear. Suggestion: keep all numbers between brackets on a separate line, and not in bold, to distinguish. [Government of Netherlands]   | The table has been completely revised. |
| Topic 3 | 78 | 9  | 78 | 10 | Table 3.2: Numbers in light green section are not completely consistent with fig.6.1 WGIII; [Government of Netherlands]  | The table has been completely revised. |
| Topic 3 | 78 | 9  | 78 | 10 | Table 3.2: Numbers in orange and blue sections cannot be easily traced back to fig. 6.24 and 6.25, respectively; [Government of Netherlands]   | The table has been completely revised. |
| Topic 3 | 78 | 9  | 78 | 10 | Table 3.2: fig. 6.24 contains more energy technology portfolio options than the four mentioned in the orange section of table 3.2 – without explanation; [Government of Netherlands]   | The table has been completely revised. |
| Topic 3 | 78 | 10 | 78 | 10 | Table : blue part : " ≤ 55GtCO" in bold font, the rest of the line "2eq" not, ">55 GtCO <sub>2</sub> eq" not in bold [Thomas Stocker/ WGI TSU, Switzerland]  | The table has been completely revised. |
| Topic 3 | 78 |    | 78 |    | "costs due delayed additional mitigation" in Table 3.2 should be changed to "costs due to delayed additional mitigation". [Keigo Akimoto, Japan]   | The table has been completely revised. |
| Topic 3 | 78 |    |    |    | Suggest specifying when additional mitigation is assumed to start; is it 2015? The time difference between the start time and the delayed start time depends on this date. [Haroon Kheshgi, United States of America]  | The table has been completely revised. |
| Topic 3 | 79 | 2  | 79 | 3  | Unclear: 'general equilibrium models' and 'partial equilibrium models'. Does this explain the apparent discrepancy between the numbers in Table 3.2 (orange section) and fig. 6.24 WGIII? [Government of Netherlands]  | The table has been completely revised. |
| Topic 3 | 80 | 0  |    |    | Both for figure 3.3 and caption : Use () around units, use CO <sub>2</sub> -eq and use yr <sup>-1</sup> [Thomas Stocker/ WGI TSU, Switzerland]   | The table has been completely revised. |

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|         |    |   |    |   |  |   |
|---------|----|---|----|---|--|---|
| Topic 3 | 80 | 1 | 80 | 1 | Unclear phrasing: "Meeting deep reductions". Suggestion: replace with "Mitigation". [Government of Netherlands]  | Paragraph has been removed, as suggested by one reviewer. The associated issues are already addressed in 3.1 and 4.4. |
| Topic 3 | 80 | 1 | 80 | 1 | Missing in SYR SPM: "Meeting deep reductions would require building effective global and national institutions (Topic 4)" Suggestion: add this statement somewhere in SYR SPM 3.1, e.g., following the 4th paragraph [Government of Netherlands]   | Paragraph has been removed, as suggested by one reviewer. The associated issues are already addressed in 3.1 and 4.4. |
| Topic 3 | 80 | 1 | 80 | 6 | The content of this paragraph seems redundant with Topic 4 and could be entirely deleted in the interest of conciseness. Moreover, the use of the word "requires" in the first sentence is policy-prescriptive and, therefore, this paragraph should be deleted. [Government of United States of America]  | Paragraph has been removed, as suggested by one reviewer. The associated issues are already addressed in 3.1 and 4.4. |
| Topic 3 | 80 | 1 | 80 | 6 | This para provides useful information. It should be presented in the context of the statements on global cooperation on P 73 L 28. [Government of Germany]   | Paragraph has been removed, as suggested by one reviewer. The associated issues are already addressed in 3.1 and 4.4. |
| Topic 3 | 80 | 2 | 80 | 2 | Is climate policy 'required to' build institutions? This statement could be clarified. [Government of Canada]  | Paragraph has been removed, as suggested by one reviewer. The associated issues are already addressed in 3.1 and 4.4. |
| Topic 3 | 80 | 4 | 80 | 4 | Vague / too general: "issues". What issues? [Government of Netherlands]  | Paragraph has been removed, as suggested by one reviewer. The associated issues are already addressed in 3.1 and 4.4. |
| Topic 3 | 80 | 4 | 80 | 6 | Although there will be necessarily differential negative effects of climate change and the response measures to it, it shouldn't be described as a situation between "winners and losers", but as an issue that needs to be dealt with in a framework of responsibility, equity and justice that is fair and beneficial to all in the long run. [Pedro Alfredo Borges Landáez, Venezuela]  | Paragraph has been removed, as suggested by one reviewer. The associated issues are already addressed in 3.1 and 4.4. |
| Topic 3 | 80 | 4 | 80 | 6 | The use of the phrase "distribution of power" is problematic in this context. This sentence is surrounded by discussions of the energy system in which that phrase has a specific meaning that is not intended here. As such it is unclear to the reader what is meant by "distribution of power." This further bolsters our position that this paragraph should be deleted. [Government of United States of America]  | Paragraph has been removed, as suggested by one reviewer. The associated issues are already addressed in 3.1 and 4.4. |
| Topic 3 | 80 | 5 | 80 | 6 | Vague: "winners and losers". Vague: who is referred to? Individuals? Regions? Countries? Also, choice of words is perhaps inappropriate. [Government of Netherlands]   | Paragraph has been removed, as suggested by one reviewer. The associated issues are already addressed in 3.1 and 4.4. |
| Topic 3 | 80 | 8 | 80 | 8 | additional' in what sense? [scott power, australia]  | Paragraph has been removed as part of a policy to include only one headline per subsection.                           |
| Topic 3 | 80 | 8 | 80 | 8 | Allowing emissions [scott power, australia]  | Paragraph has been removed as part of a policy to include only one headline per subsection.                           |
| Topic 3 | 80 | 8 | 80 | 9 | It would be more logical to move this block and the text associated with it before p 77, line 13 (the SPM uses the same order). [Government of Netherlands]  | Paragraph has been removed as part of a policy to include only one headline per subsection.                           |
| Topic 3 | 80 | 8 | 80 | 9 | "Delaying additional mitigation will substantially increase the challenges of ... reaching 450 ppmv CO2eq by 2100". I don't think "reaching" 450 ppmv will be a challenge, since we are almost there already and most scenarios reach (and exceed) that level. Maybe the wording could be: "Delaying additional mitigation will substantially increase the challenges of ... LIMITING atmospheric concentrations to 450 ppmv CO2eq or below by 2100". [David Wratt, New Zealand] | Paragraph has been removed as part of a policy to include only one headline per subsection.                           |

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|         |    |    |    |    |  |  |
|---------|----|----|----|----|--|--|
| Topic 3 | 80 | 8  | 81 | 19 | Challenging problems with regard to mitigation are not always mentioned (path dependency, stranded assets (coal plants), high speed of technological change needed to be cost-efficient) [Government of Netherlands]   | Paragraph has been removed as part of a policy to include only one headline per subsection.  |
| Topic 3 | 80 | 9  | 80 | 9  | following two decades': ambiguous [scott power, australia]   | Paragraph has been removed as part of a policy to include only one headline per subsection.  |
| Topic 3 | 80 | 9  | 80 | 9  | Inconsistent use of units: "ppmv" whereas rest of chapter mostly uses "ppm". [Government of Netherlands]   | Paragraph has been removed as part of a policy to include only one headline per subsection.  |
| Topic 3 | 80 | 11 | 80 | 11 | The sentence should read: Allowing emissions to rise .. [Government of Austria]  | Corrected.   |
| Topic 3 | 80 | 11 | 80 | 13 | Request that bold text be revised based on approved AR5 WGIII SPM text. While bold text discusses scenarios with emissions above 50GtCO <sub>2</sub> eq, subsequent text seems to discuss those with emissions above 55GtCO <sub>2</sub> eq, and therefore may be confusing. Furthermore, as "institutional challenges" on line 13 is not explained fully in paragraph, rather difficult for the reader to understand what challenges are being referred to. [Government of Japan]   | Agreed. We have moved to a new version of the text based on the approved WG3 version.  |
| Topic 3 | 80 | 11 | 80 | 13 | Since there are uncertainty in modeling it is relevant to add a word to indicate the uncertainty in understanding. [Mingshan SU, China]  | This is self-evident in the ranges provided.   |
| Topic 3 | 80 | 11 | 80 | 20 | In this section there seems to be no reference to the 2 degree C benchmark introduced by UNEP in its Emissions Gap reports, that 44 Gt CO <sub>2</sub> e/yr has to be reached by 2020, because 3 percent per year reduction is considered economically and technologically the upper limit of feasibility. From a total above 44 gigatonnes (Gt) CO <sub>2</sub> e in 2020, reductions could not occur fast enough to remain within budget, according to this view. So why is this report (and WGIII) using 2030 as its timeframe?. Note this also leads to doubt over the figs in SPM.1 (p19). [European Union] | This report has not come to the conclusion about what levels of annual emissions reductions are "feasible". Part of the reason for this is that there are very different perceptions of what may or may not be feasible, and the science does not fully support an upper limit on feasible reduction rates. Instead, this report simply reports the challenges associated with meeting different goals and allows the reader to make subjective assessments based on this information. |
| Topic 3 | 80 | 11 | 80 | 20 | It is difficult for non-expert readers to relate to numbers of GtCO <sub>2</sub> eq and ppm. Consider also relating it to temperature change, or include something like (an excerpt of) Table WGIII SPM.1 and refer to that. [Government of Denmark]   | Temperature has now been included.   |
| Topic 3 | 80 | 17 | 80 | 17 | 2031? [scott power, australia]   | The meaning is self-evident.   |
| Topic 3 | 80 | 18 | 80 | 18 | Request explicit explanation that "3%/yr" is a comparison from scenarios with emissions above 50GtCO <sub>2</sub> eq. [Government of Japan]  | This is self-evident from the text and the figure.   |
| Topic 3 | 80 | 19 | 80 | 19 | Request clarification of what authors mean by "doubling" – "doubling" from which reference figures (assumingly, scenarios with emissions above 50GtCO <sub>2</sub> eq in 2030)? [Government of Japan]  | This has been clarified.   |
| Topic 3 | 80 | 21 | 80 | 22 | Figure 3.3: Overload of information: challenging to interpret the multiple panels within the figure, each relating to different types of data on different time scales. Layout / legend placement is confusing. [Government of Netherlands]  | The caption has been revised.  |
| Topic 3 | 80 | 21 | 81 | 5  | Figure 3.3: The notion that the graphs relates to GHG concentration level targets between 430-530 ppm CO <sub>2</sub> eq only becomes (moderately) clear from the caption; the graphs themselves do not mention those targets: confusing. [Government of Netherlands]  | The caption has been revised.  |
| Topic 3 | 80 |    | 80 |    | Figure 3.3 (SPM.8): Please refer to SPM.8 in earlier [Government of Republic of Korea]   | The caption has been revised.  |
| Topic 3 | 80 |    |    |    | Figure 3.3 labels to colour key codes small and faint. Consider increasing font size as well as enhancement [Government of Kenya]  | The caption has been revised.  |

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|         |    |   |    |   |  |   |
|---------|----|---|----|---|--|---|
| Topic 3 | 80 |   |    |   | Right panel: 2010 text should be to the right of the horizontal red line in order to make it clearer that the red line is the 2010 value. [Government of Netherlands]  | The caption has been revised.   |
| Topic 3 | 80 |   |    |   | No need for two legends since colour-coding is identical between the three panels. [Government of Netherlands]   | The caption has been revised.   |
| Topic 3 | 80 |   |    |   | Middle panel, First (gray) column shows rate of change for 1900-2010. It is unclear what the 2000-2010 text refers to. Is it the wider bit in the middle of the column? This should be clearer. [Government of Netherlands]                                    | The caption has been revised.   |
| Topic 3 | 81 | 1 | 81 | 2 | BECCS is supposedly part of the low carbon technologies represented in Figure 3.3, right panel, which in turn is based on WGIII Figure 6.7 and/or Figure 7.16. In the context of those figures, BECCS is not explicitly mentioned. [Government of Netherlands] | The caption has been revised.   |
| Topic 3 | 81 | 5 | 81 | 5 | reference 7.16 should be Figure 7.16. [Government of Netherlands]  | This has been changed in the caption  |
| Topic 3 | 81 | 7 | 81 | 7 | duplicate of do not [Peter Thorne, Norway]   | This paragraph has been replaced with a paragraph based on the official WG3 SPM language. |
| Topic 3 | 81 | 7 | 81 | 7 | Remove 'do not' in sentence (The Cancun Pledges do not eliminate). [European Union]  | This paragraph has been replaced with a paragraph based on the official WG3 SPM language. |
| Topic 3 | 81 | 7 | 81 | 7 | Delete one "do not" [Government of Sweden]   | This paragraph has been replaced with a paragraph based on the official WG3 SPM language. |
| Topic 3 | 81 | 7 | 81 | 7 | Typing mistake, one more "do not". [Shiming Ma, China]   | This paragraph has been replaced with a paragraph based on the official WG3 SPM language. |
| Topic 3 | 81 | 7 | 81 | 7 | "do not" is doubly wirtten. [Akihiko Murata, Japan]  | This paragraph has been replaced with a paragraph based on the official WG3 SPM language. |
| Topic 3 | 81 | 7 | 81 | 7 | The phrase " do not" is repeated in this sentence. Consider deleting one [Government of Kenya]   | This paragraph has been replaced with a paragraph based on the official WG3 SPM language. |
| Topic 3 | 81 | 7 | 81 | 7 | Editorial issue : do not appears twice [Government of India]   | This paragraph has been replaced with a paragraph based on the official WG3 SPM language. |
| Topic 3 | 81 | 7 | 81 | 7 | Typographic error: delete a 'do not' in the middle of sentence, as it is duplicate.<br><br>(Original sentence) The Cancun Pledges do not do not eliminate ~ . [Government of Republic of Korea]  | This paragraph has been replaced with a paragraph based on the official WG3 SPM language. |
| Topic 3 | 81 | 7 | 81 | 7 | Typographical error: "do not" is repeated twice [Government of Canada]   | This paragraph has been replaced with a paragraph based on the official WG3 SPM language. |
| Topic 3 | 81 | 7 | 81 | 7 | "possibility of maintaining" is perhaps a better choice of wording than "option to maintain" [Government of Canada]  | This paragraph has been replaced with a paragraph based on the official WG3 SPM language. |

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|         |    |   |    |    |  |   |
|---------|----|---|----|----|--|---|
| Topic 3 | 81 | 7 | 81 | 7  | a typo error: delete ""do not" - it has been written twice. [Government of Italy]  | This paragraph has been replaced with a paragraph based on the official WG3 SPM language. |
| Topic 3 | 81 | 7 | 81 | 7  | do not is repeated twice [Vahid Mojtahed, Italy]   | This paragraph has been replaced with a paragraph based on the official WG3 SPM language. |
| Topic 3 | 81 | 7 | 81 | 7  | Typo. 'do not' was used twice. [Young-june Choi, South Korea]  | This paragraph has been replaced with a paragraph based on the official WG3 SPM language. |
| Topic 3 | 81 | 7 | 81 | 9  | "medium confidence" seems a bit strange. The option to perform better than promised is always available, albeit with possibly negligible chance of succeeding. But "medium confidence" expresses uncertainty with regard to the availability of optional better performance altogether. [Government of Netherlands]  | This paragraph has been replaced with a paragraph based on the official WG3 SPM language. |
| Topic 3 | 81 | 7 | 81 | 10 | The current wording is unclear. The following is suggested: The Cancun Pledges still allow to keep the temperature change likely below 2oC or the end-of-century concentration between 450 and 500 ppmv CO2eq (medium confidence). However, the Cancun Pledges are not consistent with the most cost-effective pathway to meet this goal and they increase the challenge of doing so. [Government of Austria]  | This paragraph has been replaced with a paragraph based on the official WG3 SPM language. |
| Topic 3 | 81 | 7 | 81 | 10 | Text on Cancun Pledges differs from approved text in AR5 WGIII SPM (final paragraph on p15); and therefore, suggest revision of text to match AR5 WGIII SPM text:<br><br>Estimated global GHG emissions levels in 2020 based on the Cancún Pledges are not consistent with cost-effective long-term mitigation trajectories that are at least as likely as not to limit temperature change to 2°C relative to pre-industrial levels (2100 concentrations of about 450 and about 500 ppm CO2eq), but they do not preclude the option to meet that goal (high confidence). [Government of Japan] | This paragraph has been replaced with a paragraph based on the official WG3 SPM language. |
| Topic 3 | 81 | 7 | 81 | 10 | The bold words in this paragraph are not clear in indication. It is suggested to quote the original text of the WG III SPM, which reads: "Estimated global GHG emissions levels in 2020 based on the Cancún Pledges are not consistent with cost-effective long-term mitigation trajectories that are at least as likely as not to limit temperature change to 2°C relative to pre-industrial levels (2100 concentrations of about 450 and about 500 ppm CO2eq), but they do not preclude the option to meet that goal." [Government of China]   | This paragraph has been replaced with a paragraph based on the official WG3 SPM language. |
| Topic 3 | 81 | 7 | 81 | 12 | Too condensed. Unclear. Many readers will not know what Cancun Pledges are. [scott power, australia]   | This paragraph has been replaced with a paragraph based on the official WG3 SPM language. |

Review comments on the IPCC AR5 Synthesis Report First Order Draft - Topic 3

|         |    |   |    |    |  |   |
|---------|----|---|----|----|--|---|
| Topic 3 | 81 | 7 | 81 | 12 | Clearly the main message is that the Cancun pledges do not take us where we would like to be - rather than that they do not eliminate the option that we can go there. We believe it is very odd to highlight that this less likely option - that the Cancun pledges will not reach the 2 degree objective - is not eliminated, rather than highlighting what is more likely - i.e. that the Cancun pledges will not reach the 2 degree objective. We therefore suggest to leave out the first part saying that the pledges "do not eliminate the option to maintain..." At the very least, the sentence should be turned around so that it reads: "The Cancun Pledges are not on a pathway to most cost-effectively meet the goal of maintaining likely temperature change below 2C and increase the challenge of doing so. However they do not eliminate the option of maintaining likely temperature increase below 2 degrees." [Government of Denmark] | This paragraph has been replaced with a paragraph based on the official WG3 SPM language. |
| Topic 3 | 81 | 7 | 81 | 12 | In the reference to the Cancun Pledges it would be useful to specify if the statement refers to the upper or lower range of these as many large emitters have provided a range in their Cancun submissions. The range of the Cancun pledges is reflected in figure 3.3 and ranges from over 55 GtCO2 to below 50 GtCO2 in 2020. [Government of Norway]   | This paragraph has been replaced with a paragraph based on the official WG3 SPM language. |
| Topic 3 | 81 | 7 | 81 | 12 | HIGH PRIORITY COMMENT: it is believed that way current paragraph highlights the value of the Cancun pledges above their inconsistency with achieving the 2°C, different to what it was reported in WGIII: "[...]Cancun Pledges are not consistent with cost-effective long-term mitigation trajectories that are at least as likely as not to limit temperature change to 2°C relative to pre-industrial levels (2100 concentrations of about 450 and about 500 ppm CO2eq), but they do not preclude the option to meet that goal (high confidence)." It is strongly suggested to rephrase current text so emphasis is given on the insufficiency of the Cancun Pledges to drive pathways consistent with the 2°C target. [Tabaré Arroyo Currás, Mexico]   | This paragraph has been replaced with a paragraph based on the official WG3 SPM language. |
| Topic 3 | 81 | 7 | 81 | 12 | The current text does not convey the message that the Cancún pledges would likely cause temperature to raise by 3°C, i.e. not be consistent with the 2°C limit. Please use the wording equal or similar to that of WG3 SPM: "Estimated global GHG emissions levels in 2020 based on the Cancún Pledges are not consistent with cost-effective long-term mitigation trajectories that are at least as likely as not to limit temperature change to 2°C relative to pre-industrial levels (2100 concentrations of about 450 and about 500 ppm CO2eq), but they do not preclude the option to meet that goal (high confidence). Meeting this goal would require further substantial reductions beyond 2020. The Cancún Pledges are broadly consistent with cost-effective scenarios that are likely to keep temperature change below 3°C relative to preindustrial levels. [6.4, 13.13, Figures TS.11, TS.13]" [Government of Germany]                        | This paragraph has been replaced with a paragraph based on the official WG3 SPM language. |
| Topic 3 | 81 | 7 |    |    | delete second "do not" [Government of Hungary]   | This paragraph has been replaced with a paragraph based on the official WG3 SPM language. |
| Topic 3 | 81 | 9 | 81 | 9  | goals [Peter Thorne, Norway]   | This paragraph has been replaced with a paragraph based on the official WG3 SPM language. |

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|---------|----|----|----|----|---|--|
| Topic 3 | 81 | 9  | 87 | 10 | An important (false?) assumption in this conclusion is that institutions are in place; however, their absence was noted on page 80 line 1. Please consider raising this assumption in some way in this statement. [Haroon Kheshgi, United States of America]  | Not clear on the meaning of this comment, since it refers to page 87. However, if the point is that this paragraph should point out that the Cancun Pledges are not in place, then no change is required. This paragraph is only considering their implications were the reductions to take place. Policies are discussed in more detail in 4.4. |
| Topic 3 | 81 | 11 |    |    | Wonder whether "about 550ppmv CO2eq" should be "about 550ppm to 650ppm," as approved AR5 WGIII SPM stated that the Cancun Pledges were broadly consistent with "scenarios that are likely to keep temperature change below 3C relative to preindustrial levels," which according to AR5 WGIII, Table SPM.1 include scenarios that reach concentrations of 650ppm. [Government of Japan]   | This paragraph has been replaced with a paragraph based on the official WG3 SPM language.  |
| Topic 3 | 81 | 14 | 81 | 14 | forcers'. Is this jargon needed? If yes given definition. [scott power, australia]  | The term 'Forcers' is widely used; e.g., WGI SPM; TS and WGI ch8   |
| Topic 3 | 81 | 14 | 81 | 15 | The current wording lacks clarity. The following is suggested: Reducing emissions of short-lived forcers in the near term may contribute to a reduced rate of warming. However, it has limited long-term effects. [Government of Austria]   | Taken into account. The text has been changed.   |
| Topic 3 | 81 | 14 | 81 | 15 | "Reducing emissions of short-lived forcers in the near term may contribute to a reduced rate of warming, but have a limited effect on long-term concentrations." This is somewhat arbitrary, because WGI didn't get such consensus. At this moment, we have no effective way to remove the some short-liver forcers (causing warming species) exclusively without influencing the other co-emitted components (that may result in cooling). The short-lived forcer's reduction also may lead to unexpected warming on the Earth's climate in the future. Suggest changing this to "It is still not sure that reducing emissions of short-lived forcers in the near term will contribute to a reduced rate of warming, especially for the effect on long-term concentrations." [Zong-Ci Zhao, China] | Taken into account. The text has been changed.   |
| Topic 3 | 81 | 14 | 81 | 15 | Suggest this sentence be revised to say " reducing emissions of short-lived forcers.....but will have a limited effect on long-term warming, which is driven mainly by CO2 concentrations". [Government of Canada]  | Accepted. Text has been changed (almost identical to suggestion).  |
| Topic 3 | 81 | 14 | 81 | 19 | To maintain its accuracy this paragraph should acknowledge throughout that it is speaking to near term reductions of short-lived forcers. In line 17 it should read "short-lived species in the near term may contribute." And in lines 18-19 it should read "and the effect of near term reductions on long-term warming is limited." [Government of United States of America]   | Taken into account. Text has been changed.   |



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|         |    |    |    |    |  |   |
|---------|----|----|----|----|--|---|
| Topic 3 | 81 | 14 | 81 | 19 | Further to Canada's overall comments, there is a notable lack of policy-relevant information about the role of SLCF mitigation in the IPCC AR5, and this situation is not rectified in the SYR. This paragraph is about the only place SLCFs are referred to. An opportunity is being missed here to convey to policymakers how long-lived vs short-lived forcers can contribute differently to abating climate warming and how atmospheric levels of these substances respond differently to reductions in emissions. Discussing differences between short-lived GHGs and aerosols would also have been useful. This is essential information for planning comprehensive multi-gas mitigation strategies. If there is material in a WG report which could be used to show the effect of mitigating SLCFs now and delaying action on CO2, vs taking action on CO2 and delaying action on SLCFs, or taking action on both fronts now, this would be very useful to include in the SYR. This was an issue that Canada asked be addressed in the AR5 in our submission of policy-relevant questions prior to the scoping of the AR5. This would bean ideal synthesis topic across WG1 and WGIII. [Government of Canada] | Taken into account. We agree that a synthesis is required for these issues. However, there is limited basis in the WG reports for discussing these issues in SyR, and thus we have not been able to give this a broad treatment here. However, we have expanded this slightly by introducing a para on non-CO2 before the para on SLCF. |
| Topic 3 | 81 | 14 | 81 | 19 | Very important paragraph, please keep it. [Government of Germany]  | Noted. Thanks. We have expanded this slightly by introducing a para on non-CO2 before the para on SLCF.   |
| Topic 3 | 81 | 14 | 81 | 19 | Reducing emissions of SLCFs will affect long-term concentrations for as long as their emissions are reduced. Suggest removing last phrase "but have a limited effect...." Studies often show an effect of a few tenths of a degree; a more quantitative statement would be better than labeling their effect "limited" which is not well defined. Perhaps the point that the phrase is meant to capture is that continued emissions of long-lived GHGs such as CO2 would dominate the radiative forcing of SLCFs if continued over the long-term; if so then this could be stated explicitly rather than saying SLCFs are limited. [Haroon Kheshgi, United States of America]  | Partially taken into account. The basis for being quantitative on efecteds of SLCF is limited. We have changed the text in order to clarify. We have also added a new para on non-CO2 before the para on SLCF.  |
| Topic 3 | 81 | 17 | 81 | 17 | Choice of words: "species". Seems odd word to use to refer to various GHGs. [Government of Netherlands]  | Accepted.   |
| Topic 3 | 81 | 17 | 81 | 18 | The subject of SLCFs is of critical interest to policymakers and referring vaguely to large uncertainties about "some of these components" is not useful. Suggest clarifying this sentence. For example, has it been established that there is far less uncertainty about the effect of methane emission reductions than about black carbon emission reductions (as an example)? [Government of Canada]  | Accepted. We have added text about the differences in uncertainties related to various components.  |
| Topic 3 | 81 | 21 | 81 | 21 | The text "all major emitting regions..." based on the ch.6 of WG3 is a very important background knowledge for understanding the condition to realize 450 ppm scenarios. Should be maintained. [Government of Japan]   | Paragraph has been removed as part of a policy to include only one headline per subsection.   |
| Topic 3 | 81 | 21 | 81 | 21 | It is suggested to reword "All major emitting regions" as "Global emission". [Government of China]   | Paragraph has been removed as part of a policy to include only one headline per subsection.   |
| Topic 3 | 81 | 21 |    |    | add "and emerging" after "major" because it is not only those countries that currently emit a lot that have to do a lot, but also those that have only recently started to increasingly emit a lot. [Government of Hungary]  | Paragraph has been removed as part of a policy to include only one headline per subsection.   |
| Topic 3 | 81 | 22 | 81 | 22 | Suggest to remove 'likely'. This statement is equally true for a 50% chance of keepint to 2C. [European Union]   | Paragraph has been removed as part of a policy to include only one headline per subsection.   |
| Topic 3 | 81 | 22 | 81 | 22 | Delete "2100" before "concentrations". [Government of Austria]   | Paragraph has been removed as part of a policy to include only one headline per subsection.   |

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|         |    |    |    |    |  |  |
|---------|----|----|----|----|--|--|
| Topic 3 | 81 | 22 | 81 | 22 | Insert "the" before "temperature". [Government of Austria]   | Paragraph has been removed as part of a policy to include only one headline per subsection.                    |
| Topic 3 | 81 | 22 |    |    | The same issue arises here with the word "reach" as I have commented on for line 8-9 on the previous page - ie most scenarios reach and exceed 450 ppmv. Again, I think the wording should be changed to "...to limit CO2eq concentrations to no more than 450 ppmv by 2100 ...". [David Wratt, New Zealand] | Paragraph has been removed as part of a policy to include only one headline per subsection.                    |
| Topic 3 | 81 | 24 |    |    | The paragraphs on this section are extremely long and difficult to digest. [European Union]  | We have tried to simplify wherever possible straying too far from approved WG3 language.                       |
| Topic 3 | 81 | 26 | 81 | 26 | Delete "in mitigation scenarios". It only introduces ambiguity and thus only is confusing. [Government of Austria]   | Corrected  |
| Topic 3 | 81 | 26 | 81 | 32 | This para on costs should be joint with the one on P 77. [Government of Germany]   | Agreed. The paragraph has been moved to next to the cost paragraph.  |
| Topic 3 | 81 | 27 | 81 | 27 | Vague: "can". Especially vague with respect to confidence statement. [Government of Netherlands]   | Sentence has been revised.   |
| Topic 3 | 81 | 27 | 81 | 29 | Should the words "over the next few decades" be added to the phrase "majority of mitigation efforts over the next few decades takes place in countries with the highest future emissions..."? [Government of Canada]   | Not necessary.   |
| Topic 3 | 81 | 27 | 81 | 31 | Please make this clearer by including a figure (or statistics) that show which countries (or regions) have the highest baseline emissions. [Government of United Kingdom of Great Britain & Northern Ireland]  | Not possible given limited space.  |
| Topic 3 | 81 | 34 | 81 | 34 | please remove "evolving" here. [Government of Netherlands]   | The word 'evolving' has been removed.  |
| Topic 3 | 81 | 34 | 81 | 34 | "Adaptation" is not properly defined. Suggestion: 'Adaptation means reductions in risk and vulnerability through the actions of adjusting practices, processes and capital in response to the actuality or threat of climate change'. (following WGII 7.5.1.1) [Government of Netherlands]                   | Adaptation is now defined in the Introduction of Topic 3, following the IPCC definition.                       |
| Topic 3 | 81 | 34 |    |    | Why is "evolving" put in parenthesis? We recommend to delete it. [Government of Germany]   | The word 'evolving' has been removed.  |
| Topic 3 | 81 | 35 | 81 | 35 | Section 3.2 needs an Introduction: motivation, scope [scott power, australia]  | Topic 3.3 now has an Introduction and the movement of what was 3.4 to 3.2 now provides that motivation, scope. |
| Topic 3 | 81 | 36 | 81 | 38 | Boxed text does not quite capture lines 48 – 02 (on page 82), where there is emphasis on differences in values and interests (unless this is captured by 'context') and ways to account for these in decision support. [Government of Netherlands]   | Values and interests are captured in socio-cultural contexts.  |
| Topic 3 | 81 | 36 | 83 | 12 | This section is not articulated to the language approved in the SPM WGII. There is the need to rephrase again the whole section taking into consideration the final SPM. [Government of Bolivia]   | The Sub-Topic has been re-cast substantially to draw on specific WG2 SPM text.                                 |
| Topic 3 | 81 | 37 | 81 | 37 | Maybe the rate can be measured, but it is not clear how the „amount“ of climate change can be measured in order to be experienced. CLimate change and its impact in humans/life is not yet fully comprehend let alone measured? [Government of Netherlands]  | The word 'amount' has been changed to 'degree' as this conforms with normal English useage                     |

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|         |    |    |    |    |   |   |
|---------|----|----|----|----|---|---|
| Topic 3 | 81 | 40 | 81 | 46 | There is also a shift from optimal adaptations plans to a more robust adaptation plans that guarantees achieving targets under different realizations of uncertainties. It is important to point out in this paragraph to the shift of adaptations strategies toward resilient and robust actions. As, in particular, European Union is dedicating funds and developing formal and informal guidelines to increasing the resilience of its member states to future risk of climate change. [Vahid Mojtahed, Italy]  | The change in the approach from 'optimal' to more 'robust' adaptation plans is important. The 'robust' approach is encapsulated in the text: 'multi-metric evaluations, including risk and uncertainty dimensions integrated within wider policy and ethical frameworks to assess trade-offs and constraints'. Rather than introduce this new concept here, we would prefer leave the text as it stands with some earlier adjustments to frame this as a 'pathways' approach. |
| Topic 3 | 81 | 41 | 81 | 45 | Too much information in one sentence, makes the sentence unclear. Moreover, 'integrated within wider policy and ethical frameworks' (line 45) now seems to refer only to "risk and uncertainty dimensions", which is probably not intended. Suggestion: 'Engineered and technological adaptation options are still the most common adaptive responses, although broadening to ecosystem-based, institutional, and social measures. Adaptation measures are increasing and becoming more integrated within wider policy frameworks. Economic thinking on adaptation has evolved from a focus on cost benefit analysis and identification of "best economic" adaptations to the development of multi-metric evaluations including the risk and uncertainty dimensions' (text adapted from the executive summaries of WGII 14 and 16). [Government of Netherlands] | The sentence has been re-framed slightly and words changed to enhance focus and readability. We appreciate the reviewers efforts but feel that the contrasts in approaches are best illustrated by something like the original sentence.  |
| Topic 3 | 81 | 42 | 81 | 42 | This is more of an introductory or framing statement without providing substantial information. Suggest using it in a possible introduction to the topic or to the overall SYR, to a reasonable extent. [Government of Sweden]  | The specific statement on line 42 was in relation to the evolution of research pertinent to the sub-Topic. This has been re-framed to focus on adaptation research specifically. The nature of the research is relevant to the strategic choices that can be made about adaptation approaches and so we argue that it is relevant here.   |
| Topic 3 | 81 | 46 | 81 | 46 | there is no table named Table 1 SPM, only Table SPM.1; change to " Table SPM.1" [Government of Netherlands]   | Reference amended   |
| Topic 3 | 81 | 48 | 81 | 50 | As noted in chapters 2 and 3 of WGIII it is not just an information issue with respect to risk, but more importantly differences across stakeholders with regards to their preferences for avoiding risk. It would therefore be a more complete characterization of the underlying report to phrase this as "...on societal values, objectives, available information, and preferences regarding risk" in line 49 and in line 50 to phrase the point as "social-cultural contexts, preferences regarding risk, and expectations..." noting that implied in the inclusion of expectations is notion of available information. [Government of United States of America]   | This paragraph has been replaced with one drawn from approved WG2 SPM text.   |
| Topic 3 | 81 | 48 | 81 | 57 | Too much detail. [scott power, australia]   | This paragraph has been replaced with one drawn from approved WG2 SPM text.   |
| Topic 3 | 81 | 48 | 82 | 2  | The authors should consider adding WGII 5.5 as supporting reference. [Government of United States of America]   | This paragraph has been replaced with one drawn from approved WG2 SPM text so this reference is not needed  |

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|         |    |    |    |    |   |  |
|---------|----|----|----|----|---|--|
| Topic 3 | 81 | 48 |    |    | to add to establish methodologies for quantification and economic valuation of loss and damage from climate change impacts. [Government of Nicaragua]   | This paragraph has been replaced with one drawn from approved WG2 SPM text so this addition is not needed  |
| Topic 3 | 81 | 50 | 81 | 50 | To include at the end of the sentence: ... decision-making processes, "including indigenous peoples' holistic view of community and environment". [Government of Bolivia]   | This paragraph has been replaced with one drawn from approved WG2 SPM text so this extension is not needed   |
| Topic 3 | 81 | 51 | 81 | 53 | Not tracable to WGII report. [Government of Netherlands]  | This text has been deleted and a cross-reference given to Sub-Topic 4.4.2 where this is dealt with in greater detail.  |
| Topic 3 | 81 | 51 | 81 | 53 | The use of the term "desired adaptation" is too subjective, normative and borderline prescriptive for a scientific document. The entire sentence could be deleted to avoid overlap with Topic 4. [Government of United States of America]   | This paragraph has been replaced with one drawn from approved WG2 SPM text and so this sentence has been deleted   |
| Topic 3 | 81 |    | 82 |    | Surprisingly, this section doesn't mention the dangers of 'adaptive emissions' that emerge when energy-intensive adaptation solutions are pursued, e.g. aircon, hard sea defences, desalination etc. A sentence or two could be added. [European Union]   | We now note that 'Adaptation options need to take into account co-benefits and mitigation implications' and cross-refer this statement to sub-Topics 3.5 and 4.2 where this is dealt with in more detail                           |
| Topic 3 | 82 | 1  | 82 | 2  | WGII 2.2-4 can support this statement [Stewart Cohen, Canada]   | Thankyou. The reference to disaster risk reduction has been moved to another paragraph.  |
| Topic 3 | 82 | 4  | 82 | 4  | equest revision of text to match text in AR5 WGII SPM. Current AR5 SYR text "There are constraints and limits to adaptation as well as maladaptation," seems to lay emphasis on maladaptation and limits to adaptation and moreover does not seem to be in AR5 WGII SPM. Request replacement with approved text from AR5 WGII SPM p25, paragraph 4, bold text)<br><br>Greater rates and magnitude of climate change increase the likelihood of exceeding adaptation limits (high confidence). [Government of Japan]   | This text has been replaced with the exact text from WG2 SPM.  |
| Topic 3 | 82 | 4  | 82 | 7  | Too many concepts are mixed up here (and in many other highlighted boxes). Very simple statements put one after the other do not provide a clear message. [European Union]  | This text box (headline statement) has been deleted and some of the elements included in the headline for the whole sub-Topic  |
| Topic 3 | 82 | 4  | 82 | 7  | Boxed text doesn't quite capture the paragraphs that follow. In particular, it does not emphasize (or even mention) the probable need of transformational adaptation instead of incremental adaptation, in view of limits to the latter (lines 46-52). The 'logic' of this part of section 3.3 seems to be that there are limits to adaptation, which 'suggests transformational change may be a requirement for sustainable development in a changing climate; i.e., not only for adapting to the impacts of climate change, but for altering the systems and structures, economic and social relations, and beliefs and behaviors that contribute to climate change' (quote from WGII Technical Summary). [Government of Netherlands] | This text box (headline statement) has been deleted. The text has been incorporated in part into the single headline statement in sub-Topic 3.3. and it includes a little in there on incremental to transformational adaptations. |

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|         |    |   |    |    |  |  |
|---------|----|---|----|----|--|--|
| Topic 3 | 82 | 4 | 82 | 7  | The boxed text mentions 'constraints and limits', but the following paragraphs only elaborate on limits. Suggestion: add a paragraph on constraints, referring to e.g. WGII 16.3. [Government of Netherlands]  | This text box (headline statement) has been deleted. The text has been incorporated in part into the single headline statement in sub-Topic 3.3. The subsequent text now includes clear paragraphs on both constraints and limits drawn from WG2 SPM text.   |
| Topic 3 | 82 | 4 | 82 | 7  | The authors should replace the second sentence of the shaded box with verbatim language from WG2 SPM: "Recognition of diverse interests...." [Government of United States of America]  | This text box (headline statement) has been deleted. The text has been incorporated in part into the single headline statement in sub-Topic 3.3. These headline statements are intended to be synthetic, so it is not appropriate to use exact SPM text as they integrate multiple portions of SPM text. |
| Topic 3 | 82 | 4 | 82 | 44 | The information on adaptation in these four paragraphs has a negative bias as they lack statements on the fact that no-action entails greater risks than adaptation actions. [Government of Germany]   | Some of these paragraphs have been removed and replaced with approved SPM text. The perspective of risks associated with no action vs action is addressed in the first sentence of both the sub-Topic headline statement and the first sentence of the first paragraph.                                  |
| Topic 3 | 82 | 6 | 82 | 6  | "all levels": of what? Vague, define. [Government of Netherlands]  | Both the headline statement box and that text have been removed.   |
| Topic 3 | 82 | 9 | 82 | 9  | The following wording is suggested: greater rates and magnitudes of climate change ... [Government of Austria]   | This paragraph has been replaced with WG2 SPM text, supplemented by a statement from the WG2 TS and so this amendment does not apply   |
| Topic 3 | 82 | 9 | 82 | 9  | There are limits to adaptation... (include) "recognizing that loss and damage is a challenge that is additional to, and in some cases more than, adaptation actions". [Government of Bolivia]  | This paragraph has been replaced with WG2 SPM text, supplemented by a statement from the WG2 TS.   |
| Topic 3 | 82 | 9 | 82 | 9  | The statement starting with "There are limits to adaptation..." goes beyond what was agreed to in the WGII Summary for Policymakers. Suggest deleting this sentence. [Government of United States of America]  | This has been replaced with WG2 SPM text, supplemented by a statement from the WG2 TS.   |
| Topic 3 | 82 | 9 | 82 | 10 | "There are limits to adaptation; greater rates and magnitude of climate change increase the likelihood of exceeding adaptation limits and of severe, pervasive, and irreversible impacts (high confidence)." First part of the statement is founded: "Greater rates and magnitude of climate change increase the likelihood of exceeding adaptation limits (high confidence)." (WG II SPM, p. 25) Second part of the statement: "Increasing magnitudes of warming increase the likelihood of severe, pervasive, and irreversible impacts" WG II SPM, p.14 l. 1-2, is not --> wrong attribution of confidence level. Suggestion: omit " and severe, pervasive, and irreversible impacts" (as it has been done in the SYR SPM, p. 21, l.32-33) [Government of Netherlands] | This statement has been replaced with the exact text from the WG2 SPM.   |
| Topic 3 | 82 | 9 | 82 | 22 | The authors should consider adding WGII 5.5 as supporting reference. [Government of United States of America]  | This has been replaced with WG2 SPM text, supplemented by a statement from the WG2 TS.   |
| Topic 3 | 82 | 9 | 82 | 22 | This para repeats information of section 5.2 on P 60, please straighten text. [Government of Germany]  | This has been replaced with WG2 SPM text, supplemented by a statement from the WG2 TS.   |

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|---------|----|----|----|----|--|--|
| Topic 3 | 82 | 10 | 82 | 10 | "impacts": on what? Vague [Government of Netherlands]  | This has been replaced with WG2 SPM text, supplemented by a statement from the WG2 TS.   |
| Topic 3 | 82 | 12 | 82 | 13 | It is suggested to delete the sentence starting: "This can arise from poor implementation ....". This paragraph discusses limits of adaptation from a more general perspective but limits of adaptation should not be mixed with reasons for an adaptation deficit. [Government of Austria]  | This has been replaced with WG2 SPM text, supplemented by a statement from the WG2 TS.   |
| Topic 3 | 82 | 12 | 82 | 13 | "This can .. of adaptation": confusing sentence / structure. [Government of Netherlands]   | This has been replaced with WG2 SPM text, supplemented by a statement from the WG2 TS.   |
| Topic 3 | 82 | 13 | 82 | 13 | unclear to what the "(high confidence)" refers to [Government of Netherlands]  | This has been replaced with WG2 SPM text which includes that confidence level and this text is supplemented by a statement from the WG2 TS.                      |
| Topic 3 | 82 | 13 | 82 | 16 | This sentence is trying to say a lot but a reader will be lost. Split it into 2 sentences after "and regions". [Government of Netherlands]   | This has been replaced with WG2 SPM text, supplemented by a statement from the WG2 TS.   |
| Topic 3 | 82 | 16 | 82 | 18 | 'In some parts of the world ... eroding the basis for sustainable development'; '... may be able ... [or] may not': Vague. Sentence feels out of place, not really adding anything to the paragraph. [Government of Netherlands]   | This has been replaced with WG2 SPM text, supplemented by a statement from the WG2 TS.   |
| Topic 3 | 82 | 18 | 82 | 20 | <p>The idea that some adaptation limits may not be alleviated is not discussed in AR5 WGII SPM although similar discussion with more in-depth explanatory text can be found in the Executive Summary of Chapter 16 (p3, latter half of paragraph 2), and further explanation in the glossary, that there are soft adaptation limits and hard adaptation limits, with the latter having no prospects of avoiding intolerable risks, request elaboration here in AR5 SYR SPM based on aforementioned text. Specifically, suggest the following text from AR5 WGII SPM Glossary:</p> <p>However, for most regions and sectors, there is a lack of empirical evidence to quantify magnitudes of climate change that would constitute a future adaptation limit. Furthermore, economic development, technology, and cultural norms and values can change over time to enhance or reduce the capacity of systems to avoid limits. As a consequence, some limits may be considered 'soft' in that they may be alleviated over time. Nevertheless, some limits may be 'hard' in that there are no reasonable prospects for avoiding intolerable risks. Recent literature suggests that incremental adaptation may not be sufficient to avoid intolerable risks, and therefore transformational adaptation may be required to sustain some human and natural systems.</p> <p>If not the above text, then request that the following text regarding adaptation limits be added from AR5 WGII SPM:</p> <p>Greater rates and magnitude of climate change increase the likelihood of exceeding adaptation limits (high confidence). Limits to adaptation occur when adaptive actions to avoid intolerable risks for an actor's objectives or for the needs of a system are not possible or are not currently available. [Government of Japan]</p> | This text has been replaced by exact text from the WG2 SPM with follow on text from the WG2 Technical Summary to address the issues of 'soft' and 'hard' limits. |

Review comments on the IPCC AR5 Synthesis Report First Order Draft - Topic 3

|         |    |    |    |    |   |  |
|---------|----|----|----|----|---|--|
| Topic 3 | 82 | 18 | 82 | 20 | Low confidence that there is no limit? We find this very vague. Suggestion: rephrase according to WG II 20.2 [Government of Netherlands]  | This sentence has been removed.  |
| Topic 3 | 82 | 18 | 82 | 20 | The "low confidence" given to this statement is very misleading and some editing is needed. As written, the reader could interpret this as meaning we have high confidence that there is a single temperature threshold. [Government of United States of America]                   | This statement has been removed.   |
| Topic 3 | 82 | 18 | 82 | 20 | Why is there only low confidence in this statement? [Government of Germany]   | This sentence has been removed.  |
| Topic 3 | 82 | 20 | 82 | 22 | Unclear, please consider revising [Helmut Haberl, Austria]  | This has been replaced with WG2 SPM text, supplemented by a statement from the WG2 TS. That sentence is being moved to another part of the SYR(topic 4.2), revised as follows: Both the need for and challenges to adaptation are expected to increase with the magnitude and rate of climate change . |
| Topic 3 | 82 | 21 | 82 | 21 | Should read '..impacts, and or however implementation...' rather than 'but' - or new sentence. 'But' in this sense doesn't seem appropriate as it is not describing an unexpected contrast from the first clause [Government of United Kingdom of Great Britain & Northern Ireland] | This has been replaced with WG2 SPM text, supplemented by a statement from the WG2 TS. That sentence is being moved to another part of the SYR(topic 4.2), revised as follows: Both the need for and challenges to adaptation are expected to increase with the magnitude and rate of climate change . |
| Topic 3 | 82 | 24 | 82 | 24 | Vague statement with use of word "can", yet a high confidence is attached. [Government of Netherlands]  | This paragraph has been removed. The linkages with sustainable development pathways are addressed through cross-referenced to sub-Topic 3.5  |
| Topic 3 | 82 | 24 | 82 | 24 | "can": under which circumstances/how [Government of Netherlands]  | This paragraph has been deleted.   |
| Topic 3 | 82 | 24 | 82 | 26 | Hard to find the link in the WG2 report between the two elements that are presented together here. The link to mitigation is with climate-resilient pathways for sustainable development, not with adaptation strategies, which are a different thing. [European Union]             | This paragraph has been removed. The linkages with sustainable development pathways are addressed through cross-referenced to sub-Topic 3.5  |
| Topic 3 | 82 | 24 | 82 | 26 | Do 'such strategies' (line 24/25) and 'they' (lines 25 and 26) refer to 'effective adaptation strategies' or to effective adaptation strategies that have been linked to sustainable development? [Government of Netherlands]   | This paragraph has been removed. The linkages with sustainable development pathways are addressed through cross-referenced to sub-Topic 3.5  |
| Topic 3 | 82 | 24 | 82 | 26 | Why would it be more challenging to link adaptation with SD? [Government of Germany]  | This paragraph has been removed. The linkages with sustainable development pathways are addressed through cross-referenced to sub-Topic 3.5  |
| Topic 3 | 82 | 24 | 82 | 26 | Please spell out what exactly you mean here. It is not at all clear. At the moment the statement is so general that its implications will be lost. [Government of United Kingdom of Great Britain & Northern Ireland]   | This paragraph has been removed. The linkages with sustainable development pathways are addressed through cross-referenced to sub-Topic 3.5  |
| Topic 3 | 82 | 26 | 82 | 28 | WGII 2.1-4 can support this statement [Stewart Cohen, Canada]   | Thankyou. This paragraph has been deleted but the sentence on decision-support referred to here is being moved to another section.   |

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|         |    |    |    |    |  |  |
|---------|----|----|----|----|--|--|
| Topic 3 | 82 | 27 |    |    | It would be interesting to learn more about such "targeted decision-support processes and tools", please add more explanation. [Government of Germany]   | This paragraph has been deleted. A cross reference to section 4.4.2 has been included to direct readers to detail on implementation of decision-support  |
| Topic 3 | 82 | 31 | 82 | 31 | There is no WG II 4.6 [Government of Netherlands]  | This paragraph has been deleted so this reference does not need amending   |
| Topic 3 | 82 | 31 | 82 | 31 | Unclear where the confidence refers to, couldn't find back a statement in the given references [Government of Netherlands]   | This paragraph has been deleted so this confidence statement does not need amending.   |
| Topic 3 | 82 | 31 | 82 | 35 | This paragraph refers to WGII 15.6 more directly than 16.2-5 [Government of Netherlands]   | This material has been moved to another paragraph and the references to underestimation of complexity etc have been drawn from WG2 SPM text  |
| Topic 3 | 82 | 37 | 82 | 44 | Poor adaptation may also result in increasing GHG emissions which should also be avoided (e.g. artificial snow used to replace reduced natural snow cover in skiing resorts) [Helmut Haberl, Austria]  | The point of adaptation options having emission implications has been cross-referred to SYR 3.2 and 4.2 where this is dealt with in greater detail.  |
| Topic 3 | 82 | 37 | 82 | 44 | Shouldn't the creation of 'adaptive emissions' form part of the definition of maladaptation? WGII's glossary refers to: 'Actions that may lead to increased risk of adverse climate-related outcomes, increased vulnerability to climate change, or diminished welfare, now or in the future'. This would seem to include 'adaptive emissions', so I think the text should say so explicitly. If not classified as maladaptation, the problem of adaptive emissions should at least be raised somewhere. I cannot find the term mentioned in the current SYR draft. [European Union] | Agree with this point, so have inserted into an earlier, revised paragraph a cross-reference to sub-Topics 3.2 and 4.4 where this is dealt with in more detail.  |
| Topic 3 | 82 | 37 | 82 | 44 | "maladaptation" not properly defined or described. Suggestion: use original definition by Barnett and O'Neil (2012): action taken ostensibly to avoid or reduce vulnerability to climate change that impacts adversely on, or increases the vulnerability of other systems, sectors or social groups. [Government of Netherlands]  | This paragraph has been removed. Maladaptation is now used only in the headline statement for sub-Topic 3.3 where there is no room for a definition. We use the WG2 Glossary definition.                               |
| Topic 3 | 82 | 37 | 82 | 44 | I am not sure what this paragraph is trying to say. The societies needs both investment in adaptive and coping capacities. Investing in coping capacities (protecting assets) by default is a short term plan but a necessary one. This should not be confused with maladaptations and preventing countries from directing their investment toward it. More attention should be paid to the message that this paragraph wants to deliver. [Vahid Mojtahed, Italy]  | The focus here was on poor planning leading to less than effective outcomes. The paragraph has been deleted. Some elements have been incorporated into other paragraphs using text drawn from approved WG2 SPM text.   |
| Topic 3 | 82 | 40 | 82 | 40 | "the target group": the text in the Technical Summary of WGII (p. 32) is more explicit and more informative. [Government of Netherlands]   | The paragraph has been deleted. Some elements have been incorporated into other paragraphs using text drawn from approved WG2 SPM text.  |
| Topic 3 | 82 | 46 | 82 | 57 | This is a key para. Could you spell out more clearly the implications - if we don't think long-term now then there are great risks. Also change line 47 from "considering transformational change" to "considering long-term climate and transformational change". [Government of United Kingdom of Great Britain & Northern Ireland]  | The paragraph has been re-written somewhat, bringing in an approved WG2 SPM headline statement and re-framing to focus on transformational adaptation. The actual words referred to in this comment have been removed. |
| Topic 3 | 82 | 46 | 83 | 3  | WGII 2.5 can support this statement. [Stewart Cohen, Canada]   | Thankyou, that reference has been added.   |



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|         |    |    |    |    |   |   |
|---------|----|----|----|----|---|---|
| Topic 3 | 82 | 52 | 82 | 54 | Transformational adaptation is said to include: 'introduction of new technologies or practices, formation of new structures or systems of governance, adaptation at greater scale or magnitude and shifts in the location of activities'. This is rather loosely worded: surely some new technologies, for example, could be introduced in a rather incremental way. [European Union] | These examples are drawn from the underlying IPCC chapters and the WG2 Glossary. What this reviewer comment suggests is correct - new technologies can be (and are often) used in incremental adaptation. But they can also be a core part of transformational adaptations. To try to address this point, the words 'can include' have been used. |
| Topic 3 | 82 | 52 |    |    | "lead-times": explain. [Government of Netherlands]  | Lead times is used in the normal way - where 1) a decision has been made but the consequences of that decision do not occur for a lengthy period or 2) where a decision is made and preparatory work done but the main action does not start for a lengthy period.  |
| Topic 3 | 82 | 54 | 82 | 57 | Unclear. Suggestion: copy text from WGII SPM: "Societal debates over risks from forced and reactive transformations as opposed to deliberate transitions to sustainability may place new and increased demands on governance structures to reconcile conflicting goals and visions for the future." [Government of Netherlands]   | Part of this text was used but in conjunction with other points from WG2 chapters which address additional points.  |
| Topic 3 | 82 | 57 | 82 | 57 | "therefore": we fail to see the logic here. [Government of Netherlands]   | The sentence has been changed to remove this word.  |
| Topic 3 | 82 | 57 | 83 | 3  | "iterative learning, deliberative processes, and innovation" are considered in WGII to contribute to "climate resilient pathways" and "adaptation", but as far as I could trace not directly to "sustainability". [Government of Netherlands]   | The link to adaptation pathways has been made in the text.  |
| Topic 3 | 83 | 4  | 83 | 4  | Please change "limits to adaptation" to "limits of adaptation actions". [Government of Germany]   | This reference may be to page 84 line 4. In which case, the headline statement has been removed.  |
| Topic 3 | 83 | 5  | 83 | 5  | "adaptive capacity" not defined. Adaptive capacity of what? Ecosystems? Communities? (both, according to line 7). Surely not of a building, as the current text might also imply. [Government of Netherlands]   | Adaptive capacity is used as per the WG2 Glossary 'The ability of systems, institutions, humans, and other organisms to adjust to potential damage, to take advantage of opportunities, or to respond to consequences'. The third line of the paragraph identifies that it pertains to both human and natural systems.                            |
| Topic 3 | 83 | 5  | 83 | 12 | The authors should consider adding WGII 5.5 as supporting reference. [Government of United States of America]   | Thankyou. Reference noted and included  |
| Topic 3 | 83 | 9  | 83 | 9  | Please change "limits to adaptation" to "limits of adaptation actions". [Government of Germany]   | Assuming that this comment pertains to page 82 line 9, then this paragraph has been largely replaced with WG2 SPM text supplemented by WG2 TS text.   |

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|         |    |    |    |    |  |  |
|---------|----|----|----|----|--|--|
| Topic 3 | 83 | 14 | 83 | 14 | Insert 'actions' in the heading. In line 14, page 83, the writers state that "Climate Change Risks Reduced by Mitigation and Adaptation" ,so It would probably be more accurate, instead of "Climate Change Risks Reduced by Mitigation and Adaptation" to say "Climate Change Risks Reduced by Mitigation and Adaptation Actions" and while all of document should add "measures or actions" after ""adaptation and mitigation" [Government of Vietnam] | Thanks for the suggestion. To keep the text as short as possible, we kept adaptation and mitigation, assuming that these terms refer to measures or actions.   |
| Topic 3 | 83 | 14 | 83 | 57 | Section needs to include bullet from WGII SPM which reads "Since mitigation reduces the rate as well as the magnitude of climate change, it also increases the time available for adaptation to a particular level of climate change, potentially by several decades". This is a really important point. [Rachel Warren, United Kingdom]   | This text can be found in 3.5: Prospects for climate-resilient pathways are related fundamentally to what the world accomplishes with climate-change mitigation (high confidence). Since mitigation reduces the rate as well as the magnitude of warming, it also increases the time available for adaptation to a particular level of climate change, potentially by several decades. |
| Topic 3 | 83 | 14 | 88 | 2  | Sections 3.4 and 3.5 provide useful information and attempt to synthesize information from WGs 2 and 3. They should further be integrated with the previous sections of Topic 3. The current Topic 3 contains quite some duplications and does not provide a real synthesis of WG2 and WG3 material. [Government of Germany]   | Topic 3 has a new structure that provides a better integration of the content from wg2 and 3.  |
| Topic 3 | 83 | 14 |    |    | This chapter on synergies between adaptation and mitigation is quite unfortunate and unclear. It does not really provide a good overview of these synergies and relationships. Statements are hard to understand, starting from the first one, in bold and boxed. [European Union]   | Synergies btw mitigation and adaptation policies are discussed in Topic 4. This section is on the balance btw adaptation and mitigation in pathways. We hope the new version clarifies.  |
| Topic 3 | 83 | 16 | 83 | 17 | What is meant by ethical considerations? Also below, on line 26-27. Without more information, it is totally unclear what is meant here. [European Union]   | The headline has been changed. Ethical considerations are primarily described and discussed in 3.1.  |
| Topic 3 | 83 | 16 | 83 | 24 | This introduction could be used for the total report. Why is this mentioned here, in the middle of the report? It could be left out or be moved to the introduction of the synthesis report. [Government of Netherlands]   | Thanks for the suggestion. This framing is seen as most relevant before decision-making is discussed.  |
| Topic 3 | 83 | 17 | 83 | 17 | It seems that some words are missing. The following text is suggested for the sake of clarity: Decisions about mitigation and adaptation can be informed by tools that allow to consider a broad range of risks and tradeoffs connected with other policy objectives. These decisions involve also ethical considerations. [Government of Austria]   | The headline statement has been completely revised.  |
| Topic 3 | 83 | 19 | 83 | 20 | Here and elsewhere the suggestion is to change "this report" to "AR5". [H-Holger Rogner, Austria]  | This sentence has been deleted.  |
| Topic 3 | 83 | 19 | 83 | 20 | This section is about climate change risks, not emissions pathways. Suggest then that this bolded sentence be revised to say "this report provides information regarding the consequences of a range of emissions pathways...". Also, suggest the bold format be removed. This is not a result being highlighted . [Government of Canada]  | This sentence has been deleted.  |
| Topic 3 | 83 | 20 | 83 | 24 | This is more of an introductory or framing statement without providing substantial information. Suggest using it in a possible introduction to the topic or to the overall SYR, to a reasonable extent. [Government of Sweden]   | This is now in the introduction on Topic 3   |
| Topic 3 | 83 | 20 |    |    | Would be a good idea to find another word instead of "degrees". [Government of New Zealand]  | This sentence has been revised.  |
| Topic 3 | 83 | 26 | 83 | 26 | considerations [Peter Thorne, Norway]  | The sentence has been deleted.   |

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|         |    |    |    |    |   |  |
|---------|----|----|----|----|---|--|
| Topic 3 | 83 | 26 | 83 | 26 | "ethical considerations": WGIII SPM is much more specific: "Countries have contributed differently to the build-up of GHG in the atmosphere, and have varying capacities to contribute to mitigation and adaptation. Engaging countries in effective international cooperation requires strategies for sharing the costs and benefits of mitigation, in ways that are perceived to be equitable". [Government of Netherlands]   | This section does not focus on the ethical aspects (now in 3.1) nor does it cover the question of international collaboration.   |
| Topic 3 | 83 | 26 | 83 | 26 | "limits of available tools": what exactly is intended here? [Government of Netherlands]   | The discussion has been moved to 3.1 and rewritten for clarity.  |
| Topic 3 | 83 | 26 | 83 | 27 | Suggest revising this sentence to be more direct and less wordy: "No single best mitigation target or balance between mitigation and adaptation can be identified." The reasons for this can be elaborated on in the supporting paragraph (vs in the headline statement). [Government of Canada]  | The discussion has been moved to 3.1 and rewritten for clarity. The box of economic estimates also provide an explanation that tries and clarifies this point.                     |
| Topic 3 | 83 | 26 | 86 | 27 | If by saying that it is "impossible to define a single best mitigation target" the authors intend to communicate that there is no best option from a purely scientific perspective, to avoid unnecessary confusion among policymakers, request addition of "from a purely scientific viewpoint" at the end of the sentence. [Government of Japan]   | The discussion has been moved to 3.1 and rewritten for clarity. Even from a policy perspective, there is no "best solution" that would satisfy all stakeholders and individuals.   |
| Topic 3 | 83 | 26 |    |    | "Because of ethical consideration and the limits of available tools, it is impossible to translate this information into a single best mitigation target or balance between mitigation and adaptation"<br>This text gives the wrong impression. It implies that science cannot help decision makers come up with reasonable targets for protecting the climate system. Furthermore, I do not think there is evidence in the scientific literature that proves that this task is "impossible." Rather, a range of emissions reductions needed can certainly be given.<br>I do recommend changing to: "Because of ethical consideration and the limits of available tools, it is difficult to translate this information into a single number of a certain mitigation target or a balance between mitigation and adaptation but a range of mitigation targets are available" [Tabaré Arroyo Currás, Mexico] | These sentences have been moved to 3.1, and were rewritten to make it clear that science provides input to decision-making, but not a single, unique answer.                       |
| Topic 3 | 83 | 26 |    |    | "Because of ethical consideration and the limits of available tools, it is impossible to translate this information into a single best mitigation target or balance between mitigation and adaptation"<br>[Joseph Alcamo, Germany]  | We rewrote these sentences to make it clear that science provides input to decision-making, but not a single, unique answer.   |
| Topic 3 | 83 | 26 |    |    | This text gives the wrong impression. It implies that science cannot help decision makers come up with reasonable targets for protecting the climate system. Furthermore, I do not think there is evidence in the scientific literature that proves that this task is "impossible." [Joseph Alcamo, Germany]  | Revised version in 3.1 tries to balance the message better, and stresses that the lack of consensus on an optimal target. The definition of a "reasonable" target is no different. |
| Topic 3 | 83 | 26 |    |    | Recommend changing to: "Because of ethical consideration and the limits of available tools, it is difficult to translate this information into mitigation targets or balance between mitigation and adaptation" [Joseph Alcamo, Germany]  | Revised version in 3.1 tries to balance the message better, and stresses that the lack of consensus on an optimal target. The definition of a "reasonable" target is no different. |

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|         |    |    |    |    |  |  |
|---------|----|----|----|----|--|--|
| Topic 3 | 83 | 31 | 83 | 34 | One of the dominant frameworks for analyzing information for decision makers regarding climate policy is omitted from this sentence, benefit cost analysis. BCA can be a useful input for decision makers that can potentially accommodate distributional issues directly via weights or at least be accompanied by a complementary analysis of distributional implications. WG III 3.5 and 3.6 are not as dismissive as this paragraph. The authors should amend this sentence to accommodate some discussion or mention of BCA that is consistent with the tone of the underlying WG III report. [Government of United States of America]  | This list of methodologies has been deleted to avoid this problem.   |
| Topic 3 | 83 | 36 | 83 | 36 | Remove this sentence. The key policy relevant message is one the next line - i.e. "adaptation and mitigation can reduce climate change risks" - this should be the first sentence that is clearly highlighted to policymakers [Government of United Kingdom of Great Britain & Northern Ireland]   | This headline statement has been rewritten. Revised text in this section make this point in a clearer manner.  |
| Topic 3 | 83 | 36 | 83 | 37 | This sentence, putting climate change risks at the same level as the risks from adaptation and mitigation, is rather strange. [European Union]   | The text has been revised to clarify this point (it was made at the end of the section, it is now at the beginning).   |
| Topic 3 | 83 | 36 | 83 | 37 | "... create a large array of risks that differ ... consequences." Why not rephrase: "Climate change, mitigation and adaptation each entail risks, that differ ... consequences." Or: leave out mitigation and adaptation in the first sentence. It would still lead to the same message as the uncertainties and risks of adaptation and mitigation are mentioned later. But it would not suggest that these approaches are major causes of risks such as irreversibilities. [Government of Netherlands]   | The text has been revised to clarify this point (it was made at the end of the section, it is now at the beginning).   |
| Topic 3 | 83 | 36 | 83 | 37 | Comment on second call out box:<br>Suggest reframing the following sentence removing "mitigation and adaptation" as it does not read correctly.<br>"Climate change, mitigation, and adaptation create a large array of risks that differ in nature, magnitude, and their potential to cause irreversible consequences" [Government of Italy]   | The text has been revised to clarify this point (it was made at the end of the section, it is now at the beginning).   |
| Topic 3 | 83 | 36 | 83 | 37 | Climate change, mitigation and adaptation can be read as three issues that are more or less comparable in their potential to create irreversible consequences. Is that the meaning? Or is there something missing? [Government of Finland]   | The text has been revised to clarify this point (it was made at the end of the section, it is now at the beginning).   |
| Topic 3 | 83 | 37 | 83 | 37 | the use of „CAN“ is as hopeful as hopelessness. Instead of "can" it is perfectly justifiable to use "will" since it has clearly been shown. [Government of Netherlands]  | The existence of maladaptation and interactions between adaptation and mitigation means that adaptation and mitigation measures may increase climate change risk. This is why we use "can".  |
| Topic 3 | 83 | 42 | 83 | 43 | This statement that "...meaning decisions about both [mitigation and adaptation] CANNOT [emphasis added] be made independently" seems to overstate findings that were made on this subject in WG2 SPM. This statement should be edited to read "meaning decisions on one can influence, directly or indirectly, the other." To imply that any mitigation decision must likewise take into account an adaptation decision (if in fact that is the meaning; because that is at least one interpretation) is just not the case in reality. Before a decision is made to increase the fuel efficiency of vehicles, does the policy process need to take into account some adaptation element somewhere? [Government of United States of America] | The text has been revised on this aspect: "Mitigation and adaptation interact with one another, and reduce risks, over different time scales." The interactions between adaptation and mitigation are discussed in more detail in Topic 4. |

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|         |    |    |    |    |  |   |
|---------|----|----|----|----|--|---|
| Topic 3 | 83 | 42 | 83 | 49 | reference is missing [Government of Netherlands]   | The text in this paragraph has been revised on this aspect. The interactions between adaptation and mitigation are discussed in more detail in Topic 4, with references included.   |
| Topic 3 | 83 | 43 | 83 | 43 | As stated this statement is not necessarily true. Since mitigation will only lead to significant climate mitigation over timescales of several decades or more, adaptation is only contingent on mitigation decisions when the adaptation decision impacts adaptation beyond several decades (many adaptation decisions are shorter than several decades). Suggest adding "always" after "cannot" [Haroon Kheshgi, United States of America] | The text has been revised on this aspect: "Mitigation and adaptation interact with one another, and reduce risks, over different time scales." The interactions between adaptation and mitigation are discussed in more detail in Topic 4.  |
| Topic 3 | 83 | 43 | 83 | 44 | The sentence ".....Mitigation reduces climate change and therefore reduces the need for adaptation and influences the scope of possible adaptation options..." is too simplistic and therefore needs to be properly qualified to convey right meaning. In its current form the text is seriously misleading. In addition the text does not have any reference to either WG I, II or III reports. [Government of Zambia]                      | This sentence has been deleted. The relationship between mitigation and adaptation is discussed in 3.3: "Since mitigation reduces the rate as well as the magnitude of warming, it also increases the time available for adaptation to a particular level of climate change, potentially by several decades." |
| Topic 3 | 83 | 44 | 83 | 44 | Suggest to change "possible adaptation options" to "possible adaptation measures".<br>Is it necessary to write in italic from line 23 to line 32 in page 80 to (line 1- 5) in page 81 in Figure 3.3?; from line 17 to 31 in page 84 to (line 1-10) in page 85 in Figure 3.4? And from line 15 to line 23 in page 87 to (line 1- 2) in page 88 in Figure 3.5<br>[Government of Vietnam]   | The sentence has been deleted   |
| Topic 3 | 83 | 44 | 83 | 45 | Comment:<br>Suggest reframing the following sentence as misleading and unclear: "Conversely, the ability to adapt and reduce climate change impact affects required mitigation efforts to limit overall risks". Replacing "affects" with "influence" may result more appropriate. [Government of Italy]  | The sentence has been deleted   |
| Topic 3 | 83 | 45 | 83 | 45 | The following wording is suggested: .. and reduce climate change impacts affects required mitigation efforts ... [Government of Austria]   | The sentence has been deleted   |
| Topic 3 | 83 | 45 |    |    | Change "impact" to "impacts" [Government of New Zealand]   | The sentence has been deleted   |
| Topic 3 | 83 | 47 | 83 | 49 | The sentence containing the examples needs a few additions to make it clear: "For example, the growing of biomass to produce bioenergy for mitigation will itself be subject to climate change...."<br>[Government of New Zealand]   | The sentence has been deleted   |
| Topic 3 | 83 | 47 | 83 | 49 | There is a growing literature saying that bioenergy can actually increase green house gasses due to indirect land use change as it is not a mitigation plan as once it was taught. [Vahid Mojtahed, Italy]   | The sentence has been deleted   |
| Topic 3 | 83 | 51 | 83 | 53 | Vague. Suggestion for clearer sentence: "Limiting factors for adaptation are resource, institutional and capacity constraints. These increase the need for mitigation" [Government of Netherlands]   | The paragraph has been revised. Limits and constraints to adaptation are discussed in 3.3.  |
| Topic 3 | 83 | 52 | 83 | 53 | This statement is quite strange. It is not a key finding of WG2. In WG2 there are much clearer statements about adaptation limits. This negative statement does not capture the benefits of mitigation. [European Union]   | The paragraph has been revised. Limits and constraints to adaptation are discussed in 3.3.  |

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|         |    |    |    |    |   |  |
|---------|----|----|----|----|---|--|
| Topic 3 | 83 | 52 | 83 | 53 | The sentence "Adaptation will not reach its full potential because of resource, institutional and capacity constraints, increasing the benefits of mitigation", reads too conclusively. Suggest rewording as "Because of resource, institutional and capacity constraints, adaptation may not reach its full potential, increasing the benefits of mitigation." [Government of United States of America]  | The paragraph has been revised. Limits and constraints to adaptation are discussed in 3.3.   |
| Topic 3 | 83 | 53 | 83 | 55 | "high agreement, robust evidence" vs. few global analyses and very low confidence in their results. [Government of Netherlands]   | The section has been revised. The low confidence is on global assessment, while high agreement and robust evidence was based on local studies. |
| Topic 3 | 83 | 54 | 83 | 55 | It would be important to highlight this finding about costing analyses. [European Union]  | This sentence has been moved to section 3.3.   |
| Topic 3 | 83 | 55 | 83 | 55 | Please, correct the reference to the Working group: replace "WG2.17" with "WGII.17". [Government of Russian Federation]   | This has been corrected.   |
| Topic 3 | 83 | 55 | 83 | 57 | risk ratings described in WGII SPM (Box SPM2 Table 1) show a wide range of adaptation potential, and there are some cases where adaptation potential in the long term appears to have more influence (e.g. Central and South America food production); perhaps in line 55, change 'adaptation will' to 'adaptation can', and add WGII SPM to the citation [Stewart Cohen, Canada]   | This sentence has been revised.  |
| Topic 3 | 83 | 55 |    |    | is WG2.17 actually WGII 17? [Stewart Cohen, Canada]   | This has been corrected.   |
| Topic 3 | 83 | 56 | 83 | 56 | The following wording is suggested: .. Influence on climate change risks in the near future, ... This would make the sentence more coherent with the title of chapter 3.4 (climate change risks reduced by mitigation and adaptation). [Government of Austria]  | This sentence has been revised.  |
| Topic 3 | 83 | 57 | 84 | 2  | Reference to WGII 21.2 and 21.5 seems out of place here. WGII 1.1.4.4. seems more appropriate. [Government of Netherlands]  | These have been changed to chapter 20, which is referenced because of the link to sustainable development.                                     |
| Topic 3 | 84 | 2  | 84 | 2  | Surprisingly, no reference is made to WGII 19.2 here (in the executive summary of Chapter 19: Impacts of climate change avoided under a range of scenarios for mitigation of greenhouse gas emissions are potentially large and increasing over the 21st century. Among the impacts assessed, benefits from mitigation are most immediate for surface ocean acidification and least immediate for impacts related to sea level rise. Since mitigation reduces the rate as well as the magnitude of warming, it also increases the time available for adaptation to a particular level of climate change, potentially by several decades). [Government of Netherlands] | has been included  |
| Topic 3 | 84 | 4  | 84 | 15 | Redraft the complete paragraph. There is no reference to the five reasons for concern in the WGII where this paragraph and graphic comes from. [Government of Bolivia]  | The paragraph has been completely rewritten, as suggested.   |
| Topic 3 | 84 | 4  | 85 | 10 | Great paragraph! Suggested to keep it integrally. (including graphs) [Tabaré Arroyo Currás, Mexico]   | The paragraph has been completely rewritten. Hopefully, it did not lose its qualities.   |
| Topic 3 | 84 | 5  | 84 | 5  | The phrase in the headline statement that "it is almost impossible to reduce the short-term risks (of climate change) through mitigation" requires an explanation and there is none in the supporting paragraph. Recommend text be added to the supporting paragraph that describes the inertia in both the physical climate system and in human systems (e.g. locking in of emissions due to existing and soon to be constructed infrastructure). [Government of Canada]   | A paragraph has been added at the beginning of the section.  |
| Topic 3 | 84 | 5  |    |    | is WG2.19.7.1 actually WGII 19.7.1? [Stewart Cohen, Canada]   | Yes. Corrected.  |

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|         |    |    |    |    |  |  |
|---------|----|----|----|----|--|--|
| Topic 3 | 84 | 7  | 84 | 7  | Give more background to "Reasons for Concern". Application of proper noun to this concept will be unfamiliar to many readers. [scott power, australia]   | Reasons for concern are now explained in Topic 2, and more explanation is provided in the section. |
| Topic 3 | 84 | 7  | 84 | 7  | Replace "can" with "were". [Government of Netherlands]   | Corrected.   |
| Topic 3 | 84 | 7  | 84 | 7  | Reasons for concern (RFC): if this term is used it has to be explained, also for those readers who have not read the report of WGII. [Government of Norway]  | Reasons for concern are now explained in Topic 2, and more explanation is provided in the section. |
| Topic 3 | 84 | 7  | 84 | 7  | We suggest avoiding the acronyms "RfC," "RfC1," etc. for "Reasons of Concern," as it comes across as jargon. In addition, the five Reasons should be written out in the text. [Government of United States of America]   | Corrected.   |
| Topic 3 | 84 | 11 | 84 | 14 | Integrating findings from AR5 WGI, II and III, Figure 12.6 constitutes an important essence of SYR. Therefore request that corresponding Figure SPM.9 be accompanied by explanatory text from AR5 SYR longer report. Request addition of text from AR5 SYR longer report p84, lines 11-14 to SPM after "rise also matter." on p22, line 24. [Government of Japan]  | text has been adjusted in topic  |
| Topic 3 | 84 | 14 |    |    | Article 2 Box ?? - missing reference = WGII Box 19.1 [Government of Netherlands]   | Corrected.   |
| Topic 3 | 84 | 15 | 84 | 16 | Figure 3.4: Positioning of graphs is confusing. Panels ABCD are not placed logically, and the placement of the legend of panel D exacerbates that. [Government of Netherlands]   | The figure has been revised  |
| Topic 3 | 84 | 15 | 84 | 16 | Top of figure 3.4: Remove "Relationship between emission and mitigation scenarios, global temperature changes, and the five reasons for concern" [Government of Netherlands]   | The figure has been revised  |
| Topic 3 | 84 | 15 | 85 | 10 | This figure would be better placed in "Box: Information relevant to Article 2 of the UNFCCC" [Andreas Fischlin, Switzerland]   | Thanks for the suggestion. We decided to keep the figure in Topic 3.                               |
| Topic 3 | 84 | 16 | 84 | 16 | Figure 3.4 provides perhaps too much in one place. The content in Panel D provides a great story line which may be lost with all of the other adjacent content. [Government of United States of America]   | The figure has been revised  |
| Topic 3 | 84 | 16 |    |    | Figure 3.4: Suggest this Figure be enlarged, and that more complete information about the Reasons for Concern be added to it (not sufficient to just give examples of each RfC in the caption). Consider a double page spread to accommodate the long Figure caption and still make this Figure readable. Also, add to below X-axis of middle panels that these are category or scenario labels, not specific atmospheric concentration levels. [Government of Canada]   | The figure has been revised  |
| Topic 3 | 84 | 17 | 84 | 17 | In Figure 3.4:figure "D" should be replaced by "C" [Government of Vietnam]   | The figure has been revised  |
| Topic 3 | 84 | 17 | 84 | 31 | Caption Figure 3.4: I would suggest deleting the sentences "Temperature changes shown compared with pre-industrial levels", and "For reference, the extreme right temperature axis shows temperature changes with respect to the 1986-2005 period". This information is already included inside the panel and it introduces some confusion, because reference periods for temperature are different in panels A, B and D. Other possibility is writing this sentence when panel D is explained. [Maria Carmen Llasat, Barcelona] | The figure has been revised  |
| Topic 3 | 84 | 17 | 84 | 31 | Some of the key messages in Figure 3.4 should be elaborated briefly in the text. [Government of Switzerland]   | Text revised to describe the figure better   |
| Topic 3 | 84 | 18 | 84 | 18 | Editorial: please, check correct abbreviation for Reasons for Concerns: usually it is RFC, not RfC [Government of Russian Federation]  | Corrected.   |
| Topic 3 | 84 | 20 | 84 | 20 | Reference for panel A to the WGIII is not given [Government of Netherlands]  | Corrected.   |

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|---------|----|----|----|----|--|--|
| Topic 3 | 84 | 20 | 84 | 24 | Suggest adding a description of the meanings of the bars and whiskers in panels A and B, e.g. are these the likely range or some other measure of uncertainty, distributions of models or distributions of scenarios. The figure invites comparison of the data, but insufficient information is given to make that comparison. [Haroon Kheshgi, United States of America]   | The figure has been revised  |
| Topic 3 | 84 | 24 | 84 | 27 | <Figure 3.4 (C)><br>Based on the Table 6.3 of WG3 Final Draft, this bar graph should be corrected to indicate -57% to +4% in the 500ppm scenario and -47% to +7% in the 550ppm scenario. [Hirofumi Kazuno, Japan]  | The figure has been revised  |
| Topic 3 | 84 | 24 | 84 | 27 | The caption should specify what is meant by the bars in panel C. Are these bars the range of all scenarios assessed or some subset (e.g. middle 10-90% range of scenarios)? [Haroon Kheshgi, United States of America]   | The figure has been revised  |
| Topic 3 | 84 | 24 |    |    | The WGIII.6 quotation on line 24 in figure 3.4, shown in { }, and on page 23, figure SPM.9 (it is the same figure as the 3.4), but the same quote appears in ( ). [Government of Costa Rica]   | Corrected.   |
| Topic 3 | 84 | 27 | 84 | 28 | It is stated that "Panel d reproduces the five reasons for concerns from WGII Assessment Box SPM.1 Figure 1, using the same temperature axis than Panel a". However, this is not fully clear because panel d has 2 temperature axis. A note about the right temperature axis could be added [Thomas Stocker/ WGI TSU, Switzerland]   | Corrected.   |
| Topic 3 | 84 | 27 | 85 | 10 | <Figure 3.4 (D)><br>This graph should be deleted from Figure 3.4 because it is based on subjective judgments by experts in each category and is a quite different kind of graph from (A), (B) and (C), which are based on model analyses; or objective results. They should not be compared in the same line. [Hirofumi Kazuno, Japan]   | Figure is revised. All panels are WG SPM material.   |
| Topic 3 | 84 | 28 |    |    | Change "than" to "as" [Government of New Zealand]  | Corrected.   |
| Topic 3 | 84 |    | 84 |    | Figure 3.4: Panel A includes in the bottom-up of the graph the reference period, but not the other ones. It would be better to include it in all the panels or including it only in the figure caption. [Maria Carmen Llasat, Barcelona]   | The figure has been revised  |
| Topic 3 | 84 |    | 85 |    | Figure 3.4. Please explain what is meant by "also accounting for the other specific criteria for key risks" [Government of Sweden]   | Reasons for concern are now explained in Topic 2, and more explanation is provided in the section. |
| Topic 3 | 84 |    |    |    | Figure 3.4: it is not clear why the y axis on chart D has a negative range when it is about global warming. Also, the scale on this chart and on all charts to the left should be the same. More importantly, however, this figure is one of the most important figures, but it is difficult to read and includes unnecessary information (e.g. by excluding redundant information that was already reported earlier). Chart D should be the main chart, and that could be combined with chart A to show maybe just two scenarios of temperature increase. CO2 concentrations may be just proxy in the context of policy making, what is important here is that "if I do this and that" (two temperature scenarios), "then the effects will be this and that" (in terms of chart D). However, the "five reasons for concern" are too abstract. Other concepts such as weather related events, biodiversity, food production, health, water, disposition of people etc. would be easier to perceive and digest. [Government of Hungary] | The figure has been revised  |



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|---------|----|----|----|----|---|--|
| Topic 3 | 84 |    |    |    | Figure 3.4. Suggest switching (A) and (D) as policymakers are more interested in learning how much impact is acceptable (D) and which reduction pathways to choose (C), than which RCP to choose (A). [Government of Japan]   | The figure has been revised  |
| Topic 3 | 84 |    |    |    | Figure 3.4 All lables and text are small and faint. Consider increasing font size as well as enhancement. [Government of Kenya]   | Thanks for the suggestion. We will do our best to make the figure readable, given space constraints. |
| Topic 3 | 84 |    |    |    | Figure 3.4 . Delete the burning ember figure (D). The figure is subjective as it is based on expert judgement. As such, it is not falsifiable and we can not regard it as a scientific finding. It should not be listed with (A)(B)(C) that are scientifically solid findings. Should you keep (D) despite this comment, make it very clear that "This figure is subjective as it is based on expert judgement". [Taishi SUGIYAMA, Japan] | Figure is revised. All panels are WG SPM material.   |
| Topic 3 | 84 |    |    |    | Figure 3.4. A new figure including the "burning embers" was included into the final version of the WG II SPM ( Box SPM 1. Figure 1). I consider it could included into the SYR. [Avelino G. Suarez Rodriguez, Cuba]   | The figure has been revised  |
| Topic 3 | 84 |    |    |    | Figure 3.4: See comments on figure SPM 9. [Government of Germany]   | The figure has been revised  |
| Topic 3 | 85 | 5  | 85 | 6  | "Other specific criteria for key risks" needs to be explained. [Government of Norway]   | Reasons for concern are now explained in Topic 2, and more explanation is provided in the section.   |
| Topic 3 | 85 | 8  | 85 | 8  | {Ch 19.2} > {WGII 19.2} [Government of Netherlands]   | This has been changed in the text.   |
| Topic 3 | 85 | 9  | 85 | 10 | It is suggested to delete the last sentence. It is not coherent with figure 2.9 and is definitely not true for sea level rise or ocean acidification. [Government of Austria]   | Thanks. It has been corrected.   |
| Topic 3 | 85 | 9  | 85 | 10 | 'most of the lowest three' and 'most of the others': is this supposed to mean: 'in most scenarios based on RCP 2.6, 4.5 and 6.0' and 'most scenarios based on RCP 8.5 as well as the baseline scenarios'? In that case please correct this. [Government of Netherlands]   | Thanks. It has been corrected.   |
| Topic 3 | 85 | 9  | 85 | 10 | The last sentence is wrong at least for sea level rise, ocean acidification and the permafrost melting or from potential tipping points. Please delete. [Government of Germany]   | Thanks. It has been corrected.   |
| Topic 3 | 85 | 12 | 85 | 12 | How is the „magnitude of warming" established?. Why not to simply use „the increase in temperatures due to climate change..."? [Government of Netherlands]  | Magnitude of warming is measured with global temperature change.                                     |
| Topic 3 | 85 | 12 | 85 | 17 | Delete this whole paragraph since the concern is with temperature beyond 2 degrees, and therefore the reference should be made to the 2 degrees scenario instead of 4 degrees. [Government of Bolivia]  | Paragraph has been rewritten, as suggested, to look at scenario with no additional mitigation.       |
| Topic 3 | 85 | 12 | 85 | 17 | The reference to 4 degrees here is not representative of the underlying science and should be corrected. Risks to agriculture, ecosystems, extinction and tipping points occur already with much lower warming than 4 degrees. (See for example the Figure 3.4: Panel D on Reasons for Concern on the page SYR-84). [Kaisa Kosonen, Finland]  | Agreed. The paragraph has been rewritten.  |
| Topic 3 | 85 | 14 | 85 | 15 | Extinction rates are also increased by warming of 2C. Suggest to edit to 'substantially increase' or 'greatly increase' [Rachel Warren, United Kingdom]   | Agreed. The paragraph has been rewritten.  |
| Topic 3 | 85 | 17 | 85 | 17 | Why are references suddenly starting to be footnotes rather than {}? [Peter Thorne, Norway]   | Corrected.   |
| Topic 3 | 85 | 17 | 85 | 17 | The reference is not seen. [Government of Russian Federation]   | Corrected.   |
| Topic 3 | 85 | 17 | 85 | 17 | Referencing inconsequent; Footnote 16 > {WGII 4.2-3, 11.8, 19.5, 19.7, 26.5, Box CC-HS }. [Government of Netherlands]   | Corrected.   |

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|---------|----|----|----|----|--|--|
| Topic 3 | 85 | 17 |    |    | why is there a footnote here? What WG report is being cited? Was this accidentally included in a cut-and-paste of this sentence from its source? [Stewart Cohen, Canada]   | Corrected.   |
| Topic 3 | 85 | 19 | 85 | 20 | We couldn't find evidence for this in WGIII; there is, however, a finding in the executive summary of WGIII 2 that 'the social benefit from investments in mitigation tends to increase when uncertainty in the factors relating to GHG emissions to climate change impacts are considered' which we think deserves mention here. The text is actually saying the opposite. In a more dangerous global warming scenario, the (risk-reducing) benefits of mitigation are larger. [Government of Netherlands]  | In WG3, risks from mitigation are described for each technology. The new text clarifies how these risks related to climate change risks. |
| Topic 3 | 85 | 19 | 85 | 26 | In WGII we address the risks of cc and in WGIII we address the risks of mitigation. In a synthesis we need to able to say that the risks of mitigation are in general less than the risks of climate change. Otherwise, it gives everyone a marvellous chance to say that mitigation is just as risky as climate change. So I think this message is very dangerous for policy makers as it could be mis-interpreted. Yes, there are risks associated with mitigation but on balance the risks associated with climate change are much more severe and pervasive. Can we say something like that? After reading that bullet, I start to wonder if mitigation is really a good idea: it seems to have the same list of undesirable outcomes as climate change itself. So - we need to do some synthesis of this! [Rachel Warren, United Kingdom] | This is now the introduction of the section.   |
| Topic 3 | 85 | 19 | 85 | 26 | We support the statement that mitigation involves risk and uncertainty noting linkages to biodiversity conservation. [Government of New Zealand]   | Thanks.  |
| Topic 3 | 85 | 19 | 85 | 26 | This paragraph is unclear and would have little relevance from a policy perspective. Listing risks, technologies and related issues together makes it confusing, and it reads as three lists with no clear linkages drawn. Additionally, at the risk of this paragraph being taken in isolation, it is important that the risks noted here be contextualized relative to the risks of not implementing mitigation actions. Consider revising. [Government of Canada]   | It is relevant to talk about the risk from mitigation options. The text has been rewritten to be more relevant and useful.               |
| Topic 3 | 85 | 19 |    | 26 | same as above [Carl-Friedrich Schleussner, Germany]  | Comment unclear.   |
| Topic 3 | 85 | 20 | 85 | 22 | The risks related to large-scale deployment of bioenergy, nuclear and CCS involve risks that are in a totally different category with risks related large-scale deployment of wind-power. Unless it can be clearly justified why wind power deserves to be mentioned here, it should be taken out. [Kaisa Kosonen, Finland]  | The list of technology has been removed.   |
| Topic 3 | 85 | 20 | 85 | 23 | Please consider to replace "carbon capture with storage" with "carbon capture and storage" and delete "even" before "wind power" [Government of Norway]  | The list of technology has been removed.   |
| Topic 3 | 85 | 20 | 85 | 26 | This para needs to be reformulated as it is currently misleading as it bulks all the aspects into common effects for all technologies and uniform circumstances, further delete "other risks". Lacks explicit reference. In this context it should also be balanced against of what is stated and observed regarding decreasing costs for renewables for instance since AR4 as well as the recognition of the need for accelerated investments in low carbon technology (see TS WG3 and underlying WG3 report), as well to what is expressed in WG3 SPM with regards to " decarbonizing (i. e. reducing the carbon intensity of) electricity generation is a key component of costeffective mitigation [Government of Sweden]  | The list of technology has been removed.   |

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|---------|----|----|----|----|---|--|
| Topic 3 | 85 | 20 | 85 | 26 | <ul style="list-style-type: none"> <li>- The entire para is not balanced as mitigation action is presented in a very negative way.</li> <li>- It should be put into the context of non-action which entails even higher risks and costs.</li> <li>- In the second sentence, the words "to varying degrees" should be inserted. Thus the sentence would read: "Risks increased by mitigation - to varying degrees - include those associated with large-scale deployment of technology options for producing low-carbon energy – including bioenergy, nuclear power, carbon capture with storage, bioenergy and even wind power – the potential for high aggregate economic costs, large impacts on vulnerable countries and industries, and other risks." Otherwise one might get the impression that the risks of the technologies enumerated are considered to be equal.</li> <li>- Please note that we reordered the technologies according to the associated intensity of risks, (see also WG3 chap. 7, p, 43, table 7.3).</li> <li>- As an example of the risks associated with mitigation, please include: "Mitigation also poses risks for investors in the fossil fuel sector, for power plant operators and mining industries, due to stranded assets, reduced profitability, and potential litigation risks."</li> <li>- Furthermore, if risks associated with wind power are significantly lower, than this should be stated more explicitly. [Government of Germany]</li> </ul> | The list of technology has been removed. Regarding stranded assets, it is relevant but we assumed it is included in "economic costs" (and it is unpracticable to include all relevant subrisks, such as for jobs in energy-intensive sectors, etc.). |
| Topic 3 | 85 | 21 | 85 | 22 | See comment on this exact text in the SPM. [Peter Thorne, Norway]   | The list of technology has been removed.   |
| Topic 3 | 85 | 21 |    |    | Delete "options" and change "technology" to "technologies" [Government of New Zealand]  | The list of technology has been removed.   |
| Topic 3 | 85 | 22 | 85 | 22 | Suggested to reconsider the inclusion of "wind" in the same category of technologies with potential large-scale deployment associated risks. WGIII 2.1, 2.3-2.5 seems to address wind associated risks only in the context of visual impacts. The way the paragraph is written, seems to highlight risk of wind technologies among the highest next to others like nuclear (w/ a probable higher environmental, social and economic risk) and CCS (not proven large scale technology at power generation). Seems more realistic to include large hydropower instead of wind. [Tabaré Arroyo Currás, Mexico]   | The list of technology has been removed.   |
| Topic 3 | 85 | 22 | 85 | 23 | What is the measure of the aggregated economic costs here? Investment? Changes in GDP? Losses in consumption? And is it in monetary terms? Also why there shouldn't be high economic costs if this helps to avoid the worst? i.e why the high economic costs are seen as a risk? [European Union]   | Aggregated economic costs can be in terms of investments, GDP or consumption. The text does not say that these economic costs are desirable or not, as it depends on the climate change risks they allow to avoid, as explained in the text.         |
| Topic 3 | 85 | 23 | 85 | 26 | 'linkages to' is rather vague; the whole enumeration covers about everything and is therefore almost meaningless. [Government of Netherlands]   | The sentence has been rewritten.   |
| Topic 3 | 85 | 23 | 85 | 26 | The sentence that begins "This includes linkages to..." and then goes on to include a laundry list of impacts/sectors is too vague. Consider rewriting as "There is uncertainty about the impact of mitigation on" [Government of United States of America]   | The sentence has been rewritten.   |
| Topic 3 | 85 | 25 | 85 | 25 | Consider inserting "and wealth" after "income." [Carl Southwell, United States of America]  | The sentence has been rewritten.   |
| Topic 3 | 85 | 26 | 85 | 26 | It is suggested to insert "economic" before "growth". [Government of Austria]   | The sentence has been rewritten.   |
| Topic 3 | 85 | 26 | 85 | 26 | See comment #4. The text "...and the growth of developing countries" is somewhat vague. What kind of growth? Why this relates to developing countries only? We suggest "...and sustainable development" instead of the above. [Government of Russian Federation]  | The sentence has been rewritten.   |
| Topic 3 | 85 | 26 | 85 | 26 | "growth" = 'economic growth'? Or 'population growth'? [Government of Netherlands]   | The sentence has been rewritten.   |

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|---------|----|----|----|----|--|--|
| Topic 3 | 85 | 28 | 85 | 30 | It is suggested to better align this statement with the wording of the high-level message. A more appropriate language might read: Estimates of the aggregate economic benefits of mitigation and adaptation are associated by (linked to) important conceptual and empirical limitations. [Government of Austria]   | Corrected. There is now a box on the issue.  |
| Topic 3 | 85 | 28 | 85 | 30 | This headline statement should be reformulated to be more useful for policy makers. Currently it states that economic information has been used to inform decision making, but that there is no consensus on how this should be done. The reader is left alone with these statements. [Government of Germany]  | Corrected. There is now a box on the issue.  |
| Topic 3 | 85 | 28 | 85 | 31 | Limitations of economic estimations and gaps for large warming magnitudes could be presented in separate sentences, for the sake of clarity. [European Union]  | Corrected. There is now a box on the issue.  |
| Topic 3 | 85 | 28 | 85 | 31 | The statements in this box introduce a section that only considers economic benefits from avoided climate change impacts, and do not include other economic co-benefits from mitigation policies, such as reductions in local air pollution. [Robert Ward, United Kingdom]   | The section (now box) is on the estimates of climate change costs (and thus mitigation benefits through reduced climate change impacts). The question of cobenefits is treated elsewhere.                      |
| Topic 3 | 85 | 28 | 85 | 31 | Again, the option of non-action is not mentioned. Please add. [Government of Germany]  | Comment unclear.   |
| Topic 3 | 85 | 29 | 85 | 29 | It is suggested to substitute "attended" by "associated" or "linked to". [Government of Austria]   | Thanks for the suggestion.   |
| Topic 3 | 85 | 30 | 85 | 30 | "they" -> "the estimates"? [Government of Netherlands]   | Corrected  |
| Topic 3 | 85 | 30 | 85 | 31 | The statement that there is no consensus about how to use estimates of the economic benefits of mitigation in climate policy is inconsistent with the underlying text in WGIII Chapter 3 section 3.9.4 on the Social Cost of Carbon, which states that, "Although estimates of the damages from climate change are useful in formulating GHG policies (despite the caveats listed in Section 3.9.2), they are often needed for more mundane policy reasons. Governments have to make decisions about regulation when implementing energy policies, such as on fuel or EE standards for vehicles and appliances. They social cost of carbon emissions can be factored into such decisions." We suggest deleting the sentence on lines 30-31 to remain consistent with the underlying text, which suggests a clear rationale for economic damage estimates about which there is some degree of consensus. In addition, one could point to numerous elements of climate change science, impacts, and mitigation analyses where there is not consensus on exactly how the information should be used to inform decision making. [Government of United States of America] | The text has been completely rewritten and is hopefully clearer now. Governments have been using these numbers but there is no consensus about these numbers and how to use them in the scientific literature. |
| Topic 3 | 85 | 33 | 85 | 33 | It seems that something is missing at the beginning of the following sentence - making it difficult to understand: "Estimates of the benefits the economic risks..." [Government of Denmark]   | Corrected.   |
| Topic 3 | 85 | 33 | 85 | 34 | What are the 'benefits of economic risks'? Please clarify? Are these the benefits from potentially high economic costs? How does this section link with the one above? [European Union]  | Corrected.   |
| Topic 3 | 85 | 33 | 85 | 34 | Hard to grasp the meaning of this sentence. Something apparently is missing. [European Union]  | Corrected.   |
| Topic 3 | 85 | 33 | 85 | 34 | language not clear! [Stewart Cohen, Canada]  | The text has been revised.   |
| Topic 3 | 85 | 33 | 85 | 34 | Repeats small box immediately above this text [scott power, australia]   | Thanks for the suggestion.   |

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|---------|----|----|----|----|---|---|
| Topic 3 | 85 | 33 | 85 | 34 | This is a surprising statement (that very little is known about the economic impacts of warming above 3degC). The SRES scenarios used by the IPCC for the past two assessments included scenarios projecting greater/much greater mean warming than 3degC. The lack of studies available for assessment is puzzling. An explanation would be of interest. [Government of Canada]        | It is a finding of WG2 that there is little work for high warming, but the WG2 does not provide an explanation.         |
| Topic 3 | 85 | 33 | 85 | 35 | Incoherent sentence; suggestion: 'Estimates of the benefits and economic risks are accompanied by important conceptual and empirical limitations. In addition, very little is known about the economic impacts of warming above 3 0C.' Another suggestion is to delete 'the benefits'. [Government of Netherlands]  | Corrected.  |
| Topic 3 | 85 | 33 | 85 | 37 | The language describing the "costs of impacts" could be improved, by including the fact that these are likely underestimates of the impacts. This was a key finding and discussion in the WG2 Approval Session and warrants inclusion here to provide the policymaker with the appropriate caveats and context for interpreting these numbers. [Government of United States of America] | Corrected.  |
| Topic 3 | 85 | 33 | 85 | 43 | When mentioning that many estimates of economic losses from mitigation do not account for catastrophic changes etc., it should also be mentioned that the co-benefits of mitigation are not accounted for (assuming that that is the case). [Government of Denmark]   | To avoid confusion, the section focuses on climate change impacts only. Co-benefits are discussed later on.             |
| Topic 3 | 85 | 33 | 86 | 3  | We ask you not to refer to "ambitious mitigation" when you refer to a global warming of 2.5°. In the climate negotiations, the term ambitious is often used in relation to measures that allow us to stay below 2°. You might rather say "meaningful" - this term does not have the same connotation. [Government of Germany]   | Corrected.  |
| Topic 3 | 85 | 34 | 85 | 34 | "3C" should be "3oC" [Government of Vietnam]  | Thanks.   |
| Topic 3 | 85 | 34 |    |    | Warming of 3°C relative to today? [Government of Germany]   | Done  |
| Topic 3 | 85 | 34 |    |    | ...impacts of warming above 3C...". Please specify the baseline , e.g. "... above 3°C COMPARED TO PRE-INDUSTRIAL ...". [David Wratt, New Zealand]   | Done  |
| Topic 3 | 85 | 35 | 85 | 35 | The modelling studies referred to are those chosen for a single paper by Tol (2013) and do not assume any mitigation. Rather they simply attempt to estimate impacts at a particular level of warming, which is usually selected as that resulting from a doubling of the atmospheric concentration of carbon dioxide. [Robert Ward, United Kingdom]                                    | The new box should clarify these issues.  |
| Topic 3 | 85 | 35 | 85 | 36 | It would be clarifying here to more explicitly note that the "aggregated economic losses" meant here refer to climate impacts, not mitigation cost or the net mitigation/adaptation/losses/avoided losses/cobenefits -whole. [Government of Sweden]   | The new box should clarify these issues. It is now focusing on the economic estimates of the risks from climate change. |

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|---------|----|----|----|----|---|---|
| Topic 3 | 85 | 35 | 85 | 37 | <p>Request replacement of text regarding economic impact assessment to the following from AR5 WGII SPM:</p> <p>A set of modeling studies suggest that the incomplete estimates of global annual economic losses for additional temperature increases of ~2°C are between 0.2 and 2.0% of income (<math>\pm 1</math> standard deviation around the mean) (medium evidence, medium agreement). Losses are more likely than not to be greater, rather than smaller, than this range (limited evidence, high agreement). However, global economic impacts from climate change are difficult to estimate, economic impact estimates completed over the past 20 years vary in their coverage of subsets of economic sectors and depend on a large number of assumptions, many of which are disputable, and many estimates do not account for catastrophic changes, tipping points, and many other factors*.</p> <p>Footnote* Disaster loss estimates are lower bound estimates because many impacts, such as loss of human lives, cultural heritage, and ecosystem services, are difficult to value and monetize, and thus they are poorly reflected in estimates of losses. Impacts on the informal or undocumented economy as well as indirect economic effects can be very important in some areas and sectors, but are generally not counted in reported estimates of losses.<br/>[Government of Japan]</p> | <p>The new box should clarify these issues. The footnote on disaster losses is not included, because of space constraints.</p>  |
| Topic 3 | 85 | 35 | 85 | 37 | <p>Statement can be traced to WGII 10.9.2, but the underlying graph, Figure 10-1, shows a larger range than 0.2 - 2.0%. Is a confidence interval intended, that is missing? This can also be found in WG III, 6.3 figure 6.21 and 6.22 (GDP losses in a 480 - 530 ppm scenario.). The median value in 2100 is about 4% and some models even project values up to 10% losses of the baseline GDP.<br/>[Government of Netherlands]</p>  | <p>The new box should clarify these issues. In particular, it clarifies that these cost estimates are for climate change costs only (from WG2), and that mitigation costs to achieve these levels of warming (from WG3) need to be added. Figure 10-1 includes a larger range, but the 0.2-2% range is approved WG2 SPM language.</p> |
| Topic 3 | 85 | 35 | 85 | 37 | <p>It is not entirely clear whether this sentence is discussing the mitigation costs or climate damages of temperature increases of 2.5 degrees. We suggest replacing "global aggregate economic losses" with "global aggregate climate damages" to clarify this point. [Government of United States of America]</p>  | <p>The new box should clarify these issues. It is now focusing on the economic estimates of the risks from climate change.</p>  |
| Topic 3 | 85 | 35 | 85 | 37 | <p>In the WG2 SPM these same values were characterized as global economic losses as the result of global warming of around 2C. There was no mention that these same values (0.2 to 2% of global income loss) were the result of "ambitious mitigation" scenarios, as they are described here. Are these values reflective of the same underlying literature that underpinned the WG2 SPM estimates? Is this reporting intending to characterize these economic losses as the result of the costs of mitigation, or as the result of the costs of climate change impacts in a 2.5C world? If it is the latter then the use of "ambitious mitigation" confuses the message. [Government of United States of America]</p>  | <p>The new box should clarify these issues. In particular, it clarifies that these cost estimates are for climate change costs only, and that mitigation costs to achieve these levels of warming need to be added.</p>   |

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|         |    |    |    |    |  |   |
|---------|----|----|----|----|--|---|
| Topic 3 | 85 | 36 | 85 | 36 | The figures for global aggregate economic losses that are cited are drawn from a single paper by Tol (2013), which contains a number of errors. When these errors are taken into account, the range of impacts on global GDP from a warming of 2.5degC is suggested to be +0.1% to -1.9%. However, these estimates suffer from fundamental flaws because they exclude many impacts, including potentially catastrophic effects that cannot be ruled out. For this reason, these estimates are completely inconsistent with other parts of SYR, particularly Section 2.5 on page 60. I am therefore doubtful about the value of citing figures that are so flawed and may seriously mislead the reader about the economic benefits. [Robert Ward, United Kingdom]   | IPCC assesses the literature and these estimates are part of the literature. We provide a review of the limits of these studies, to make sure these limits are known from policymakers and decisionmakers.  |
| Topic 3 | 85 | 36 | 85 | 36 | '2.5 0C' > '2.5 0C in 2100' [Government of Netherlands]  | These studies do not include a temporal dimension, so it is not for 2100.   |
| Topic 3 | 85 | 37 | 85 | 37 | What are partial estimates? [Government of Netherlands]  | Partial estimates are not comprehensive, i.e. they do not include all categories of impacts. The new text should be clearer.  |
| Topic 3 | 85 | 37 | 85 | 39 | The use of the term "catastrophic changes" is inconsistent with the underlying report. The chapter referenced, WGII Chapter 19, does not include any use of the words "catastrophe" or "catastrophic." Furthermore its definition in this context is ambiguous. The tone used to describe assumptions about uncertain parameters may also be interpreted as signaling bias and therefore the caveat should be rephrased to be solely descriptive. To maintain consistency with underlying text and remain neutral the sentence should be rephrased as "These estimates are partial, vary in their coverage of subsets of economic sectors and depend on a large number of assumptions, regarding uncertain parameters, and many estimates do not account for tipping points and other important factors." [Government of United States of America] | Thanks for the comment. We replaced the term "catastrophic change" with wording consistent with WG2 SPM ("large-scale singular event and irreversibility" and "severe, pervasive, and challenging impacts"). Regarding the existence of a bias, it is indeed considered likely that existing estimates underestimate real impacts, due to the non-inclusion of some impacts.  |
| Topic 3 | 85 | 39 | 85 | 39 | The reference to WGII 19.6 substantiates what is meant by "catastrophic changes ... other important factors", but not the fact that the "estimates" (line 37) do not account for these factors. [Government of Netherlands]  | Thanks. We added appropriate references to WGII.10.9.2 and 10.9.4.  |
| Topic 3 | 85 | 41 | 85 | 43 | This sentence could be construed as misleading because it is the discount rate (rather than intragenerational weights, as the sentence implies) that drives much of the wide variation across existing mitigation benefit estimates. Consider rewriting the sentence as, "One additional reason that estimate vary widely is that they depend on how impacts are aggregated over time and across individuals, decisions that entail ethical considerations." We also suggest deleting the statement, "few empirical applications...have been well-founded in this respect," which implies a value judgement and may also be inaccurate, since most studies make clear and explicit assumptions about the discount rate used to aggregate impacts over time. WG III 3.6 makes no such statement. [Government of United States of America]           | This paragraph has been largely rewritten, hopefully correcting this problem. The relative impact of inter- and intra-generational weights cannot be determined because no study investigates intra-generational issues (some studies look at equity weights across countries, but none look at equity weights within countries, even though the latter may matter most). This problem also justify the second sentence, on the fact that few studies are well founded in terms of ethics and loss distributions. |
| Topic 3 | 85 | 45 | 85 | 46 | incremental aggregate economic' - jargon unclear. 'know' ... known' [scott power, australia]   | Clarified.  |

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|         |    |    |    |    |  |  |
|---------|----|----|----|----|--|--|
| Topic 3 | 85 | 45 | 85 | 47 | The statement that there is a wide range of social cost of carbon estimates "in large part because little is known about impacts at high levels of warming" does not accurately reflect the underlying WG II 10.9 text. The authors should consider separating the two clauses in this sentence into separate statements and reflect the fuller discussion in WG II 10.9. It states that (1) uncertainty regarding SCC estimates is due to uncertainty about total damages, future emissions, future climate change, and future vulnerability and valuation; and that (2) the spread in SCC estimates is due to disagreement regarding the discount rate, equity weighting and risk aversion. [Government of United States of America] | Thanks for this comment. We tried to clarify in the new box on economic estimates. Space constraints do not allow for a full exploration of the issue, but the new sentences avoid the confusion you mention.  |
| Topic 3 | 85 | 45 | 85 | 53 | This paragraph is unsubstantially backed with sources. [Government of Netherlands]   | Additional references have been introduced.  |
| Topic 3 | 85 | 47 | 85 | 48 | This is a misleading statement and seems to conflate lack of agreement about key SCC parameters (e.g., discount rate) with lack of agreement about the role it should play in decisionmaking. The sentence suggests that no one has any idea what to do with the SCC. That is untrue as the SCC is actually being used (e.g. the US, Canada, Germany, and UK all use some form of \$/ton). There is no more disagreement about the role that SCC should play in decisionmaking than about other economic metrics or, for that matter, other scientific findings contained in the IPCC reports. [Government of United States of America]  | In the assessed scientific literature, there is disagreement on how to use the SCC. Some governments have been using it, as the comment rightly mention. The new text clarifies that the SCC is a useful but insufficient information for decision-making regarding long-term mitigation targets (for the reasons discussed in the new box).     |
| Topic 3 | 85 | 48 | 85 | 48 | Low Agreement? Does that refer to agreement about valuation or agreement about the statement? [Government of Netherlands]  | The paragraph has been rewritten.  |
| Topic 3 | 85 | 48 | 85 | 48 | Footnote 17 > {WGII 10.9} [Government of Netherlands]  | Corrected.   |
| Topic 3 | 85 | 48 | 85 | 48 | When mentioning "the social cost of carbon" for the first time (whether that would be here or somewhere earlier in the report), this term should be explained/defined. [Government of Denmark]   | The term is now explained.   |
| Topic 3 | 85 | 48 |    |    | why is there a footnote here? What WG report is being cited? [Stewart Cohen, Canada]   | Corrected.   |
| Topic 3 | 85 | 49 | 85 | 50 | This sentence is unclear. Why does this range in the social cost of carbon only apply to emissions in the first fifteen years of the 21st century. Given that we are almost at 2015, does this mean there is no useful information in these values? Consider revising. [Government of Canada]  | These values have been calculated for emissions in the first 15 years of the 21st century. So it gives the SCC for current emissions, which is relevant for decision-making.   |
| Topic 3 | 85 | 50 | 85 | 51 | Not tracable to WGII 10.9. [Government of Netherlands]   | The new text clarifies. The appropriate reference is WGIII 3.6).   |
| Topic 3 | 85 | 50 | 85 | 51 | We suggest deleting the statement that there are differing views about the propriety of using mitigation benefit estimates in climate policy. It is inconsistent with the underlying text in WGIII Ch. 3 sec. 3.9.4, which states, "Although estimates of the damages from climate change are useful in formulating GHG policies (despite the caveats listed in Section 3.9.2), they are often needed for more mundane policy reasons. Governments have to make decisions about regulation when implementing energy policies, such as on fuel or EE standards for vehicles and appliances. The social cost of carbon emissions can be factored into such decisions." [Government of United States of America]                          | Thanks for this comment. The new text should be clearer. We now write that the SCC is a useful but insufficient information for decision-making regarding long-term mitigation target, which is consistent with your comment that the SCC can be factored into such decisions (but such decisions usually take into account many other factors). |
| Topic 3 | 85 | 51 | 85 | 53 | Not tracable to WGII nor WGIII [Government of Netherlands]   | The new text clarifies. The appropriate reference is WGIII 3.6).   |
| Topic 3 | 85 |    | 85 |    | Footnotes 16, 17. It is not clear where are these chapters from (WG?) [Government of Russian Federation]   | Clarified.   |



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|         |    |   |    |    |   |   |
|---------|----|---|----|----|---|---|
| Topic 3 | 86 | 2 | 86 | 4  | This sentence is obvious - by construction, some people will realize net costs above the global average, and some will realize net cost below the average. The authors should delete this sentence as a result. [Government of United States of America]  | Corrected.  |
| Topic 3 | 86 | 5 | 86 | 7  | what is meant by '...these differences increase the level of desirable efforts over the short term'? How about '...these differences mean that higher levels of effort are required over the short term...'? See comment page 22 line 35-37. [Stewart Cohen, Canada]  | We rewrote as "increase the benefit of short-term mitigation actions".              |
| Topic 3 | 86 | 5 | 86 | 7  | unclear [scott power, australia]  | Revised in the new version.   |
| Topic 3 | 86 | 5 | 86 | 7  | Putting risks from mitigation and from climate change on one line seems to weaken the argument. Why not state: Risks from climate change are different from risks that accompany mitigation, in nature, in magnitude, and in the potential to cause irreversible consequences. These differences increase the desirability of efforts in the short term, in an iterative risk management framework"? [Government of Netherlands]  | Revised in the new version.   |
| Topic 3 | 86 | 5 | 86 | 7  | Half this header is text already used in the header on page 83. Suggest this header be deleted and the supporting paragraph below on lines 9-17 be moved up to before the header that begins on line 28 of page 85. [Government of Canada]  | Revised in the new version.   |
| Topic 3 | 86 | 5 | 86 | 7  | Consider deleting the shaded box. The text is unclear and the sentences do not logically follow one another. [Government of United States of America]   | Revised in the new version.   |
| Topic 3 | 86 | 5 | 86 | 13 | Same point as above: go further than saying 'different in magnitude'. If we can't say that risks of mitigation are less than the risks of climate change itself, there is no basis for a policy maker to take any action. Need to say HOW they are different in magnitude, WHICH one of them has irreversible consequences, and so on. The sentence 'risks from mitigation do not involve the same possibility .....' is a step in this direction, but actually I think the whole idea of comparing risks from mitigation with risks from climate change is inadvisable if we cannot make a clear statement that the risks from climate change are very much greater. What might be reasonable is to say that the risks from climate change are 'overwhelmingly more severe in magnitude, geographic spread and persistence'. and then perhaps something along the lines of 'however when very large scale mitigation is applied to constrain temp to 2C, these scenarios imply a significant level of land use change which competes with food production and biodiversity conservation (ref VanVuuren et al 2011) [Rachel Warren, United Kingdom] | The new text provides some of these details, taking into account space constraints. |
| Topic 3 | 86 | 5 | 86 | 17 | Given great importance of information on difference between risks from mitigation and risks from climate change (line11) and decision-making in light of irreversibility of climate change impact (line 12) for policymakers, request maintenance of these lines in longer report, as well as addition of same explanatory text in SPM. [Government of Japan]   | Noted.  |
| Topic 3 | 86 | 6 | 86 | 7  | The meaning of the last sentence is rather unclear. It is therefore suggested to use a much clearer and plain language. A possible wording might be: Due to these differences the overall risk, e.g. for sustainable development, would be smaller by reducing the risks of climate change by strong and effective mitigation of GHG emissions. [Government of Austria]   | Revised in the new version.   |
| Topic 3 | 86 | 9 | 86 | 9  | Should start with "Actions taken or not taken today..." [Kaisa Kosonen, Finland]  | Changed as suggested.   |
| Topic 3 | 86 | 9 | 86 | 10 | too long. Part about irreversibility unclear [scott power, australia]   | Text has been revised.  |

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|         |    |    |    |    |  |  |
|---------|----|----|----|----|--|--|
| Topic 3 | 86 | 9  | 86 | 10 | Please consider to change to order of "temperature change", "adapt" and "reduce emissions", so that the sentence reads "The actions taken today constrain the options available in the future to reduce emissions, limit temperature change, and adapt, and therefore ...", since there is a need to reduce emissions to limit temperature change, and that will also affect what we actually need to adapt to. [Government of Norway]   | Text has been revised accordingly.   |
| Topic 3 | 86 | 9  | 86 | 11 | The bold sentence in this paragraph is not accessible to readers. It is suggested to reword "constrain" as "affect" in the phrase "The actions taken today constrain the options". [Government of China]   | Text has been revised as suggested, using "affect".  |
| Topic 3 | 86 | 9  | 86 | 11 | This sentence needs clarifying. The document has said previously that mitigation actions today give us more flexibility about future actions. And now here it's saying "The actions taken today constrain options available in the future", but what is meant is that EMITTING actions today, not MITIGATION actions today - as has been invoked earlier in the report. [Government of United States of America]   | Thanks for this comment. The text has been revised to clarify this issue.  |
| Topic 3 | 86 | 9  | 86 | 16 | The use of the word "irreversible" in line 16 seems acceptable, but the use in lines 10 and 14 seem over-reaching. The authors should revise the text accordingly. [Government of United States of America]  | The text has been revised. The use of irreversibility applies not only to climate change impacts (line 16 in previous version), but also on emissions and carbon atmospheric concentration. In line 10, irreversibility arises in part from accumulation of CO2 in the atmosphere (an irreversibility over centuries or millenia). In line 14, irreversibility refers to climate change impacts, such as the loss of unique ecosystems that can be completely irreversible. So the terms apply. The new version clarifies the causes of irreversibility. |
| Topic 3 | 86 | 9  | 86 | 17 | While this bolded header is very good, the supporting text is confusing in places. We have a few suggested clarifications:<br>Sentence 1: Do the risks of climate change imply inertia (current text) or is it that inertia in the climate system is the cause of certain risks?<br>Sentence 2: This sentence seems to convey an opposite conclusion to that in the header. The header says actions taken today will constrain future options, whereas this sentence implies future options can be responsive to observed consequences and costs. It is wrong to convey to policymakers that a wait and see approach is appropriate for systems with inertia, which is what this sentence implies.<br>Sentence 3: Box 3.3 on geoengineering is referred to here, and only here. Recommend more explicit mention here of geoengineering when referring to Box 3.3 and to the role of geoengineering in potentially changing the irreversibility of carbon emissions and related impacts. [Government of Canada] | The new text tries to answer these questions: (1) some risks create irreversibility, and irreversibility is itself a risk; (2) we tried to clarify the role of irreversibility and lock-in and the impact on future options; (3) more information is now provided.   |
| Topic 3 | 86 | 9  |    |    | what actions? [Stewart Cohen, Canada]  | All actions related to climate change.   |
| Topic 3 | 86 | 10 |    |    | need to add "to understand" after "important" such that it reads "...and therefore create a significant irreversibility that is important to understand for decision-making" [Government of New Zealand]   | Revised in the new version. The irreversibility influences decision-making and is thus important (beyond the need to understand it).   |

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|         |    |    |    |    |   |  |
|---------|----|----|----|----|---|--|
| Topic 3 | 86 | 11 | 86 | 12 | Replace 'than' with 'as': Risks from mitigation do not involve the same possibility of catastrophic damages and do not imply the same inertia than risks from climate change. [European Union]  | Thanks for the suggestion.   |
| Topic 3 | 86 | 12 | 86 | 15 | Downward adjustment of the stringency of CP implies a concomitant rise in GHG emissions and thus CC, possibly resulting in irreversible changes anyway. Perhaps better to rephrase: In particular, climate policies can be adjusted in the short term in response to observed consequences and costs. [Government of Netherlands]   | New version consistent with your suggestion.   |
| Topic 3 | 86 | 14 | 86 | 14 | Explain what is meant by irreversibility in this specific context [scott power, australia]  | Irreversibility is explained in the new version.   |
| Topic 3 | 86 | 15 | 86 | 17 | Suggestion for rephrasing: 'increase the desirability of efforts over the short-term'? [Government of Netherlands]  | We now use "increase the benefits from short-term actions".  |
| Topic 3 | 86 | 15 | 86 | 17 | This statement can't be traced back to WGIII 2.6. [Government of Netherlands]   | Thanks, it was WGIII 3.6.  |
| Topic 3 | 86 | 16 |    |    | "increase the level of desirable efforts". What efforts? Desirable by whom? To what end? [Government of Netherlands]  | We now use "increase the benefits from short-term actions".  |
| Topic 3 | 86 | 19 | 87 | 23 | We support the section regarding interactions among mitigation, adaptation and sustainable development. In particular the statement regarding in the framework of sustainable development the design of climate change policy involves the recognition of trade-offs and synergies across multiple objectives resulting in "co-benefits" or "adverse side-effects". [Government of New Zealand]   | Thank you. We appreciate the support.  |
| Topic 3 | 86 | 19 | 92 | 46 | This discussion is not aligned with what we agreed in section 4 of WgIII, which is about mitigation pathways and measures in the context of sustainable development. It is necessary to align the whole section to what was agreed in WGIII. [Government of Bolivia]  | Mitigation pathways are discussed in section 3.4, and 3.5 considers both mitigation and adaptation in the context of sustainable development, and is consistent with the SPMs from WGII and WGIII. |
| Topic 3 | 86 | 21 | 86 | 23 | There is the need to incorporate the definition of transformation changes according to the definition incorporated in WGII referring that transformation is related to strengthening, aligning or changing paradigms in the context of sustainable development and poverty eradication. Transformation is a concept only used in the context of adaptation in WGIII. [Government of Bolivia]  | The glossary definition of transformation has been included in the introduction to the topic, with some reference to WGII description of transformation.   |
| Topic 3 | 86 | 21 | 86 | 23 | Sentence too long. Unclear. [scott power, australia]  | The sentence has been revised.   |
| Topic 3 | 86 | 21 | 86 | 23 | Boxed text seems to omit some key messages from the underlying reports that are referenced here. E.g. WGIII 4.2 states: 1) Sufficiently disruptive climate change could exclude any prospect for sustainable future (also WGII Chapter 19). An effective climate response is necessarily an integral objective of an SD strategy. And there are 2) Trade-offs (climate policy could draw resources from other SD topics), and 3) Synergies (co-benefits for human and economic development). Conclusion: There is a need for "mainstreaming" climate issues into the design of comprehensive SD strategies. Suggestion: Add "disruptive climate change has the potential to prevent a sustainable future" and "there is a need for integration of climate issues in comprehensive SD policy". [Government of Netherlands] | The headline statement has been revised and simplified.  |
| Topic 3 | 86 | 22 | 86 | 22 | Please indicate which „multiple objectives“ are referred to. [Government of Netherlands]  | The headline statement has been revised and simplified, and no longer refers to multiple objectives..  |
| Topic 3 | 86 | 25 | 86 | 25 | Isn't "equitable" an integral part of sustainable development? Suffice to say 'threat to sustainable development'? [H-Holger Rogner, Austria]   | Sustainable development is not always equitable.   |

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|         |    |    |    |    |   |  |
|---------|----|----|----|----|---|--|
| Topic 3 | 86 | 25 | 86 | 25 | We suggest changing the phrase "equitable and sustainable development" to "equity and sustainable development" to be consistent with WGIII Ch. 4. [Government of United States of America]  | Equitable qualifies development in the specific context of this sub section; it is used in WGIII Ch 4, WG II ch 20 |
| Topic 3 | 86 | 25 | 86 | 30 | Please include here the IPCCs key conclusion on the implications of climate change for economic development and poverty alleviation (i.e. from WG2 SPM) and make bold - this is a crucial conclusion [Government of United Kingdom of Great Britain & Northern Ireland]               | The SPM has been referenced in this paragraph, and poverty alleviation mentioned in the subsequent paragraph.      |
| Topic 3 | 86 | 27 | 86 | 28 | Climate change will place additional burdens on all people, not just the poor. The sentence would be a more appropriate description of the underlying report, which finds everyone will be impacted, if the clause "on the poor" is deleted. [Government of United States of America] | Text has been edited to note "particularly on the poor."   |
| Topic 3 | 86 | 29 | 86 | 29 | It is suggested to insert "emission" before "pathways" in order to enhance clarity. [Government of Austria]   | The reference here is to development pathways.   |
| Topic 3 | 86 | 30 | 86 | 30 | An important message conveyed in WGIII 4.2 is that there is a requirement for "mainstreaming" climate issues into the design of comprehensive SD strategies. This could be mentioned here. [Government of Netherlands]  | The issue of mainstreaming is more appropriate to topic 4.   |
| Topic 3 | 86 | 32 | 86 | 39 | In my view the message should come through clearer that adaptation is no substitute for mitigation but that both is required. [Helmut Haberl, Austria]  | This is covered extensively in 3.2, and in 3.3, as well as in the final bullet of 3.5.                             |
| Topic 3 | 86 | 36 | 86 | 36 | The "iterative" processes are not depicted in the graph. [Government of Netherlands]  | The figure has been deleted.   |
| Topic 3 | 86 | 37 | 86 | 37 | The word "Some" must add space before and other many similar errors in the whole documents should be revised. For example "Some" from line 37 to line 38 in page 86, etc... [Government of Vietnam]   | Corrected.   |
| Topic 3 | 86 | 47 | 86 | 47 | Please simplify this by prefacing with a simple statement like "Mitigation could bring substantial co-benefits" [Government of United Kingdom of Great Britain & Northern Ireland]  | The text has been edited.  |
| Topic 3 | 86 | 47 | 86 | 50 | The confidence statement should follow after "resilience of the energy system". [H-Holger Rogner, Austria]  | This sentence has been deleted.  |
| Topic 3 | 86 | 54 | 86 | 54 | Typo: We think this should be Box 3.1 Figure 1 (not Box 3.2 Figure 1). [Government of Canada]   | This has been corrected.   |
| Topic 3 | 87 | 0  |    |    | Figure 3.5 : The figure seems to suggests that resilience is the inverse of risk (right column). But lack of resilience is not the only cause of risk. Perhaps this should be stated in the caption. [Thomas Stocker/ WGI TSU, Switzerland]   | The figure has been deleted.   |
| Topic 3 | 87 | 1  | 87 | 1  | "AFOLU": acronym not (properly) introduced/explained (also not consistent in the whole report, only explained in figure 1.5). Suggestion: add "(land use)" [Government of Netherlands]  | This text has been deleted.  |
| Topic 3 | 87 | 4  | 87 | 8  | Repititious [scott power, australia]  | Sentence has been deleted; text edited in this paragraph to address other comments.                                |
| Topic 3 | 87 | 9  | 87 | 9  | "Some transformation processes also involve risks that may have inequitable consequences" Here an example of inequitable consequences would be helpful [H-Holger Rogner, Austria]   | This sentence has been deleted.  |
| Topic 3 | 87 | 9  | 87 | 9  | It would be good to give an example of inequitable consequences [Government of Netherlands]   | This sentence has been deleted.  |

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|         |    |    |    |    |  |   |
|---------|----|----|----|----|--|---|
| Topic 3 | 87 | 13 | 87 | 15 | Figure 3.5: The figure is unnecessary because it conveys a simple message: the choices humanity makes determine the climate change resilience of a future world. It is also done in a very detailed but abstract way (e.g. use of arrows), suggesting this says anything more about the underlying principles, although this is not the case. The figure also doesn't support the text (p. 86 lines 35-39). Suggestion: omit figure. [Government of Netherlands] | This figure has been deleted.   |
| Topic 3 | 87 | 13 | 87 | 15 | Figure 3.5 Caption: A1, A2, A3, B1, B2, B3, C, C1, C2. not in the figure. [Government of Netherlands]  | This figure has been deleted.   |
| Topic 3 | 87 | 13 | 87 | 23 | Is this diagram really necessary? I don't think it helps. A simple short statement in English would suffice. If figure remains: caption contains jargon that is unclear: 'opportunity space', 'climate-resilient pathways', L16: resilience of what?, what is 'A-1, B-1'? [scott power, australia]   | This figure has been deleted.   |
| Topic 3 | 87 | 15 | 87 | 15 | There are references to [A-1, B-1] etc. However, no such signs are found in the figure [Government of Russian Federation]  | This figure has been deleted.   |
| Topic 3 | 87 | 15 | 87 | 15 | Figure 3.5 has very little information and conveys the wrong message that all social and ecological elements are only "stressors" while they can be, and frequently are, an important part of the "resilience space" (i.e. elements that can generate or promote climate-resilient pathways.). It should be deleted. [Pedro Alfredo Borges Landáez, Venezuela]   | This figure has been deleted.   |
| Topic 3 | 87 | 15 | 87 | 19 | The bracketed characters [A-1, B-1], [A-2, A-3, B-2, C-1, C-2] and [C, B-3] are not explained anywhere. [Government of Canada]   | This figure has been deleted.   |
| Topic 3 | 87 | 15 | 87 | 23 | Caption Figure 3.5: Our world [A-1, B-2] or the opportunity space A-2, A-3 etc need to be explained [H-Holger Rogner, Austria]   | This figure has been deleted.   |
| Topic 3 | 87 | 15 | 87 | 23 | Figure caption : What are the number and letters given into square bracket ? Those should be explained or adapted to be clear. [Thomas Stocker/ WGI TSU, Switzerland]  | This figure has been deleted.   |
| Topic 3 | 87 | 15 | 88 | 2  | need to delete references to WGII SPM sections A-1, B-1, A-2, etc. [Stewart Cohen, Canada]   | This figure has been deleted.   |
| Topic 3 | 87 | 17 | 87 | 18 | The inclusion of 'cultural factors' as a stressor, alongside climate change, climate variability, land-use change, degradation of ecosystems, poverty and inequality, seems a little obscure. Can it be elaborated briefly - if not here then elsewhere? [European Union]  | This figure has been deleted.   |
| Topic 3 | 87 | 18 | 87 | 19 | There are references to [A-1, B-1] etc. However, no such signs are found in the figure [Government of Russian Federation]  | This figure has been deleted.   |
| Topic 3 | 87 |    | 87 |    | Figure 3.5. The figure is not quite informative, consider to delete [Government of Russian Federation]   | This figure has been deleted.   |
| Topic 3 | 87 |    |    |    | Figure 3.5, lines 15, 18 and 19, specify that those letters [A-1, B-1]; [A-2, A-3, B-2, C-1, C-2] and [C, B-3] what mean these scenarios?. [Government of Costa Rica]  | This figure has been deleted.   |
| Topic 3 | 87 |    |    |    | Figure 3.5. A new figure on "opportunity space and climate resilient pathways ", was included into the final version of the WG II SPM (SPM 9). I consider it could included into the SYR. [Avelino G. Suarez Rodriguez, Cuba]  | Good suggestion but not included for space limitations.   |
| Topic 3 | 88 | 4  | 88 | 4  | Box 3.1. The title of Box.3.1 could be "Co-benefits and 'trade-offs' " to represent the content of the box. [Government of Japan]  | The title of the box has been changed to co-benefits and adverse side effects.  |
| Topic 3 | 88 | 4  | 88 | 38 | The text should clarify whether these are co-benefits between mitigation and adaptation, or between climate change and other things. In addition, the title of the box should be re-named to reflect "Co-benefits of [WHAT?]". [Government of United States of America]  | The text provides details in response to the comment; the title has been expanded to reflect the contents more comprehensively; |

Review comments on the IPCC AR5 Synthesis Report First Order Draft - Topic 3

|         |    |   |    |    |   |  |
|---------|----|---|----|----|---|--|
| Topic 3 | 88 | 4 | 88 | 38 | Can the authors provide examples of policies that should be avoided because they interfere with one another: within mitigation, within adaptation, and between the two? [Government of United States of America]  | Examples have been provided in section 4.2, 4.3 and 4.5; the box is meant to introduce the concept.  |
| Topic 3 | 88 | 4 | 88 | 38 | We support the inclusion of the Box 3.1, but suggest its title is expanded from co-benefits to "co-benefits, adverse side effects and adaptation deficits". [Government of New Zealand]   | The title of the box has been changed to co-benefits and adverse side effects.   |
| Topic 3 | 88 | 4 | 88 | 38 | The idea of a box on co-benefits is appreciated but needs to be much more informative with specific examples: At the moment, the box duplicates information given throughout the SYR, it is too general and also addresses negative side effects. Please restructure and list, after a short introduction co-benefits from mitigation and adaptation action in a concise way. [Government of Germany]   | Examples have been provided in section 4.2, 4.3 and 4.5 with cross-referencing; the box is meant to introduce the concept.   |
| Topic 3 | 88 | 4 | 88 | 38 | Box3.1. Co-benefit will provide additional value on the mitigation. However we have to remind the possibility of the increase of total cost when we seek for co-benefit too much. It is fair to mention the cost increase (pros and cons). [Takashi Hongo, Japan]   | The pros and cons of co-benefits are discussed in the box.   |
| Topic 3 | 88 | 4 | 88 | 38 | It is not clear to me if the estimation of cobenefits is limited to direct co benefits or also include the indirect co benefits meaning the effects on neighbouring country, region, city. However, it is clearly mentioned that the indirect effects on other sectors has been considered. The second point is about the weights of different objectives in the estimation of benefits and costs. The box is not informative if equal weights have been considered in assessing benefits or costs. It also does not discuss the determination of weights as a guideline for decision makers who always needs to know how to attribute weights to different objectives. Some more clarification in that respect is needed. For an overall evaluation of benefits and cost, there should be a metric. If some assessments are not monetized then how can the decision makers decide whether it is profitable to spend one more dollar on a certain mitigation of adaptation measure? I am aware of the ethical/cultural concerns but the box is again silent in addressing this issue and the relevant concerns. [Vahid Mojtahed, Italy] | All co-benefits are considered irrespective of geographic factors. Air quality gains are con-benefits if in country or trans-boundary. Weights are not explicitly discussed in the box, nor in the underlying WGIII Box TS.11. Weightage of different policy variables is discussed in WGIII 6.6 |
| Topic 3 | 88 | 4 | 89 | 4  | Box 3.1 & Box 3.2, Figure 1: First of all, the caption 'Box 3.2, Figure 1' seems to be wrong as it seems belonging to the Box 3.1 rather than Box 3.2. So please make sure the caption is right.<br><br>Secondly, Box 3.1 with Figure 1 would be better to relocate alongside with Table 3.2 in page 78 and 79, as the figure seems quite well support the table with more comprehensive presentation. [Government of Republic of Korea]  | The caption has been modified, and the figure is no longer in the box.   |
| Topic 3 | 88 | 4 |    |    | Sections of underlying reports that address co-benefits, particularly in WGIII, are not referenced here. I.e. WGII 5.7; WGIII 3.6, 5.7 and Box TS.11 [Government of Netherlands]  | These references have all been added.  |
| Topic 3 | 88 | 7 | 88 | 7  | There is a reference to figure 1 for box. 3.1, however, no such figure is given. Probably the figure currently labeled as Box 3.2 Figure 1 is actually Box 3.1 Figure 1. [Government of Russian Federation]   | The caption has been modified, and the figure is no longer in the box.   |
| Topic 3 | 88 | 9 | 88 | 9  | "to better manage impacts" should be replaced by "to manage adverse impacts". The term "better" gives a misleading idea given that "adaptation deficit" implies not coping with adverse/negative impacts. Check the definition given by WGII, page 162/2590, line 2. [Government of Netherlands]  | The text has been edited.  |

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|         |    |    |    |    |  |  |
|---------|----|----|----|----|--|--|
| Topic 3 | 88 | 10 | 88 | 15 | Hard to trace, especially the “no regret”-label-for-measurements statement. [Government of Netherlands]  | The wording has been changed to no or low regret, and references to ch. 16 and 17 added. |
| Topic 3 | 88 | 12 | 88 | 13 | We suggest editing this sentence to say, "Co-benefits and adverse side-effects can be measured in monetary or non-monetary units," since both types of measures have been used in the literature. [Government of United States of America]   | The text has been edited.  |
| Topic 3 | 88 | 12 | 88 | 13 | “Co-benefits and adverse side-effects are most often measured in non-monetary units” should be replaced by “Co-benefits and adverse side-effects are measured either in monetary or non-monetary units”. Check what is expressed in WGII page 1371/2590, 17.2.3., 2nd paragraph -just before 17.2.3.1-; or WGIII page 69/2092, lines 5-6. [Government of Netherlands]  | The text has been edited.  |
| Topic 3 | 88 | 14 | 88 | 14 | Unclear where 'it has been shown'. Reference is missing at the end of this paragraph. [Government of Netherlands]  | This sentence has been deleted.  |
| Topic 3 | 88 | 17 | 88 | 18 | “difficult to meaningfully compare the costs and benefits of climate change mitigation and derive an optimal mitigation pathway” should be replaced by “difficult to not only meaningfully compare the costs and benefits of climate change mitigation, but also to derive an optimal mitigation pathway”. It makes more sense in this way what they/she/he is trying to summarize. Check WGIII page 410/2092, line 9. [Government of Netherlands]   | Sentence deleted   |
| Topic 3 | 88 | 18 | 88 | 19 | “Although a comprehensive analysis of the social value of co-benefits is difficult, it is still possible to identify positive impacts on other sectors” should be reconsidered, for instance, as “Mitigation can have many potential co-benefits and adverse side-effects, which makes comprehensive analysis difficult. Co-benefits of climate policy could include effects partly on a set of objectives such as energy security, income distribution, labour supply and employment, urban sprawl, and the sustainability of the growth of developing countries among others.”. This is extensively more in agreement with what is found in Box TS.11; which is the box this Box 3.1 is based on. When paraphrasing the original idea found in Box TS.11, the meaning was lost/twisted. Check WGIII, page 69/2092, especially lines 16-23. [Government of Netherlands] | This sentence has been revised.  |
| Topic 3 | 88 | 19 | 88 | 21 | Scenarios with target above 530 ppm CO <sub>2</sub> eq will also be associated with non-trivial levels of co-benefits. Explicitly calling out only scenarios between 430 and 530 ppm CO <sub>2</sub> eq is potentially misleading as readers could interpret this as suggesting scenarios reaching higher concentrations do not have co-benefits. To be a more robust and complete representation of the underlying report the sentence should be reworded as “Mitigation scenarios are associated with” After the sentence the authors could include an additional sentence indicating the correlation between the stringency and level of co-benefits: “Scenarios reaching lower CO <sub>2</sub> eq concentrations are often associated with greater co-benefits.” [Government of United States of America]  | This text has been deleted.  |
| Topic 3 | 88 | 19 | 88 | 21 | Repetition. This example is already mentioned in line 6-7 of the same page. [Government of Netherlands]  | This text has been deleted.  |
| Topic 3 | 88 | 21 | 88 | 21 | In “{WG II 11.9, Figure 3.6}”, “Figure 3.6” is nowhere to be found! What does exist is Figure TS.11 (WGIII, page 61/2092) which is one part of the Figure 6.31 (WGIII, page 680/2092). Is that the figure that is referred to here? [Government of Netherlands]  | Thank you. The reference has been changed to WGIII TS11.                                 |
| Topic 3 | 88 | 21 | 88 | 22 | “...reduced....energy security” Is this what is meant/ or should it say increased energy security? [Government of United Kingdom of Great Britain & Northern Ireland]  | This text has been deleted.  |

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|         |    |    |    |    |   |   |
|---------|----|----|----|----|---|---|
| Topic 3 | 88 | 22 | 88 | 24 | Is this restricted to scenarios leading to 430 and 530 ppm CO <sub>2</sub> eq in 2100, or valid for all scenarios? [Government of Norway]   | This text has been deleted.   |
| Topic 3 | 88 | 22 |    |    | Add "the" before "absence" [Government of New Zealand]  | Corrected.  |
| Topic 3 | 88 | 22 |    |    | Recommend elaborating briefly on the co-benefits likely to be realized for energy security: i.e., diversification and resilience of supply, reduced demand, etc. [Government of Canada]   | This text has been deleted.   |
| Topic 3 | 88 | 24 | 88 | 24 | In "{WG II 3.6, 4.8, 6.6, 15.2}", numeral "4.8" and "6.6" seems to not be related with the suggested discussion [Government of Netherlands]   | The references have been checked, 4.8 has been deleted but 6.6 is still relevant to the paragraph..                             |
| Topic 3 | 88 | 30 | 88 | 30 | Unclear what is meant by externalities and non-competitive behavior (for market outputs) and how this contributes to difficulties in valuation. [Government of Netherlands]   | This text has been deleted.   |
| Topic 3 | 88 | 30 | 88 | 33 | Suggest clarifying that the mitigation option under discussion here is one that address fossil fuel combustion, which releases GHGs as well as other substances, including SO <sub>2</sub> (an air pollutant) . [Government of Canada]  | The sentence has been revised to be more clear.   |
| Topic 3 | 88 | 33 | 88 | 38 | Hard to trace, especially the "risk management is weak"-part. Reference is missing. [Government of Netherlands]   | The sentence has been revised and reference to 20.4.1 has been added.   |
| Topic 3 | 88 | 34 | 88 | 34 | Box 3.1: "...natural climate variability is responsible larger human and economic losses". Add 'for' between responsible and larger. [H-Holger Rogner, Austria]   | This sentence has been revised  |
| Topic 3 | 88 | 34 | 88 | 34 | Should read natural climate variability is responsible FOR larger human and economic losses [Government of Brazil]  | This sentence has been revised.   |
| Topic 3 | 88 | 34 | 88 | 34 | It is suggested to insert "for" before "larger human.." [Government of Austria]   | This sentence has been revised.   |
| Topic 3 | 88 | 34 | 88 | 34 | Typo: Missing a 'for' between 'responsible' and 'larger'. [Government of Canada]  | This sentence has been revised  |
| Topic 3 | 88 | 34 |    |    | Add "for" after "responsible" [Government of New Zealand]   | This sentence has been revised  |
| Topic 3 | 88 |    |    |    | Figure 3.5 tables of key to colour codes at bottom left is faint. Consider enhancement [Government of Kenya]  | This figure has been deleted.   |
| Topic 3 | 88 |    |    |    | • SYR [P88 Box 3.1] Add negative impacts of mitigation policy and Response Measures [Government of Saudi Arabia]  | The text provides details in response to the comment; the title has been expanded to reflect the contents more comprehensively; |
| Topic 3 | 89 | 0  |    |    | Box 3.2, Figure 1 : Units should be between ( ), /m <sup>3</sup> should be m <sup>-3</sup> , no * between capita and µg, CO <sub>2</sub> eq should be CO <sub>2</sub> -eq<br>The figure numbering is wrong, it is Box 3.1 and not 3.2 ! [Thomas Stocker/ WGI TSU, Switzerland]  | Figure replaced with WG3 Figure SPM.6 and added to the main text.   |
| Topic 3 | 89 | 1  | 89 | 4  | The diameter of the circles used in the world-like figure are too big when compared to the original ones. Such large circles mislead the places where the phenomena is occurring, and make more difficult to spot the underlying world-map. Check WGIII, page 1776/2092, Figure 12.23. Also check <a href="http://www.iiasa.ac.at/web/home/research/Flagship-Projects/Global-Energy-Assessment/GEA_Chapter18_urban_hires.pdf">http://www.iiasa.ac.at/web/home/research/Flagship-Projects/Global-Energy-Assessment/GEA_Chapter18_urban_hires.pdf</a> , page 75/94. [Government of Netherlands] | Figure replaced with WG3 Figure SPM.6 and added to the main text.   |
| Topic 3 | 89 | 1  | 89 | 4  | In the legend of the figure, "Concentrations" should be replaced by "Concentration". Drop the "s", as it appears on the originals: WGIII, page 1776/2092, Figure 12.23; or <a href="http://www.iiasa.ac.at/web/home/research/Flagship-Projects/Global-Energy-Assessment/GEA_Chapter18_urban_hires.pdf">http://www.iiasa.ac.at/web/home/research/Flagship-Projects/Global-Energy-Assessment/GEA_Chapter18_urban_hires.pdf</a> , page 75/94. [Government of Netherlands]  | Addressed. Caption replaced as Figure replaced with WG3 Figure SPM.6 in the main text.  |



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|         |    |   |    |   |  |  |
|---------|----|---|----|---|--|--|
| Topic 3 | 89 | 1 | 89 | 4 | The figure of this box, holds within itself another figure (lower-right part). The legend within this sub-figure, opposite to its original counterpart, does not present the "Individual Scenarios" convention. It should be placed! Check WG III Figure SPM.6. [Government of Netherlands]  | Figure replaced with WG3 Figure SPM.6 and added to the main text, and the caption corrected. |
| Topic 3 | 89 | 1 | 89 | 4 | The Y-axis label of the lower-right figure is misleading and/or confusing. It is better to keep the Y-axis label of the original figure, that is to say, "Change from 2005[%]". Check WG III Figure SPM.6. [Government of Netherlands]   | Figure replaced with WG3 Figure SPM.6 and added to the main text, and the caption corrected. |
| Topic 3 | 89 | 1 | 89 | 4 | One of the X-axis labels, from the lower-right figure, is "No Climate Policy". It is more consistent to keep the original label "2050 - Baseline" (and why not its definition: "state against which change is measured"). Check WG III Figure SPM.6; and WGIII page 1924/2092, line 15. [Government of Netherlands]  | Figure replaced with WG3 Figure SPM.6 and added to the main text, and the caption corrected. |
| Topic 3 | 89 | 1 | 89 | 4 | Unclear to which year the exposure quintiles in the figure refer. [Government of Netherlands]  | Figure replaced with WG3 Figure SPM.6 and added to the main text, and the caption corrected. |
| Topic 3 | 89 | 1 | 89 | 4 | One of the X-axis labels, from the lower-right figure, is "Stringent Climate Policy". It is more understandable if that label is slightly changed to "2050 - Stringent Climate Policy". Both cases "Baseline" and "Stringent Climate Policy" are for the year 2050. Check WG III Figure SPM.6; and WGIII, page 1924/2092, line 15. [Government of Netherlands]   | Figure replaced with WG3 Figure SPM.6 and added to the main text, and the caption corrected. |
| Topic 3 | 89 | 1 | 89 | 4 | The connection between the text on the horizontal axis in the inserted figure "Co-Benefits of Mitigation for Air Quality" ("No Climate Policy" and "Stringent Climate Policy") and the Box 3.1 "Co-benefits" itself is somewhat unclear. Box 3.1 discusses benefits of mitigation with or without other air quality policies. Does the "no climate policy" in the figure represent the case where only the "other policies" are operating, or are just climate policies included here? In any case: for SO2 stringent climate policy seem to have an effect, whereas a statistically significant difference between no climate policy and stringent climate policy seem more uncertain for black carbon according to the box plots. Please consider to make a more informative figure caption to give the reader a better chance to understand this very important message. [Government of Norway] | Figure replaced with WG3 Figure SPM.6 and added to the main text, and the caption corrected. |
| Topic 3 | 89 | 1 | 89 | 4 | Box 3.2, It is great to see more information on human health, but please consider adding some text explaining PM <sub>10</sub> and particles/aerosols in the air in general: this needs explanation for the readers. This could be placed in Box 3.1 itself or in the Box 3.1, Figure 1 caption. Minor typo: In the figure caption title it is now written "Box 3.2, Figure 1:", it should be "Box 3.1, Figure 1:". [Government of Norway]   | Figure replaced with WG3 Figure SPM.6 and added to the main text, and the caption corrected. |
| Topic 3 | 89 | 1 |    |   | Box 3.2 here should be labelled Box 3.1. Also, clarify if the stringent policies are for air quality or for climate change, with air quality co-benefits. Are air quality policies implemented specifically as part of these low atmospheric CO <sub>2</sub> eq scenarios? [Government of Canada]  | Figure replaced with WG3 Figure SPM.6 and added to the main text, and the caption corrected. |
| Topic 3 | 89 | 2 | 89 | 2 | Caption should read Box 3.1, Figure 1. [European Union]  | Figure replaced with WG3 Figure SPM.6 and added to the main text, and the caption corrected. |
| Topic 3 | 89 | 2 | 89 | 2 | Box 3.1 ... [Peter Thorne, Norway]   | Figure replaced with WG3 Figure SPM.6 and added to the main text, and the caption corrected. |

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|         |    |   |    |   |   |  |
|---------|----|---|----|---|---|--|
| Topic 3 | 89 | 2 | 89 | 2 | There is a reference to figure 1 for box. 3.1, however, no such figure is given. Probably the figure currently labeled as Box 3.2 Figure 1 is actually Box 3.1 Figure 1. [Government of Russian Federation]   | Figure replaced with WG3 Figure SPM.6 and added to the main text, and the caption corrected. |
| Topic 3 | 89 | 2 | 89 | 2 | Box 3.2. Editorial comment, however should be Box 3.1 Figure 1, not Box 3.2 Figure 1? [Government of Japan]   | Figure replaced with WG3 Figure SPM.6 and added to the main text, and the caption corrected. |
| Topic 3 | 89 | 2 | 89 | 2 | "Box 3.2" should be replaced by "Box 3.1". [Government of Netherlands]  | Figure replaced with WG3 Figure SPM.6 and added to the main text, and the caption corrected. |
| Topic 3 | 89 | 2 | 89 | 2 | explain PM10 in fig caption or footnote [Monika Rhein, Germany]   | Figure replaced with WG3 Figure SPM.6 and added to the main text, and the caption corrected. |
| Topic 3 | 89 | 2 | 89 | 2 | Box 3.2, Figure 1 should be Box 3.1, Figure 1. So all the text referring to this figure should be changed. [Songli Zhu, China]  | Figure replaced with WG3 Figure SPM.6 and added to the main text, and the caption corrected. |
| Topic 3 | 89 | 2 | 89 | 3 | The second part of the caption, of the "Figure 1", wrongly expresses the meaning of the lower-right embedded figure. Therefore, "co-benefits of stringent mitigation policies for air quality in scenarios reaching concentrations of 430-530 ppm CO <sub>2</sub> eq in 2100." should be replaced by "Air pollutant emission levels for Black Carbon and Sulfur Dioxide in 2050 (relative to 2005) as an impact of stringent climate policy on air pollutant emissions". As a matter of fact, both cases are for 2050, but they are consistent with the projections of CO <sub>2</sub> eq concentration levels of 430-530 ppm by 2100. Check WG III Figure SPM.6. [Government of Netherlands] | Figure replaced with WG3 Figure SPM.6 and added to the main text, and the caption corrected. |
| Topic 3 | 89 | 2 | 89 | 4 | Should review the Box 3.2, Figure 1, it has the same name on pages 89 and 91, but they are different. [Government of Costa Rica]  | Figure replaced with WG3 Figure SPM.6 and added to the main text, and the caption corrected. |
| Topic 3 | 89 |   |    |   | Box 3.2, Figure 1: don't fill circles in. sulphur [scott power, australia]  | Figure replaced with WG3 Figure SPM.6 and added to the main text, and the caption corrected. |
| Topic 3 | 89 |   |    |   | Box 3.2, Figure 1: labels for key to color codes as well as diagram at bottom are faint. Consider enhancement [Government of Kenya]   | Figure replaced with WG3 Figure SPM.6 and added to the main text, and the caption corrected. |

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|         |    |   |    |    |   |  |
|---------|----|---|----|----|---|--|
| Topic 3 | 89 |   |    |    | <p>It is suggested to delete BOX 3.2, Figure 1. The reasons are as follows:</p> <p>(1) The risk of human exposure to PM 10 and the co-benefits of annual mitigation to air quality are not directly or logically related. Their piecing together tends to be misleading. Moreover, line 25 to 26, Page 66 of the Underlying Report states that "Worldwide, only 160 million people live in cities with truly clean air – that is, in compliance with World Health Organization guidelines (Grubler et al., 2012) (Figure 12.23). ", which does not identify PM 10 in particular. And Target 1-3 in the figure gives no clear indication. Furthermore, Section 12.8.1 (Urban air quality co-benefits), WG III Report elaborates on the impacts of sulfur dioxide, nitrous oxide and ozone. It is not appropriate to associate the two things rigidly here.</p> <p>(2) The mid-upper panel in Box 3.2 Figure 1, which is an expression of the status of PM 10 emission, is from the Global Energy Assessment, which is a simulation of the future emission scenario, black carbon and sulfur dioxide in particular. Moreover, WG III 6.6 does not discuss the spatial distribution either. They do not match in terms of research focus or temporal scale. Their staying together tends to confuse and mislead readers. And what the two panels represent in the underlying report indicates no logical relationship in a strict sense.</p> <p>(3) As we understand, the text in the present BOX 3.1 is a clear description of a climate policy interacting with an environmental policy. Thus, the figure seems redundant. [Government of China]</p> | Figure replaced with WG3 Figure SPM.6 and added to the main text, and the caption corrected.   |
| Topic 3 | 89 |   |    |    | Box 3.2 Figure 1: Please explain targets. How much of the PM10 is from natural sources? (The number of the box should be 3.1.) [Government of Germany]  | Figure replaced with WG3 Figure SPM.6 and added to the main text, and the caption corrected.   |
| Topic 3 | 90 | 1 | 90 | 45 | Box 3.2 (pg 90) defines GHG metrics and explains their sensitivities. However, these metrics are used from very early in the report without this intimate understanding. Should be defined earlier and remain consistent. [Government of Netherlands]   | Taken into account. Since metrics are most relevant in the context of mitigation we keep the box in Topic 3. But we agree that we need much stronger links from main text to the box and more references and links have be inserted.   |
| Topic 3 | 90 | 1 | 90 | 45 | Box 3.2, GHG metrics and transformation pathways. We believe that this box in general is well written and that it is quite balanced as it is now. However, we feel the statement "no recommendations are given here" in line 11-12 is redundant. Please consider to delete this part of the bolded statement since it is self-explanatory given IPCCs mandate to be policy relevant but not policy descriptive. We believe that information about how the relative uncertainty differs between metrics is much more policy relevant, and should be included in this bolded statement. Please consider to reformulate this bolded statement to take this aspect into account. It could be something like e.g. "The choice of metric and time horizon depends on application and policy context, especially the choice of metric also affects uncertainty e.g. GTP has a larger uncertainty than GWP" [Government of Norway]  | 1) Taken into account 2) Rejected. 1) We have changed the text. 2) Rejected due to space limitations. Since there are implicit uncertainties related to GWP it is not straightforward to compare the uncertainties related to these two metrics in a condensed format like this. |
| Topic 3 | 90 | 2 | 90 | 2  | Needs introduction stating purpose of Box and its scope. [scott power, australia]   | Taken into account. Text is changed and introduction added.  |
| Topic 3 | 90 | 3 | 90 | 3  | Metrics: jargon, menaing unclear in this context. [scott power, australia]  | Taken into account. Text is changed and introduction added.  |
| Topic 3 | 90 | 5 | 90 | 5  | "FAR" should be replaced by "IPPC First Assessment Report (FAR)". For the common reader it is useful to know what the acronyms stand for. [Government of Netherlands]   | Accepted. "FAR" is replaced by "IPCC First Assessment Report"  |

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|         |    |    |    |    |  |   |
|---------|----|----|----|----|--|---|
| Topic 3 | 90 | 5  | 90 | 5  | "to illustrate the difficulties" - perhaps this is a bit strong/negative when read out of context, although I suspect I was partially responsible for the FAR wording, as a CLA. It was also introduced as one candidate metric for producing CO2-equivalent emissions. [Keith Shine, United Kingdom]  | Taken into account. Text has been modified.   |
| Topic 3 | 90 | 5  |    |    | Box 3.2.: This box does not provide information of metrics in a useful way. Please modify:<br>- Add a general definition of GHG metrics and introduce the different existing concepts in a neutral way. (different parameters, snap shot or integral, different time horizons, uncertainties).<br>- The title of the box is confusing as there is no link between GHG metrics and transformation pathways. At most, the choice of metric could influence the choice of specific mitigation actions, but not the choice on transformational or incremental actions.<br>- Reference should be made to footnote 10.<br>- Any duplications should be removed.<br>- L 5: To our understanding the purpose of the GWP has been from the start to provide a means to compare different GHG in a common framework, and not to "illustrate difficulties in comparing...".<br>- L 12: IPCC never gives recommendations, therefore this statement is confusing and must be deleted.<br>- L 35-39: Please remove these lines, they are policy prescriptive, incomplete and confusing. (For example, the relative weight of short lived and long lived gases rather depends on the time horizon chosen than on the metrics itself.) [Government of Germany] | Taken into account. The points raised in this comments are taken into account in various ways by several changes in the text (we refer to definitions in Glossary, title is changed, footnote 10 is changed with references to the box as well as definitions in Glossary, sentences about recommendation and introduction in FAR are changed, we think the line 35-39 are not policy prescriptive, but we have improved the wording here.) |
| Topic 3 | 90 | 8  | 90 | 9  | "Alternative metrics have been proposed and a suite of metrics is assessed." should be replaced by "Alternative metrics to GWP have also been proposed, for instance Gdamp (Global Damage Potential), GCP (Global Cost Potential), GTP (Global Temperature change Potential) among others.". This last re-phrasing gives more clarity and it is useful for later statements expressed within Box 3.2. Check WGIII, table 3.4, page 342/2092. [Government of Netherlands]   | Rejected, due to space limitations  |
| Topic 3 | 90 | 9  | 90 | 9  | It is suggested to substitute "is" by "has been". [Government of Austria]  | Noted. Text changed and the comment is no longer directly relevant.   |
| Topic 3 | 90 | 11 | 90 | 12 | delete "and no recommendations are given here". Even though that is obviously the case, it seems strange to point it out. [Government of Denmark]  | Taken into account. Text has been changed.  |
| Topic 3 | 90 | 15 | 90 | 15 | "as a single basket," should be replaced by "in a 'single-basket' approach, i.e., emission reductions of one GHG can be traded with reductions in another GHG;". Explaining what 'single-basket' approach means is necessary for a full understanding. Check WGIII, page 341/2092, lines 30-31. [Government of Netherlands]  | Rejected due to space limitations   |
| Topic 3 | 90 | 17 | 90 | 17 | "change." should be replaced by "change ('multi-basket' approach)". Broad understanding by adding the 'multi-basket' definition-term. Check "WG I Total report Final.pdf", section 8.7.1.5, page 731/1552, paragraph 2; or "WGIII Total report 17 December.pdf", page 341/2092, lines 35-36. [Government of Netherlands]   | Rejected due to space limitations   |
| Topic 3 | 90 | 19 | 90 | 29 | Para very difficult to understand and potentially misleading, please consider revising. In particular the bold summary is quite unclear (at least to me, perhaps that's my fault) [Helmut Haberl, Austria]   | Taken into account. Text is reformulated.   |
| Topic 3 | 90 | 21 | 90 | 21 | maybe make clear it is a pulse emission [Keith Shine, United Kingdom]  | Rejected. We think this will be too technical in this context   |

Review comments on the IPCC AR5 Synthesis Report First Order Draft - Topic 3

|         |    |    |    |    |  |   |
|---------|----|----|----|----|--|---|
| Topic 3 | 90 | 22 | 90 | 23 | "The relative uncertainty is larger for GTP." should be replaced by "The relative uncertainty ranges are wider for GTP when compared to GWP.". Gives more clarity to the statement. Check WG I, section 8.7.1.3, last paragraph, page 728/1552. [Government of Netherlands]  | Rejected due to space limitations. Since there are implicit uncertainties related to GWP it is not straightforward to compare the uncertainties related to these two metrics in a condensed format like this.   |
| Topic 3 | 90 | 24 | 90 | 24 | The following wording is suggested for the sake of clarity: The choice of the time horizon ... [Government of Austria]   | Accepted  |
| Topic 3 | 90 | 24 | 90 | 24 | Change "long-term effect of CO2 beyond the time horizon" to "long-term effects beyond the time horizon", because all impacts beyond the horizon are disregarded (i.e. not only those of CO2). [Tommi Ekholm, Finland]  | Taken into account. Text is changed to "CO2 as well as other longlived gases". CO2 is mentioned since it is the gas with targets effect on climate and because it is the reference gas.   |
| Topic 3 | 90 | 24 | 90 | 24 | It is not entirely clear why the comment on "long-term" refers just to CO2 - it is also true for many long-lived GHGs [Keith Shine, United Kingdom]  | Taken into account. Text is changed to "CO2 as well as other longlived gases". CO2 is mentioned since it is the gas with targets effect on climate and because it is the reference gas.   |
| Topic 3 | 90 | 24 | 90 | 25 | In relation to the fact that metrics put "put no weight on the long-term effect of CO2 beyond the time horizon", it would be also good to note that end-point metrics such as GTP put no weight to what happens before the end-point. [Tommi Ekholm, Finland]  | Accepted  |
| Topic 3 | 90 | 26 | 90 | 26 | What does "similar" refer to? Sign or magnitude? [Government of Sweden]  | Taken into account. Text has been changed.  |
| Topic 3 | 90 | 26 | 90 | 27 | This sentence "but the warming" is very unclear to me, and indeed, misleading. It is only the GTP that addresses warming in the sense of temperature change, and hence the difference between the upper two frames in Figure 1.1 could be taken as an indication of severe failure of the GWP - after 100 years, it seriously over-weights the impact of the methane emission on temperature [Keith Shine, United Kingdom] | Taken into account. Text changed, and this sentence has been removed.   |
| Topic 3 | 90 | 26 | 90 | 27 | There is a typo on line 26 - insert the word "over" after the word "dominant" . [Government of Canada]   | Noted. Text changed and the comment is no longer relevant   |
| Topic 3 | 90 | 28 | 90 | 28 | ..., whilst CH4 decays on a shorter timescale [Government of Austria]  | Noted. Text changed and the comment is no longer relevant   |
| Topic 3 | 90 | 28 |    |    | Change "decay" to "decays" [Government of New Zealand]   | Noted. Text changed and the comment is no longer relevant   |
| Topic 3 | 90 | 29 | 90 | 30 | Insert the following sentence at the end of the paragraph: "The GTP metric is better suited to target-based policies, but is again not appropriate for every goal." [TS WGI, p.58] [Government of Brazil]  | Taken into account. First part of comment is not correct as a general statement so this part of the comment is rejected. The 2nd part of the sentence is already covered and we have also introduced similar wording in the first sentence (the bold part) of the previous paragraph. |

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|         |    |    |    |    |   |  |
|---------|----|----|----|----|---|--|
| Topic 3 | 90 | 31 | 90 | 44 | Box 3.2 GHG metrics: We support the inclusion of a Box on metrics in the SYR due to the policy relevance of the topic. Some clarifications are needed to the paragraph on lines 31-44. In particular, line 39 seems to convey a message that is opposite to that often given to policymakers, that is, that mitigating CH4 and other SLCFs is an effective near-term strategy to influence near-term warming. Here it says that a time-dependent metric like GTP100 would lead to less CH4 mitigation in the near-term but more in the long term. If we understand the time-dependent GTP correctly, we think the message is intended to be that using a dynamic GTP would mean that the closer you get to your target year, the more important becomes mitigation of shorter-lived substances. This is consistent with messages that action on SLCFs can influence near-term warming. [Government of Canada] | Taken into account. Text is modified and made clearer (e.g., added a definition of the dynamic GTP in the Glossary, which is referred to here). We have also revised the para on SLCF in the main text and introduced a more general para on non-CO2 gases.  |
| Topic 3 | 90 | 31 | 90 | 45 | provide a better text reference [Government of Netherlands]   | Taken into account. Stronger links between the box and main texts have been included.  |
| Topic 3 | 90 | 32 | 90 | 32 | The text states that "For most metrics, global cost differences are small [...]". While this might be true for papers covered in AR5, papers have been published after AR5 which indicate that for some prominent metrics the cost increase can be substantial. (See e.g. results for GTP100 from Ekholm et al., Robustness of climate metrics under climate policy ambiguity, Env. Sci. & Pol. 31, pp. 44-52, 2013.) Therefore the statement might be very misleading, and should be removed or at least reformulated. [Tommi Ekholm, Finland]   | Noted. Text in this paragraph is slightly rephrased. (But we are not taking into account papers not assessed by underlying AR5 reports)  |
| Topic 3 | 90 | 33 | 90 | 34 | "could be more significant" - there is ambiguity here. Does the "could" imply that it has not been assessed? Otherwise why "could" rather than "is", or "is in some cases" if it has been assessed? [Keith Shine, United Kingdom]   | Noted. We have carefully considered the wording here in light of the basis in the underlying report. The statement is based on limited literature but economical and physical principles   |
| Topic 3 | 90 | 35 | 90 | 35 | There is no Panel B in Box3.2 Figure 1. Please define these. [Government of Netherlands]  | Taken into account. Text changed   |
| Topic 3 | 90 | 35 | 90 | 39 | this sentence seems to imply that early CO2 action is more costly than late CO2 action in achieving the same climate outcome?? [Government of Denmark]  | Taken into account. Text changed   |
| Topic 3 | 90 | 36 | 90 | 36 | Is there any logic why GTP(100) is highlighted - why 100? [Keith Shine, United Kingdom]   | Noted. 100 years is taken as example since this time horizon is generally used for GWP in policy making. We fully acknowledge that this does not automatically mean that this is an adequate time horizon for a different metric, but it is not obvious what to choose as example. Space restrictions do not allow us to go into discussion of this issue. |
| Topic 3 | 90 | 37 | 90 | 38 | This sentence is incomprehensible to me ... using the GWP or the GTP will NOT achieve the same climate outcome because these metrics measure different quantities of equivalence. So it is impossible to link the climate outcome to the mitigation costs, as is done here. It may indeed be cheaper to use GWP(100) but the climate outcome of using it will not be the same climate outcome as if GTP(100) is used - and indeed, on 100 year time scales, the climate outcome using GWP is likely to be a greater warming than GTP. [Keith Shine, United Kingdom]   | Taken into account. Text has been changed.   |
| Topic 3 | 90 | 38 | 90 | 38 | If the "dynamic GTP" is a different concept than the GTP defined in line 22 above, this needs to be clear, and the concept should be defined. [Government of Denmark]   | Taken into account. Definition added in Glossary, and we have inserted a reference to this.  |

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|         |    |    |    |    |  |   |
|---------|----|----|----|----|--|---|
| Topic 3 | 90 | 42 | 90 | 42 | "global ... is small" - yes, indeed, but the header to this paragraph (31-34) has more elaboration than the text itself. The choice of metric could have much larger effects at a country/sector level. [Keith Shine, United Kingdom]  | Noted. The text has been removed.   |
| Topic 3 | 90 |    | 91 |    | In WGIII, the text about GHG metrics is very limited (I did not read WGI 8.7, however), so I wonder if it is appropriate to have a special box for this point. There is almost no text of SYR referring to this Box except the paragraph on Line 14-19, Page 81. I am not an expert on short-lived forcers, but I do believe consensus has not been reached on this point expressed in this paragraph. [Songli Zhu, China] | Taken into account. The box is not only about short-lived forcers and the box is kept. The links between the box and the main texts have been made stronger. We have revised the para on SLCF in the main text and also added a para on non-CO2 gases in general.   |
| Topic 3 | 91 | 1  | 91 | 1  | Box 3.2. In accordance with the legend, "a" and "b" should be put for the upper and lower panels, respectively. Also in the lower panel, "GWP100," "TWP20" and "GTP100" should be inserted for 3 circle graphs. [Government of Japan]  | Taken into account. We have implemented changes to make this clearer.   |
| Topic 3 | 91 | 1  | 91 | 1  | The charts presented in Figure 1 of Box 3.2 are not found in any background report; therefore it is/was impossible to assess whether these charts are ok or not. Nor even the data-sets these charts were obtained from are traceable!. [Government of Netherlands]  | Noted. The charts themselves are not copied directly from the underlying reports. But we have made it clearer in the figure text that the metrics are from taken from WGI 8.7 and the emissions are from WGIII 5.2. So the figure is based on the underlying report and represent a synthesis of results and data from WGI and WGIII. |
| Topic 3 | 91 | 1  | 91 | 11 | The figure would be more balanced if another "pie" were added showing the shares with 20-year GTPs [Government of New Zealand]   | Rejected due to space limitations   |
| Topic 3 | 91 | 1  |    |    | Upper and lower panels are not labelled A and B as referred to in the caption. [Government of Canada]  | Taken into account  |
| Topic 3 | 91 | 2  | 91 | 11 | Figure caption : The caption refers to A and B for top and bottom panels, but these letters are not on the figure, they should be added. Line 10 : CO <sub>2</sub> equivalent, one "q" should be removed<br>The references to WG should be between {} [Thomas Stocker/ WGI TSU, Switzerland]   | Taken into account. Text has been changed.  |
| Topic 3 | 91 | 3  | 91 | 3  | There are references to upper panel (A) and lower panel (B) in the figure Box 3.2 Figure 1. However. No such signs in the figure are found [Government of Russian Federation]  | Taken into account  |
| Topic 3 | 91 | 4  | 91 | 4  | Please clarify: Do these graphs show the effects of pulse emissions (i.e., all emissions in 2010 released at once and then no emissions thereafter)? [Government of Canada]  | Taken into account. Information about this is added in the text.  |
| Topic 3 | 91 | 9  | 91 | 9  | There are references to upper panel (A) and lower panel (B) in the figure Box 3.2 Figure 1. However. No such signs in the figure are found [Government of Russian Federation]  | Taken into account  |
| Topic 3 | 91 |    | 91 |    | Box 3.2, Figure 1: No panels are indicated in Figure 1 but referred to in the caption [H-Holger Rogner, Austria]   | Taken into account  |
| Topic 3 | 91 |    | 91 |    | (Box 3.2, Fig.1) Letters A and B used in the caption are not present on this figure. The contributions of PFCs, NF3 and SF6 in part (B) are impossible to see. These gases could be removed from the caption. The caption could appear just once, as the same one is used for all three pie charts. [European Union]   | Noted. New figures have been made (by sector instead of by gas) and this comment is therefore not relevant anymore  |
| Topic 3 | 91 |    |    |    | Box 3.2, Figure 1: the 3 lower diagrams should come with a title, e.g., CO <sub>2</sub> -equivalent global greenhouse gas emissions in the year 2010, and the every diagram with its own title: 100-year GWP (left), 20-year GWP (middle) or 100-year GTP (right). [Thomas Stocker/ WGI TSU, Switzerland]  | Accepted. We have added title to Panel B. Over the pies we have inserted GWP100, GWP20 and GTP100 (with time horizon in subscripts) instead of 100-year GWP etc. This saves space and is in line with what we did in WGI ch8.   |

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|         |    |   |    |    |  |  |
|---------|----|---|----|----|--|--|
| Topic 3 | 91 |   |    |    | Box 3.2, Figure 1. In our view both upper and lower panels need individual titles. For the upper panels please consider to insert "GWP values" above the right panel, and "GTP values" above the left panel. For the lower panels please consider to insert "100-year GWP" above the leftmost lower panel, "20-year GWP" above the middle lower panel, and "100-year GTP" above the leftmost lower panel. [Government of Norway]   | Taken into account. Titles in the lower figures are introduced.  |
| Topic 3 | 92 | 1 | 92 | 46 | In the text on "Geo-engineering" authors pay attention mainly to SRM cluster and practically ignore CDR cluster. So, "role, options, risks and status" of CDR are not considered in the text of the Box 3.3. It is not consistent with WGIII SPM (pages 15, 16), does not cover WGIII findings properly [Government of Russian Federation]   | Yes, partially. Need to add links in main text.  |
| Topic 3 | 92 | 1 | 92 | 46 | Possible role of both CDR and SRM methodologies would be useful to formulate explicitly and clearly on the page, for example, as follows: "A possible role of CDR and SRM methods is avoiding climatic catastrophe if all mitigation measures fail and threat of overwarming the planet is inevitable". [Government of Russian Federation]   | The IPCC is not policy prescriptive  |
| Topic 3 | 92 | 1 | 92 | 46 | Suggest to move final para of Box ahead of penultimate para [Rachel Warren, United Kingdom]  | Accepted   |
| Topic 3 | 92 | 1 | 92 | 46 | Box 3.3 is misleading in what it includes as "geo-engineering". In what sense is biomass energy with CCS (BECCS) 'geo-engineering'? Ocean fertilisation is commonly understood as geo-engineering; bio-energy is not. If the storage part of BECCS were the reason, then all CCS should be included here. Our proposal is not to include BECCS under geo-engineering [Government of South Africa]  | The title of the box has been changed to Carbon Dioxide Removal and Solar radiation Management geoenengineering technologies -- possible roles, options, risks and status. |
| Topic 3 | 92 | 1 | 92 | 46 | Box 3.3: In general, the information presented on CDR vs SRM seems unbalanced given the relative roles of CDR vs SRM in the scenarios assessed by WGIII. BECCS - a form of CDR geoenengineering - is barely mentioned here and yet it is repeatedly flagged in the SYR and WGIII report as being potentially critical technology for the achievement of low stabilization targets. We support the inclusion of information on SRM but request additional text on CDR, especially BECCS. Referring readers to section 4.3 is inadequate as there is only one sentence there that discusses BECCS specifically. Recommend expanding the discussion of BECCS and explaining what it is that makes BECCS a form of geoenengineering when the component technologies on which BECCS is based (i.e. the use of biomass as a source of energy and the use of CCS to prevent emissions of CO2 to the atmosphere) are considered as mitigation options. We presume this has to do with either or both issues of the current status of such technology and the scaling up required to influence global temperature. [Government of Canada] | The box has been revised and referred to in the main text.   |



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|         |    |   |    |    |   |  |
|---------|----|---|----|----|---|--|
| Topic 3 | 92 | 1 | 92 | 46 | Box 3.3: The reference to this Box in the text (on page 86) is not very obvious (i.e. no specific reference to geoengineering in the text) and should be made more explicit. We also suggest that the text should be shortened (recognizing that the current amount of text is disproportionate to the material on this issue in the underlying chapter) and that the information flow in the box could be improved. The following are some specific suggestions: (1) Suggest the physical science considerations (lines 14-20 and 38-46) be brought together followed by a paragraph on social science considerations. (2) Add the word "rapidly" before "offset" on line 15. This would capture the important point on line 22 allowing a more suitable header for the text on social science considerations to be crafted. (3) Delete text on lines 22-25. Much of this is too subjective. Use an abbreviated version of text on lines 26-28 as a header. (4) Integrate lines 38-46 with lines 14-20. The content of lines 38-46 is already more appropriately captured by the header on lines 14-15 (benefits and risks of SRM). [Government of Canada] | Taken into account. Text has been reorganized and reworded.                      |
| Topic 3 | 92 | 1 | 92 | 46 | the geo-engineering box is very helpful in setting out different methods and identifying potential risks. It might be helpful to explicitly state that low costs are low monetary costs which would complement the text on risks from side-effects. The box should include some stronger text about the current deployability/scalability of technology clusters and the plausibility of their forming an effective solution to climate change in the near/shorter term. This includes CCS and BECCS which are specifically cited, but not as yet demonstrated on commercial scales. [Government of United Kingdom of Great Britain & Northern Ireland]   | Taken into account.  |
| Topic 3 | 92 | 3 | 92 | 4  | This is not a sufficient definition of geoengineering. Suggest wording more consistent with the IPCC WGI definition be used, that captures the central characteristics of scale and intent. "Geoengineering refers to a broad set of methods that aim to deliberately induce large scale changes in the climate system in order to alleviate the impacts of climate change." [Government of Canada]   | The definition has been expanded slightly and reference is made to the glossary. |
| Topic 3 | 92 | 3 | 92 | 4  | Geoengineering is not defined within the main body of WGIII however within WGIII Annex 1 the definition of geoengineering includes the text "Scale and intent are of central importance." This has been left out of the SYR definition. If this sentence is going to be dropped, then I think the definition as written here should include the term 'large-scale'. CDR techniques at small-scale do not geoengineer the planet, they aim to slow increases in atmospheric CO2 concentrations (see above), and they are completely overwhelmed by positive emissions [Government of United Kingdom of Great Britain & Northern Ireland]   | The definition has been expanded slightly and reference is made to the glossary. |
| Topic 3 | 92 | 4 | 92 | 4  | It is noted that the term carbon dioxide reduction is used instead of carbon dioxide removal. This new term would be confusing as frequently the term emission reduction is used. It is strongly recommended to stick to the already established terminology and avoid confusing the reader and follow the terminology of the underlying reports of WG II and III. The term used should be Carbon Dioxide Removal but not carbon dioxide reduction. [Government of Austria]   | The text has been revised.   |
| Topic 3 | 92 | 4 | 92 | 4  | Please, replace 'Carbon Dioxide Reduction (CDR)' with 'Carbon Dioxide Removal (CDR)'. WG I (page 29 of WGI SPM) and WG III (page 15 of WGIII SPM) use 'removal' only. It would be also useful to add 'from the atmosphere' after 'Carbon Dioxide Removal (CDR)'. [Government of Russian Federation]   | The text has been revised.   |

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|         |    |    |    |    |  |  |
|---------|----|----|----|----|--|--|
| Topic 3 | 92 | 4  | 92 | 4  | WGIII SPM defines CDR as Carbon Dioxide Removal (not Reduction) [Government of Denmark]  | The text has been revised.   |
| Topic 3 | 92 | 4  | 92 | 4  | The definition is be "Carbon Dioxide Removal", not "Reduction". [Government of Germany]  | Yes  |
| Topic 3 | 92 | 4  | 92 | 5  | Useful definition of Carbon Dioxide Reduction (CDR) - "aims to slow or reverse increases in atmospheric CO2 concentrations." as it specifically details that these technologies aim to both slow or reverse. It's important that the term 'slow' is retained. [Government of United Kingdom of Great Britain & Northern Ireland]   | This has been taken into account.  |
| Topic 3 | 92 | 4  | 92 | 7  | "technologies" does not seem to be the appropriate definition here. Please reformulate, e.g.: "There are two clusters of technological concepts" OR "There are two clusters of envisioned technologies". [Government of Germany]   | Revised to "two clusters of technologies"  |
| Topic 3 | 92 | 5  | 92 | 5  | "slow or reverse increases in atmospheric CO2 concentrations." should be replaced by "remove CO2 from the atmosphere and store the carbon in land, ocean or geological reservoirs.". Check WGIII, page 706/2092, lines 3-4. [Government of Netherlands]  | The text has been revised, and the CDR part is expanded.                                   |
| Topic 3 | 92 | 6  | 92 | 6  | "counter the warming" should be replaced by "lower the temperature of the Earth". That is the 'actual' definition. "Counter the warming" does not mean "lower the temperature". Check WGIII, page 708/2092, lines 23-24. [Government of Netherlands]   | The suggestion has been rejected; counter is considered better as the Earth will not cool. |
| Topic 3 | 92 | 7  | 92 | 7  | "WG II Box 20-4" in "{WG I 6.5, 6 7.7, WG II Box 20-4, WGIII 6.9}" makes reference to an untraceable Box. Are you/they sure that is the right reference?; or perhaps they/you are trying to cite WG I, FAQ 7.3, page 648/1552; or Box TS.7, page 114/1552.? [Government of Netherlands]  | Taken into account. We have checked reference to box and it is OK.                         |
| Topic 3 | 92 | 9  | 92 | 11 | Please add information on uncertainty, following this sentence - e.g.: ". Also, a/the degree of uncertainty attached to CDR is to be taken into account." [Government of Germany]  | The text has been revised, and the CDR part is expanded.                                   |
| Topic 3 | 92 | 9  | 92 | 12 | The discussion of CDR and CCS is too short and implies only minimal research has been done, but this is not so. The text here should include results from this research rather than just stating this research has occurred. [Government of United States of America]  | The text has been revised, and the CDR part is expanded.                                   |
| Topic 3 | 92 | 9  | 92 | 12 | Please keep mentioning risks of CDR technologies. That is important. [Government of Germany]   | Thank you. The CDR part has been expanded.   |
| Topic 3 | 92 | 9  | 92 | 12 | We recommend to give additional information about the availability of these methods, as it was done on P 76 L 15-17: "The availability and scale of BECCS, afforestation, and other Carbon Dioxide Removal (CDR) technologies and methods are uncertain and CDR technologies and methods are, to varying degrees, associated with challenges and risks." [Government of Germany]   | We have added additional information.  |
| Topic 3 | 92 | 10 | 92 | 10 | It is suggested to delete "there has been". [Government of Austria]  | The text has been deleted.   |
| Topic 3 | 92 | 11 | 92 | 12 | It should be "...are discussed" instead of "...is discussed". [Government of Russian Federation]   | Taken into account, Text changed   |
| Topic 3 | 92 | 12 | 92 | 12 | In "4.3", if this means that the reader should look for a reference in the "Section 4.3" in SYR FOD, there is in fact something wrong. Section 4.3 does not present any clear reference to the suggested geoengineering methods mentioned in the sentence. It is better to cite/refer WG III 6.4 or WG I 6.5 and WG I 7.7, or even WG III 6.9. Please check WGII, section 6.4.2.2, page 550/2590; and WG I, sections 6.5 and 7.7, pages 562/1552 and 643/1552 respectively; and WGIII, section 6.9, page 705/2092. [Government of Netherlands] | Taken into account, and the cross-references have been corrected                           |

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|         |    |    |    |    |   |  |
|---------|----|----|----|----|---|--|
| Topic 3 | 92 | 14 | 92 | 15 | This sentence should be preceded by a statement on uncertainty (consistent to comment no. 3). "There is a vast degree of uncertainty attached to Solar Radiation Management (SRM)." [Government of Germany]   | Rejected. We think this formulation is too strong.   |
| Topic 3 | 92 | 15 | 92 | 16 | (Box 3.3) Totally or partially offset - or both? [European Union]   | Accepted. We write "to some degree"  |
| Topic 3 | 92 | 22 | 92 | 22 | This sentence is inconsistent with the previous statement on the limited understanding of SRM (lines 14 to 20). Please reformulate, e.g.: "SRM has attracted attention given its potential effectiveness of rapid cooling effects in case of climate emergency." [Government of Germany]  | Accepted. Text is reworded.  |
| Topic 3 | 92 | 23 | 92 | 25 | (Box 3.3) The end of sentence 'and may have negative spillovers for other jurisdictions' may be more clearly defined as 'but may have negative consequences for other nations'. [European Union]  | Taken into account. Text has been changed.   |
| Topic 3 | 92 | 24 |    |    | Change "deploy unilaterally" to "unilaterally deploy" [Government of New Zealand]   | Taken into account. Text changed.  |
| Topic 3 | 92 | 25 | 92 | 28 | (Box 3.3) Not clear what 'norms' refers to in this context. [European Union]  | Taken into account. 'Norms' is deleted since it was unclear.                               |
| Topic 3 | 92 | 29 |    |    | Please use gender-neutral language: man-made -> human-made. [Government of Germany]   | Accepted   |
| Topic 3 | 92 | 31 | 92 | 32 | (Box 3.3) Does this refer to field experiments of SRM as opposed to modelling studies? [European Union]   | Noted. Both, but we think text is OK as it is.   |
| Topic 3 | 92 | 33 | 92 | 33 | (and also 45-46) - perhaps it would be useful to spell out the "termination" problem arises from the longevity of the CO2 perturbation - this point is left implicit here. [Keith Shine, United Kingdom]  | Taken into account. Sentiment, not suggestion, taken into account                          |
| Topic 3 | 92 | 38 | 92 | 38 | Using the word "identified" seems to be incorrect. It is impossible to identify shortcomings and side-effects if "SRM is currently untested..." (see line 15). It would be more logical to replace '... have been identified' with 'are theoretically possible'. [Government of Russian Federation]   | Rejected. The text is taken from WG1 assessment  |
| Topic 3 | 92 | 38 | 92 | 39 | Further to a general comment from Canada on this box, we are concerned that there seems to be a conflict in tone between this text, which is rather assertive in saying that side-effects, risks and shortcomings have been identified, and the text at line 14-15, which describes the state of knowledge as highly preliminary. Suggest this text be revised, either by integrating it with the text in lines 14-15 or revising it to remind readers that the science basis is still preliminary (and thus implicitly point out that our understanding of side-effects, etc., will evolve and change). [Government of Canada] | Taken into account. Text has been reworded   |
| Topic 3 | 92 | 38 | 92 | 46 | (Box 3.3) Several model studies indicate that regional precipitation increases/decreases could occur as a result of SRM. Text could be changed to "SRM would itself change global precipitation and could change regional precipitation patterns". [European Union]   | Taken into account. Text is reworded   |
| Topic 3 | 92 | 38 | 92 | 46 | Mention that sulphur-based stratospheric aerosols used for SRM would not pose a surface acidification threat (WGI 7.7.2). [European Union]  | Rejected. We think this is too detailed. And we will not discuss things that won't happen. |

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|         |    |    |    |    |   |                                      |
|---------|----|----|----|----|---|--------------------------------------|
| Topic 3 | 92 | 39 | 92 | 40 | The sentence "Several lines of evidence indicate that SRM would itself decrease global precipitation." is vague, highly inaccurate and too drastic. It is rather advisable to re-write it as "SRM would also cause small and uneven decreases in global precipitation.", or simply to leave it out (delete it). Figures 7.22 and 7.23, in WG I, spatially describe the variation of global precipitation. The decreases in global precipitation would mainly occur in latitudes between 4°C and 20°C approximately, north and south, if SRM is implemented in a time-window of 50 years. Still, these decreases would be mainly expected in oceans areas (not in mainlands where practically all world population is distributed). Besides all this, Figure 7.24 in WG I indicates a decrease around 0.03 mm/day (on average); or in 'percentual' terms just around 1% less (WG I FAQ 7.3 – Figure 2) when compared to an scenario of no-SRM implementation. In practical terms 0.03 mm/day is a negligible amount of precipitation (if the graphs are understood as presented in WG I). Check WG I, Section 7.7.3, Figures 7.22, 7.23, 7.24, and Figure 2 (FAQ 7.3), pages 645-650/1552. [Government of Netherlands] | Taken into account. Text is changed. |
| Topic 3 | 92 | 39 | 92 | 40 | SYR - "Several lines of evidence indicate that SRM would itself decrease global precipitation." However WGIII 6.91 adds that "model simulations suggest that SRM would result in substantially altered global hydrological conditions, with uncertain consequences for specific regional responses such as precipitation and evaporation in monsoon regions." It then details further problems, and although a reference to chapter WGIII 6.9 is included the spatial changes to precipitation are worthy of actual text on the matter. [Government of United Kingdom of Great Britain & Northern Ireland]  | Taken into account. Text is changed. |
| Topic 3 | 92 | 40 | 92 | 40 | "to deplete ozone" should be replaced by "to increase ozone losses". Check WG I, section 7.7.2.1, 3rd paragraph, page 643/1552. [Government of Netherlands]   | Text has been revised.               |
| Topic 3 | 92 | 41 | 92 | 42 | "SRM would not prevent the negative effects of CO2 on ecosystems and ocean acidification." is not a good rephrasing of the underlying report. Check WG I, section 7.7.2.1, 3rd paragraph, pages 643-644/1552. [Government of Netherlands]   | Taken into account. Rephrased        |
| Topic 3 | 92 | 42 | 92 | 42 | An example of other consequences that could be mentioned here is that SRM doesn't only counter RF from GHGs, it also reduces incoming solar radiation. Temperatures might drop, but at the cost of less photosynthesis for instance. [Government of Netherlands]  | Taken into account.                  |
| Topic 3 | 92 |    | 92 |    | (Box 3.3) This box is mostly about SRM. It would be better if it synthesised more information about all aspects of geo-engineering. [European Union]  | Accepted. Agreed, CDR added          |
| Topic 3 | 92 |    |    |    | Box 3.3: This box is rather unbalanced as it focuses on SRM and it does not fit into subchapter 3.5 that has the title: Interactions among mitigation, adaptation, and sustainable development. It is suggested not to address geo-engineering in any detail in the SYR. This topic needs a broader assessment in a broader context and probably deserves a special report. It is suggested to keep only the first paragraph including the references to the underlying chapters. [Government of Austria]   | Accepted. Agreed, CDR added          |
| Topic 3 | 92 |    |    |    | The box contains a lot of information on SRM and very little on CDR. However, IAM merely mention this latter technology. Therefore, the information on CDR, in particular BECCS should be enhanced. [Government of Germany]   | Accepted. Agreed, CDR added          |